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APR 26, 2021 02:36 PM

IN THE SUPERIOR COURT OF WHITFIELD COUNTY

STATE OF GEORGIA

*Babs Bailey*  
Babs Bailey, Clerk  
Whitfield County, Georgia

ANNETTE SMITH and MICHAEL  
SMITH, individually and as  
representatives of the estate of  
MICHAELA E. SMITH, deceased

*Plaintiffs*

— *versus* —

MICHAEL J. COONEY, MD,  
VIRTUAL RADIOLOGIC  
CORPORATION,  
KEVIN F. JOHNSON, MD,  
NORTH GEORGIA  
RADIOLOGY, PA,  
DAVID F. HAWKINS, MD,  
EMERGENCY COVERAGE  
CORPORATION,  
JEFFREY T. GLASS, MD,  
HAMILTON MEDICAL  
CENTER, INC.,  
HAMILTON HEALTH CARE  
SYSTEM, INC., and  
JOHN/JANE DOES 1-10,

*Defendants*

CIVIL ACTION

FILE NO. \_\_\_\_\_

JURY TRIAL DEMAND

# PLAINTIFFS' COMPLAINT FOR DAMAGES

## Nature of This Action

1. This medical-malpractice action arises out of medical services negligently provided to 26-year-old Michaela Elizabeth Smith at Hamilton Medical Center (“Hamilton”), on June 28 and 29, 2019, leading to her wrongful death.
2. This action is brought by Michaela’s parents, Annette and Michael Smith, individually and on behalf of Michaela’s estate.



3. Plaintiffs assert a wrongful-death claim pursuant to OCGA Title 51, Chapter 4, on behalf of all wrongful-death beneficiaries.
4. As representatives of Michaela’s estate, Plaintiffs assert a claim for harm Michaela suffered as a result of the alleged negligence.
5. Pursuant to OCGA § 9-11-9.1, the affidavits of Radiologist Anthony Mancuso, ER Doctor Brian Stettler, Neurologist Alexander Merkler, Neurosurgeon Elad Levy, and Nurse Lynne Cesarini are attached as Exhibits 1-5, respectively. This Complaint incorporates the opinions and allegations those affidavits contain.
6. As used here, the phrase “standard of care” means the degree of care and skill ordinarily employed by the medical profession generally under similar conditions and like circumstances as pertained to Defendants’ actions here.
7. This Complaint relies largely on uncontroversial medical principles and facts.

8. This is a straightforward case: Although two radiology studies and her clinical presentation indicated that Michaela was having a catastrophic stroke, Defendants repeatedly misread the studies as normal, failed to diagnose the stroke, failed to treat her deficits as a neurological emergency, and failed to treat the stroke with a thrombectomy or otherwise, causing her death at 26.

### **Parties, Jurisdiction, and Venue<sup>1</sup>**

9. Plaintiffs Annette Smith and Michael Smith are both citizens of Georgia.
10. **Defendant Michael Joseph Cooney, MD**, is a citizen of California. He may be served with process at his residence, 116 N. Dianthus Street, Manhattan Beach, CA 90266. Dr. Cooney has been properly served with this Complaint.
11. Dr. Cooney is subject to the personal jurisdiction of this Court.
12. Pursuant to OCGA § 9-10-93, Dr. Cooney is subject to venue in this Court because the cause of action originated in Whitfield County and because one of his co-defendants is a Georgia resident subject to venue here.
13. At all times relevant to this Complaint, Dr. Cooney acted as an employee or other agent of Defendant Virtual Radiologic Corporation.

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<sup>1</sup> OCGA §§ 14-2-510 and 14-3-510 provide identical venue provisions for regular business corporations and for nonprofit corporations:

“Each domestic corporation and each foreign corporation authorized to transact business in this state shall be deemed to reside and to be subject to venue as follows: (1) In civil proceedings generally, in the county of this state where the corporation maintains its registered office.... (3) In actions for damages because of torts, wrong, or injury done, in the county where the cause of action originated, if the corporation has an office and transacts business in that county; (4) In actions for damages because of torts, wrong, or injury done, in the county where the cause of action originated.”

These same venue provisions apply to Professional Corporations, because PCs are organized under the general “Business Corporation” provisions of the Georgia Code. *See* OCGA § 14-7-3. These venue provisions also apply to Limited Liability Companies, *see* OCGA § 14-11-1108, and to foreign limited liability partnerships, *see* OCGA § 14-8-46.

OCGA § 9-10-31 provides that, “joint tort-feasors, obligors, or promisors, or joint contractors or copartners, residing in different counties, may be subject to an action as such in the same action in any county in which one or more of the defendants reside.”

14. **Defendant Virtual Radiologic Corporation (“vRAD”)** is a Delaware Corporation. Registered Agent: Cogency Global Inc. Physical Address: 900 Old Roswell Lakes Parkway, Suite 310, Roswell, GA, 30076 (Fulton County). vRAD has been properly served with this Complaint.
15. vRAD is subject to the personal jurisdiction of this Court.
16. vRAD is subject to venue in this Court because the cause of action originated in Whitfield County, and because one of vRad’s co-defendants is subject to venue here.
17. At all relevant times, vRAD was the employer or other principal of Dr. Cooney’s.
18. If another entity was Dr. Cooney’s employer or principal during those times, that entity is hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.
19. **Defendant Kevin Fountain Johnson, MD,** is a citizen of Georgia. He may be served with process at his residence, 1075 Buckingham Way, Rocky Face, GA 30740-9101 (Whitfield County). Dr. Johnson has been properly served with this Complaint.
20. Dr. Johnson is subject to the personal jurisdiction of this Court.
21. Dr. Johnson is subject to venue in this Court because he is a resident of Whitfield County, and because one of his co-defendant is subject to venue here.
22. At all times relevant to this Complaint, Dr. Johnson acted as an employee or other agent of Defendant North Georgia Radiology, P.A.
23. **Defendant North Georgia Radiology, P.A., (“NGR”)** is a Georgia Professional Corporation. Registered Agent: Brian Cate. Physical Address: 1407 North Thornton Avenue, Dalton, GA, 30720 (Whitfield County). NGR has been properly served with this Complaint.
24. NGR is subject to the personal jurisdiction of this Court.
25. NGR is subject to venue in this Court because NGR maintains its registered office in Whitfield County; because the cause of action originated in, and NGR



has an office and transacts business in, Whitfield County; and because one of NGR's co-defendants is subject to venue here.

26. At all relevant times, NGR was the employer or other principal of Dr. Johnson's.
27. If another entity was Dr. Johnson's employer or principal during those times, that entity is hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.
28. **Defendant David Franklin Hawkins, MD**, is a citizen of Georgia. He may be served with process at his residence, 421 Blue Jay Pkwy, Ringgold, GA 30736-4918 (Catoosa County). Dr. Hawkins has been properly served with this Complaint.
29. Dr. Hawkins is subject to the personal jurisdiction of this Court.
30. Dr. Hawkins is subject to venue in this Court because one of his co-defendants is subject to venue here.
31. At all times relevant to this Complaint, Dr. Hawkins acted as an employee or other agent of Defendant Emergency Coverage Corporation.
32. **Defendant Emergency Coverage Corporation ("ECC")** is a Tennessee corporation with a principal place of business in Tennessee. ECC is registered in Georgia. Registered Agent: The Prentice-Hall Corporation System. Physical Address: 40 Technology Parkway South, #300, Norcross, GA 30092. ECC has been properly served with this Complaint.
33. ECC is subject to the personal jurisdiction of this Court.
34. ECC is subject to venue in this Court because the cause of action originated in Whitfield County and because one of ECC's co-defendants is subject to venue here.
35. At all relevant times, ECC was the employer or other principal of Dr. Hawkins's.
36. If another entity was Dr. Hawkins's employer or principal during those times, that entity is hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.

37. On or about December 14, 2020, in response to a letter from Plaintiffs' counsel, counsel for Dr. Hawkins and ECC represented to Plaintiffs' counsel that ECC was Dr. Hawkins's employer at all times relevant to this action.
38. If another entity was Dr. Hawkins's employer or principal during those times, that entity is hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.
39. **Defendant Jeffrey Thurman Glass, MD**, is a citizen of Tennessee. He may be served with process at his residence, 200 Manufacturers Road, Apt. 308, Chattanooga, TN 37405-5001. Dr. Glass has been properly served with this Complaint.
40. Dr. Glass is subject to the personal jurisdiction of this Court.
41. Pursuant to OCGA § 9-10-93, Dr. Glass is subject to venue in this Court because the cause of action arose in Whitfield County and because of one his co-defendants is a Georgia resident subject to venue here.
42. At all times relevant to this Complaint, Dr. Glass acted as an employee or other agent of Defendant Hamilton Medical Center, Inc., and/or Defendant Hamilton Health Care System, Inc. (both, "the Hamilton Defendants").
43. **Defendant Hamilton Medical Center, Inc. ("Hamilton")** is a Georgia nonprofit Corporation. Registered Agent: Savannah B. Moore. Physical Address: 1200 Memorial Drive, Dalton, GA 30720 (Whitfield County). Hamilton has been properly served with this Complaint.
44. Hamilton is subject to the personal jurisdiction of this Court.
45. Hamilton is subject to venue in this Court because Hamilton maintains its registered office in Whitfield County; because the cause of action originated in, and Hamilton has an office and transacts business in, Whitfield County; and because one of Hamilton's co-defendants is subject to venue here.
46. At all relevant times, Hamilton was the employer or other principal of Dr. Glass, as well as Nurses Megan Martin, Victoria Brock, and Gabe Herman.
47. If another entity was the employer or principal of Jeffrey T. Glass, Meagan Martin, Victoria Brock, or Gabe Herman during those times, that entity is

hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.

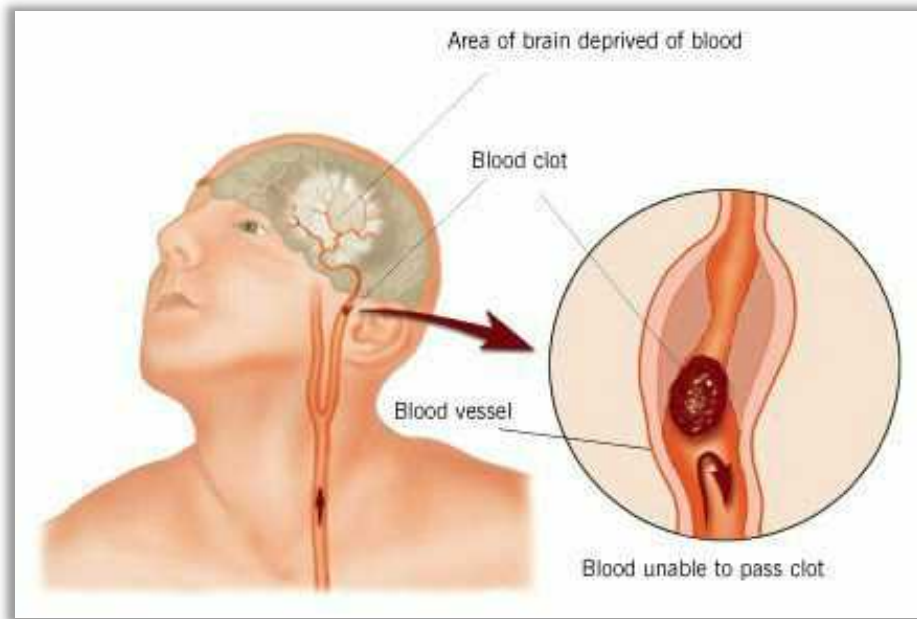
48. **Defendant Hamilton Health Care System, Inc. (“Hamilton Health”)** is a Georgia nonprofit Corporation. Registered Agent: Savannah B. Moore. Physical Address: P.O. Box 1900, 1200 Memorial Drive, Dalton, GA 30720 (Whitfield County). Hamilton Health has been properly served with this Complaint.
49. Hamilton Health is subject to the personal jurisdiction of this Court.
50. Hamilton Health is subject to venue in this Court because it maintains its registered office in Whitfield County; because the cause of action originated in, and Hamilton Health has an office and transacts business in, Whitfield County; and because one of Hamilton Health’s co-defendants is subject to venue here.
51. At all relevant times, Hamilton Health was the employer or other principal of Dr. Glass, as well as Nurses Megan Martin, Victoria Brock, and Gabe Herman.
52. If another entity was the employer or principal of Dr. Glass, Nurse Martin, Nurse Brock, or Nurse Herman during those times, that entity is hereby on notice that, but for a mistake concerning the identity of the proper party, this action would have been brought against that entity.
53. Herein, “Hamilton Defendants” refers to both Hamilton and Hamilton Health.
54. **Defendants John/Jane Does 1-10** are those yet-unidentified natural persons and/or entities who may be liable, in whole or in part, for the damages alleged herein. Once served with process, John/Jane Does 1-10 are subject to the jurisdiction and venue of this Court.
55. No Defendant has a defense to this action based on undue delay, whether based on the statute of limitations, the statute of repose, laches, or any similar theory.
56. This Court has subject-matter jurisdiction over this case.

## **General Medical Principles**

### *Acute Ischemic Stroke*

57. Stroke is the sudden death of brain cells due to a lack of oxygen.

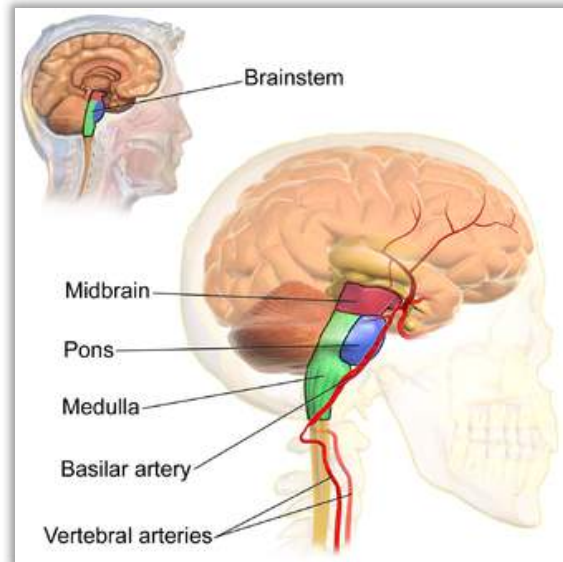
58. A stroke may result in brain-damage, long-term disability, and death.
59. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.
60. When a stroke is caused by blocked blood-flow, it is called an ischemic stroke.
61. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.
62. If something blocks blood-flow to the brain, brain cells start to die because they cannot get oxygen. That is an acute ischemic stroke.



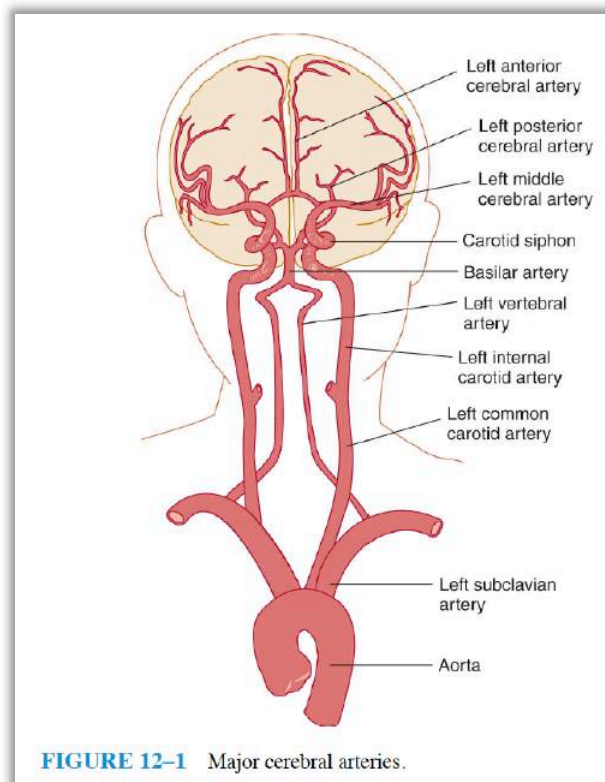
63. A thrombus is a blood clot that forms within a blood vessel, reducing blood-flow.
64. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.

### *Basilar Artery Occlusion - BAO*

65. The basilar artery lies at the front of the brainstem in the midline.



66. The basilar artery is formed by the union of the two vertebral arteries.



67. Basilar Artery Occlusion (“BAO”) is the name for an acute ischemic stroke originating in the basilar artery.

68. A BAO is a type of posterior-circulation stroke.
69. A BAO occurs when a blood clot in the basilar artery impedes blood-flow, resulting in ischemia in the posterior part of the brain.







70. If not treated quickly, a BAO can lead to brain damage, organ malfunction, catastrophic disability, and death.
71. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

### *BAO Signs and Symptoms*

72. Because the cerebral vessels tend to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion (occlusion).
73. Likewise, the signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
74. The hallmarks of a BAO include:
  - decreased or altered consciousness
  - quadriparesis (loss of voluntary movement in all four limbs)

- various combinations of limb ataxia (impaired balance or coordination)
- oculomotor (eye-movement) abnormalities
- pupillary abnormalities (pupils react abnormally to light)
- dysarthria (inability to articulate speech)

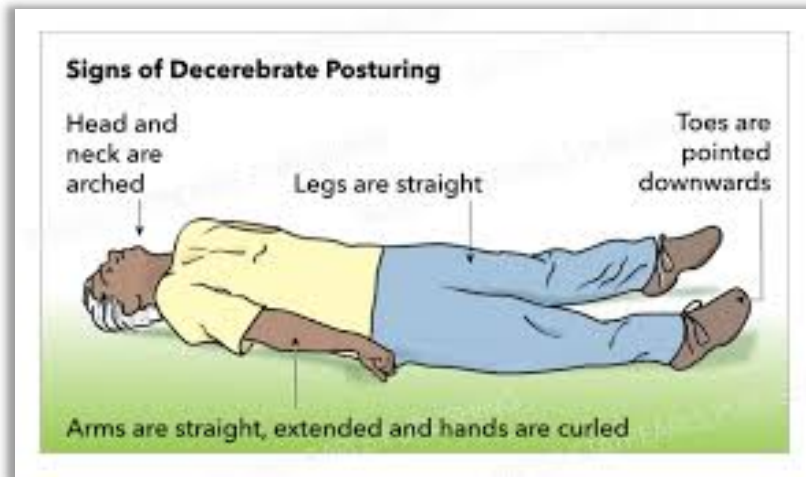
Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

75. Other signs and symptoms of BAO include:

- Hyperreflexia (overactive or overresponsive reflexes)
- Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking
- Dysphonia (loss of the ability to speak)
- Abnormalities of alertness and behavior, including hallucinations.
- Dizziness, vomiting.

76. The signs and symptoms of BAO can present in various combinations.

77. Decerebrate posturing is a sign of BAO. Also known as “extensor posturing,” decerebrate posturing involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.



78. In rare BAO cases, patients suffer locked-in syndrome. Patients with this syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware of their “locked-in” condition.

### *Stroke triage*

79. When a patient arrives at a hospital’s emergency department (“ED” or “ER”) with serious neurological deficits concerning for stroke, the triage nurse must: (a) notify the attending physician immediately; (b) provide emergent care to the patient; and (c) call a code stroke or initiate a stroke protocol insofar as the nurse has the authority to do so under the hospital’s policies.
80. Triage refers to the process of sorting and prioritizing patients for care.
81. The triage nurse performs a brief, focused assessment and assigns the patient a triage acuity level, which is a proxy measure of how long an individual patient can safely wait for a medical-screening examination and treatment.
82. An ER nurse must assign, document, and report an accurate acuity level (also known as “triage score”) for a patient.
83. The Emergency Severity Index (ESI) stratifies patients into five acuity groups, from level 1 (most urgent) to level 5 (least urgent).
84. Level 1 (resuscitation) requires immediate, life-saving intervention. Level 1 includes patients with cardiopulmonary arrest, major trauma, severe respiratory distress, and seizures.



85. Level 2 (emergent) requires an immediate nursing assessment and rapid treatment. Level 2 includes patients who are in a high-risk situation, are confused, lethargic, or disoriented, or have severe pain or distress, including patients with stroke, head injuries, asthma, and sexual-assault injuries.
86. Level 3 (urgent) includes patients who need quick attention but can wait as long as 30 minutes for assessment and treatment. Level 3 includes patients with signs of infection, mild respiratory distress, or moderate pain—conditions that are a far cry from stroke.
87. A patient who arrives at the ED with neurological deficits concerning for an acute stroke must generally be assigned an acuity level of 2.
88. The accuracy of the acuity level is critical because it determines the care the patient subsequently receives and the urgency with which it is provided.

### *Neurological assessments*

89. When a patient presents to the ER with significant neurological deficits concerning for stroke, an ER nurse must promptly perform, document, and report a full neurological assessment of the patient.
90. A full neurological assessment is important because it determines the care the patient receives downstream and the urgency with which it is provided.
91. A full neurological assessment covers, at minimum, the patient's mental status, motor function, sensory function, and pupillary response.
92. The obligation to perform a comprehensive neurological assessment applies with special force at a designated stroke center.
93. When a patient manifests neurological deficits concerning for stroke, an ER nurse caring for the patient must perform, document, and report neurological assessments of the patient on an hourly basis, if not more frequently.
94. These obligations apply with special force if the patient deteriorates.

### *Stroke diagnosis: history and presentation*

95. The most characteristic historical aspect of stroke is its abrupt onset.

96. After onset, symptoms most often stay the same or improve over the few hours that follow. Symptoms may also worsen in a smooth or stuttering course.
97. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
98. A second characteristic historical aspect of stroke is that symptoms usually fit the distribution of a single vascular territory: the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
99. Symptoms thus provide an important clue as to the likely location of the stroke.

*Stroke diagnosis: Glasgow Coma Scale*

100. A patient's mental status includes the patient's level of consciousness.
101. The Glasgow Coma Scale (GCS) is an objective and reliable way of recording and tracking a patient's level of consciousness.
102. The GCS tests three categories of function: eye-opening response, verbal response, and motor response.

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
<b>Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points</b>		

103. A GCS score ranges from 3 (totally unresponsive) to 15 (normal). A score of 9-12 means that the patient has suffered moderate brain injury. A score of 3-8 means that the patient is comatose and has suffered severe brain injury.
104. The GCS is not a substitute for a full neurological assessment.
105. In the GCS, motor response (including any decerebrate posturing) is the most powerful predictor of the patient's outcome.

*Stroke diagnosis: MEND exam*

106. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.
107. The MEND exam was developed to facilitate communication among healthcare providers throughout the continuum of care.
108. The MEND exam consists of (a) the three elements of the Cincinnati Prehospital Stroke Scale (CPSS), plus (b) six elements from the National Institute of Health Stroke Scale that account for posterior-circulation strokes.

**MEND EXAMINATION - PREHOSPITAL**  
Green Boxes Contain Basic Exam (CPSS)

**MENTAL STATUS**

- Level of Consciousness (AVPU)
- Speech: "You can't teach an old dog new tricks"
- Questions (age, month)
- Commands (close, open eyes)

**CRANIAL NERVES**

- Facial Droop (show teeth or smile)
- Visual Fields (four quadrants)
- Horizontal Gaze (side to side)

**LIMBS**

- Motor – Arm Drift (close eyes-hold out arms)  
Leg Drift (open eyes-lift each leg separately)
- Sensory – Arm, Leg (close eyes & touch, pinch)
- Coordination – Arm, Leg (finger-nose, heel-shin)

109. The MEND exam is an ideal screening tool in emergency situations because it can be performed in less than two minutes, without any instruments.

*Stroke diagnosis: NIHSS score*

110. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
111. The NIHSS is considered the only valid tool to assess stroke-deficit severity.
112. The NIHSS is the gold standard in clinical trials and clinical practice in the U.S.
113. The NIHSS looks at 11 elements that evaluate specific abilities in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
	CATEGORY	SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

114. A patient’s score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
115. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.

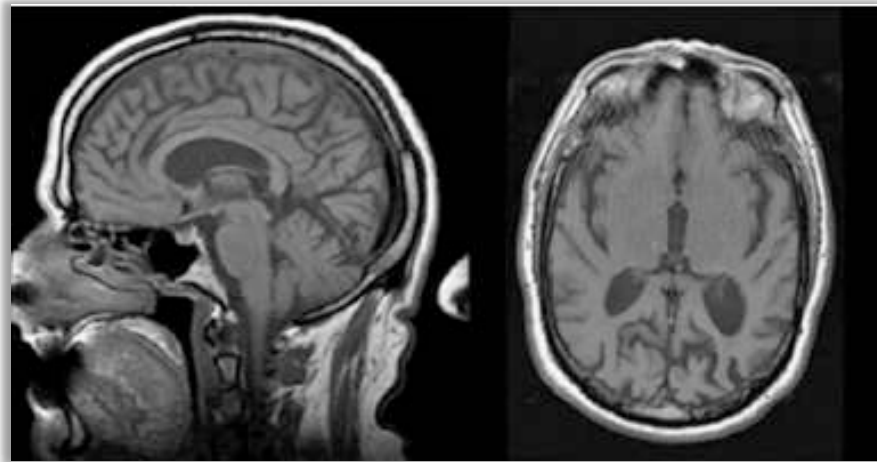
116. The NIHSS score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
117. In fact, the initial severity of a stroke according the NIHSS is the most important predictor of outcome.

*Stroke diagnosis: CT scan and MRI*

118. A CT scan and an MRI are noninvasive diagnostic tests.
119. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.
120. A non-contrast head CT scan is the standard procedure for the initial evaluation of stroke.
121. In the emergent initial evaluation of an acute-stroke patient in the ED, a non-contrast head CT scan is the imaging test used in most hospitals worldwide.
122. A CT scan takes less than 1 minute to complete.



123. A CT scan can quickly differentiate between an ischemic stroke and intracranial hemorrhaging and other mass lesions—information crucial to the subsequent therapeutic decisions that will be rapidly made.
124. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. Unlike a CT or CTA, an MRI requires the patient to hold still for several minutes
125. A brain MRI can visualize ischemic infarcts earlier than a CT scan, and can identify acute posterior-circulation strokes more accurately than a CT scan.
126. An MRI's diffusion-weighted imaging (“DWI sequence”) can show any restricted diffusion consistent with infarct.



127. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
128. An MRI's DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury

*Stroke diagnosis: vascular imaging*

129. A CTA and an MRA are vascular-imaging tests.
130. Vascular imaging specifically focuses on the blood vessels.
131. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.



132. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
133. Vascular imaging specifically helps doctors find blood clots.
134. Vascular imaging helps doctors diagnose and treat ischemic strokes, including BAO.
135. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
136. A CTA takes minutes to complete—a few minutes to inject a contrast dye and less than a minute to run the scan.
137. A CTA quickly provides a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.
138. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
139. An MRA provides the same information as a CTA. Unlike a CT or CTA, an MRA requires the patient to hold still for several minutes.
140. A doctor must promptly order vascular imaging when there is reason to suspect an occlusion in a major artery supplying the brain, like the basilar artery.
141. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.



### *Radiology reports*

- 142. Radiologists interpret imaging studies (including a CT, CTA, MRI, MRA) and communicate findings and conclusions on written radiology reports.
- 143. A radiologist must interpret imaging studies reasonably and accurately. A radiologist must also provide prompt and accurate radiology reports.
- 144. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.
- 145. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call critical values—that is, immediately call the attending physician to inform him or her of the study’s findings.

### *Stroke treatment: medical emergency*

- 146. During a stroke, every minute counts. Time lost is brain lost.
- 147. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
- 148. When a patient presents with significant neurological deficits concerning for stroke, a physician must act quickly to confirm or rule out stroke.
- 149. The National Institute of Neurological Disorders recommends time-frames for completing standard procedures for evaluating potential ischemic-stroke patients. ER physicians and neurologists must generally meet these targets.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

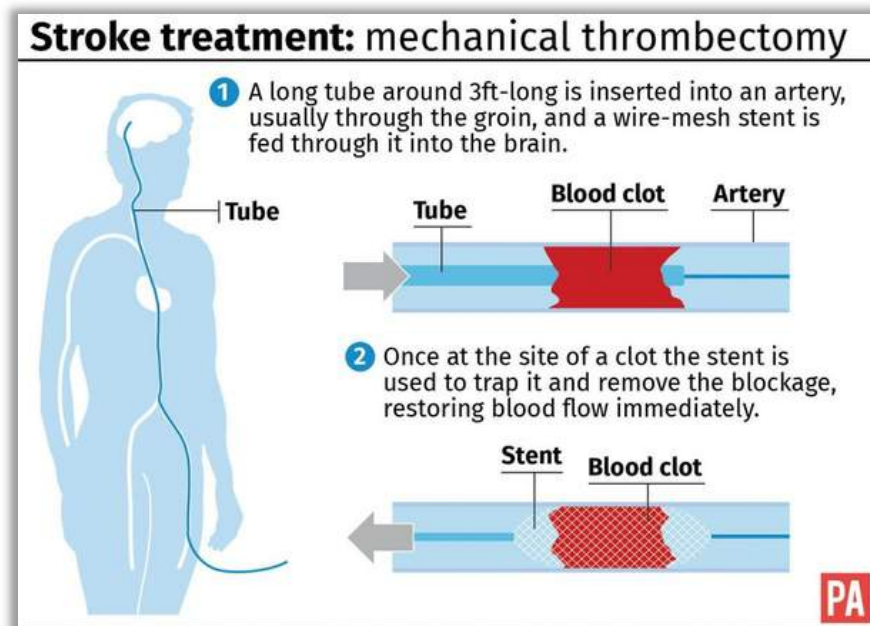
\*By phone or in person.



- 150. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
- 151. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke. If the stroke is an ischemic stroke, providers must act quickly to clear the blood clot causing the stroke. In some cases, providers must act quickly to order and perform a thrombectomy to remove the blood clot.
- 152. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.

*Stroke treatment: thrombectomy*

- 153. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
- 154. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery (which is located in the groin).
- 155. The catheter is guided through the blood system towards the blood clot.
- 156. Once the catheter reaches the blood clot, the neurosurgeon attempts to suction, dissolve, or retrieve the clot.



- 157. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in the probability of good outcome, on average. Every 20 minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
- 158. The practitioner initially evaluating the patient is responsible for facilitating the patient's transfer to a thrombectomy suite.

### Treatment of Michaela Smith

#### *Prologue: Michaela Gets Kicked on the Head*

- 159. About June 21, 2019, during training for her job as a detention officer, Michaela was kicked on the right side of her head. HMC 30, HMC 71.
- 160. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own. HMC 30, HMC 71.

Holsonback, Shawn D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

#### June 28-29, 2019 – Michaela's First Visit to Hamilton

##### *Onset of Symptoms*

- 161. On June 28, 2019, Michaela again received job-training, which involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

162. After training, Michaela drove herself home and “felt well for a couple [of] hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETELY OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

163. Between 20:30 and 21:30, Michaela developed headache, shortness of breath, swelling throat, slurred speech, facial and hand numbness, near syncope, vomiting, dizziness, face pain, and difficulty talking. HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

H&P

Initial Provider Contact 6/28/2019 2338

HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

164. Michaela had no prior history of a similar problem. HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.  
no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton ED*

165. By 21:43, Michaela arrived at the Hamilton ED with her parents. HMC 65, HMC 72.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>		Disposition: <u>Home</u>	
Dispo Summary Printed: <u>6/29/2019 0215</u>		Condition at Dispo: <u>Stable</u>	
RN Triage: <u>Kayla R. R.N.</u>		Rm (last): _____	
RN Eval: <u>Stacey S. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
PMD: <u>Duckett, Jennifer P.A.</u>		MLP: _____	
Chief Cmplnt: <u>Poss Allergic Reaction</u>		PMD Ph: <u>(706) 278-0138</u>	

HMC 65.

166. Upon admitting Michaela, the ED identified the reasons for her visit as headache, shortness of breath, and nausea with vomiting. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT
<b>Reason For Visit Diagnosis</b>			
<b>Code</b>	<b>Description</b>		
R51	Headache		
R06.02	Shortness of breath		
R11.2	Nausea with vomiting, unspecified		

HMC 79.

167. Between 22:53 and 22:59, Nurse Kayla Rewis triaged Michaela. HMC 67-68.

168. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

169. Michaela’s complaints included “soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rewis, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259
<b>NURSING TRIAGE (Adult)</b>
<b>HPI:</b>
Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

170. Nurse Rewis assigned Michaela’s condition an acuity level of 3. HMC 68.

Acuity: <u>3</u>	Precautions: <u>Standard Precautions</u>
------------------	--

HMC 68.



171. At about 23:38, Dr. Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

172. At that time, Dr. Holsonback noted the prior kick to Michaela's head: "Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness, headache w/o syncope at the time, sx resolved." HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

173. At that time, Michaela's neurological condition was: "motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside." HMC 72.

174. Her mental status was: "speech clear, oriented X 3, normal affect, responds appropriately to questions." HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.  
**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.  
**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.

175. Michaela's general appearance was: "well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort." HMC 71.

**PHYSICAL EXAM:**

**GENERAL APPEARANCE:** well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

176. Dr. Holsonback also obtained an NIHSS score. Michaela scored 0 on each of the 11 elements and overall. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.


*Michaela Has Head CT Scan*

177. At 23:47, despite Michaela's NIHSS score, Dr. Holsonback ordered a stat head CT scan, for "headache right side." HMC 64.

Order Type: Radiology				
Order Sub Type: CT				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.

178. The CT scan was performed by 23:54—within minutes of the order. HMC 61.

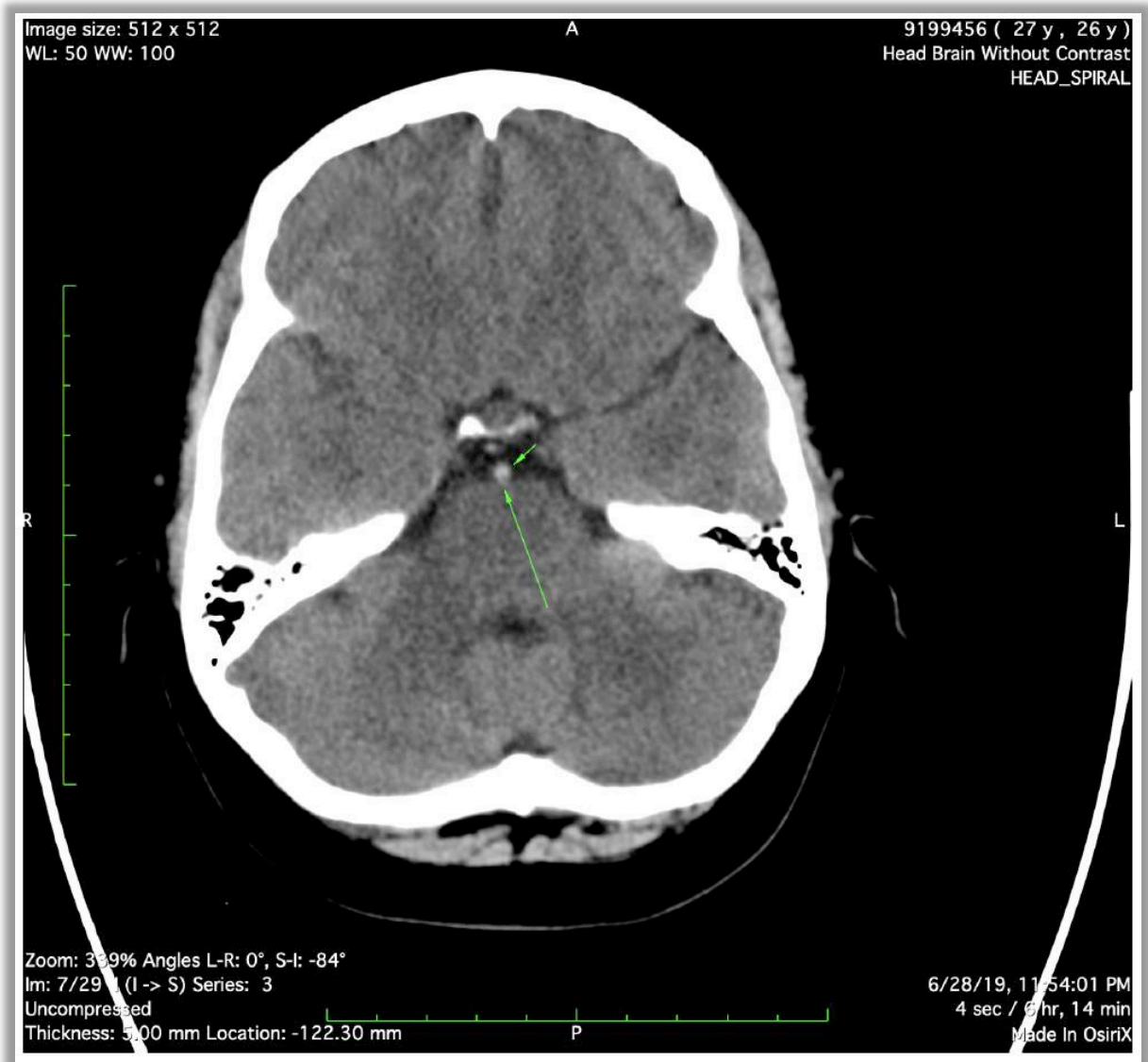
Hamilton Medical Center		24/7/365 assistance		Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>	
					
<b>Preliminary Radiology Report</b>					
<b>Patient Name:</b>	SMITH, MICHAELA				
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720				
<b>Study Type:</b>	CT HEAD WO				
<b>Ordered As:</b>	CT HEAD WO				
<b>Date of Dictation:</b>	29 Jun 2019 EDT		<b>Accession:</b>	3948616	
<b>Date of Exam:</b>	28 Jun 2019 EDT		<b>Account Number:</b>		
<b>Patient ID:</b>	9199456		<b>Patient DOB:</b>		
<b>Patient Location:</b>	Unknown		<b>Caretaker:</b>		
<b>Account #:</b>			<b>Referring Physician:</b>	HOLSONBACK, SHAWN	
This interpretation is based upon the receipt of 32 images.					
<b>EXAM:</b>					
CT Head Without Contrast					
<b>EXAM DATE/TIME:</b>					
6/28/2019 11:52 PM					

HMC 61.

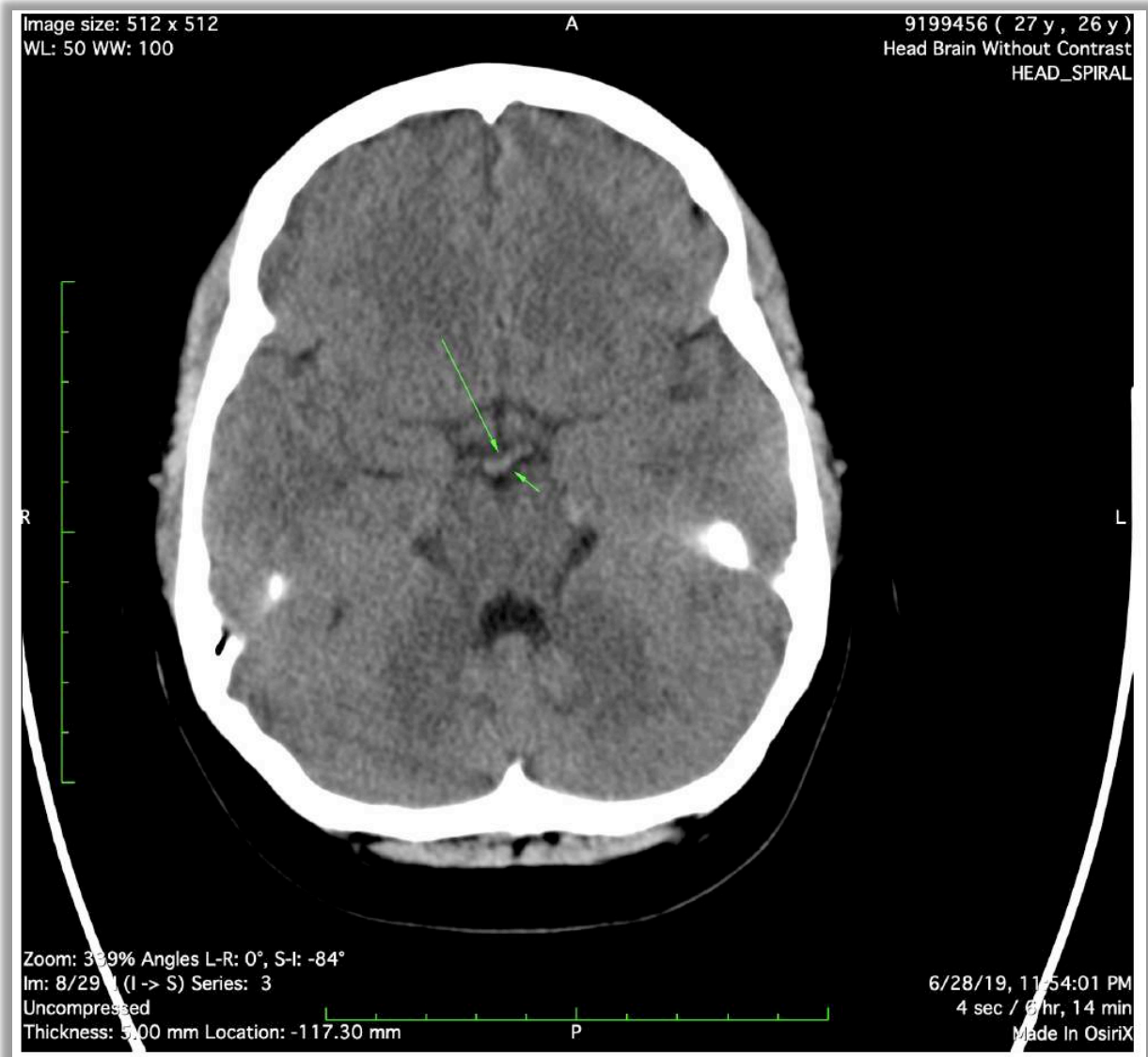
179. The CT scan showed a brainstem or posterior-circulation stroke.

180. Image 7 of 29 showed a white hyperdense sign of a basilar-artery thrombosis:






181. Image 8 of 29 showed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:



*Dr. Cooney Fails to Identify Stroke on CT*

182. At 00:18 (now June 29, 2019), acting as a vRad employee, Radiologist Michael Cooney interpreted the 32 images associated with the CT scan. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<hr/>			
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
<b>This interpretation is based upon the receipt of 32 images.</b>			
<hr/>			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.

183. Dr. Cooney found no hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
 No acute intracranial abnormality.

HMC 61.

184. Dr. Cooney’s findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. HMC 61.
185. Dr. Cooney’s findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. HMC 61.
186. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded and reported that the study showed “No acute intracranial abnormality.” HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
 No acute intracranial abnormality.

HMC 61.

187. At 00:28, Dr. Holsonback documented Dr. Cooney’s reading of the CT scan as showing “no acute intracranial abnormality.” HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0027 Last Entry: 0028  
 MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
 without Informing Her of BAO*

188. At 00:57, Dr. Holsonback rechecked Michaela. She was “resting, feeling better,” with a “headache still present” and “all numbness resolved.” HMC 72.

189. At 02:15, Michaela continued to feel “better,” had “No focal neuro deficits,” and was “Agreeable with discharge.” HMC 72, HMC 2.


Holsonback, Shawn D.O. Created: 6/29/2019 0056 Last Entry: 0057  
 MD Note: recheck, resting, feeling better, headache still present. all numbness resolved.  
 Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

190. At 02:15, Michaela signed her disposition summary. HMC 65-66.

191. The summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” identified her chief complaint as a possible allergic reaction, permitted

her to return to work in 1-2 days without restrictions, and instructed her to “Return to the Emergency Department sooner if worse.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	101737552 05LB01 06/28/2019 OP
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	Smith, Michaela E EMR
May return to work/school: <u>1-2 Days</u>	Physician, On Duty
Restrictions: <u>None</u>	
Critical Care Time: <u>none</u>	

HMC 65.

- 192. Michaela “verbalized understanding and ability to comply” with these instructions, without any “learning/communication barriers.” HMC 70.
- 193. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.
- 194. Her pain was 0 of 10. HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

- 195. At 02:27, Michaela went home in “stable” condition. HMC 65, HMC 70.
- 196. Neither any provider nor the discharge papers informed Michaela or her parents of the occlusion in her basilar artery. *See, e.g.,* HMC 65-66, HMC 70.



Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #: _____	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>		Disposition: <u>Home</u>	
Dispo Summary Printed: <u>6/29/2019 0215</u>		Condition at Dispo: <u>Stable</u>	
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmpint: <u>Poss Allergic Reaction</u>			

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING\COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

197. Michaela “felt comfortable going home.” HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

198. At home, she “went to bed about 3:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

June 29, 2019 – Michaela Returns to Hamilton by Ambulance

*She Wakes with Global Alteration of  
Consciousness*

199. Michaela awoke with severe signs and symptoms of stroke, reflecting the onset of a neurological emergency after her discharge from Hamilton.

200. Michaela awoke “foaming out the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

201. At about 07:15, Michaela’s mother “heard her moan” in her bedroom and found her “with altered mental status and poor mobility.” HMC 2, HMC 6, HMC 30.

202. Michaela talked “through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech.” HMC 2.
203. Speaking “through her teeth,” Michaela told her mother “that she was unable to get out of bed and had wet on herself.” HMC 6, HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.



204. Thus, “something happened between [03:45] and 7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

205. The paramedics were then called. HMC 2, HMC 6. Because they could not get Michaela up to walk, she was transported back to the ED by stretcher. HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

*Michaela Returns to Hamilton ED with  
Classic Signs of a BAO*

206. By 08:19, the ambulance arrived at the Hamilton ED. HMC 24, HMC 25.

207. Michaela returned as a clinically different patient, whose neurological condition had deteriorated dramatically overnight.
208. She now had, for example, “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, HMC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

209. These signs alone made clear that Michaela was facing a neurological emergency requiring expedited evaluation and intervention. Her extensor posturing, moreover, suggested that the emergency involved brainstem injury.
210. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was noted as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

211. Between 08:14 and 08:27, Nurse Megan Martin triaged Michaela. HMC 25-27. Nurse Gabe Herman was present. HMC 24.

212. Michaela “was squinting her eyes and looking around, while still shaking.” HMC 26.

213. Nurse Martin gave Michaela a MEND exam. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

214. Nurse Martin did not document or report the findings of the MEND exam.

215. In addition, despite Michaela’s dramatic new deficits, Nurse Martin assigned her condition an acuity level of 3—the same score Nurse Rewis gave to Michaela’s vastly better condition the night before. HMC 26, HMC 68.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		Patient: <u>Smith, Michaela E</u> Pt Accnt: <u>101737594</u>
Allergies		
Allergic Substance	Reaction-Severity	Entered
NKDA		6/29/2019 0825
Acuity: <u>3</u>		Precautions: <u>Standard Precautions</u>

HMC 26.

216. Nurse Martin also failed to perform a full neurological assessment. HMC 26-27.

*Dr. Hawkins Notes but Fails to Treat the Stroke*

217. At some point between 09:12 and 12:44, Emergency Medicine Physician David Hawkins examined Michaela. HMC 30-31.

218. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244
<b>H&amp;P</b>
Initial Provider Contact 6/29/2019 0912
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL
Initial Provider Contact 6/28/2019 2338
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or
HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX nothing worsens Sx. nothing improves Sx. no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

219. Michaela's general appearance was: "unresponsive, uncooperative," with "no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2." HMC 31.
220. Michaela's neurological condition was: "extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs. Will not follow commands." HMC 31.
221. Michaela's extremities were: "flaccid" with occasional "spastic tone" as in posturing. HMC 31.
222. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

GENERAL APPEARANCE: somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIROMENT, URINATED IN BED X 2

**VITALS: SEE NN,**

PULSE OXIMETRY: 97% on RA.

EARS: canals clear bilat, TMs clear, no discharge from ears.

EYES: PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

NOSE: no nasal discharge.

MOUTH: (-)decreased moisture. + GAG

THROAT: no tonsillar inflammation, no airway obstruction.

NECK: supple, no neck tenderness, (-)thyromegally.

BACK: (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

CHEST WALL: no chest tenderness.

LUNGS: no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

HEART: normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

ABDOMEN: normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

EXTREMITIES: good pulses in all extremities, no swelling/tenderness in the extremities, no edema. FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTUREING

SKIN: warm, dry, good color, no rash.

NEURO: EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS

MENTAL STATUS: unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

223. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including adjustment reaction, drug abuse, eating disorder, personality disorder, and schizophrenia. HMC 31.



224. Dr. Hawkins’s differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA.<sup>2</sup> HMC 31.

**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

225. Despite listing stroke, Dr. Hawkins did not order vascular imaging to confirm or rule out stroke, did not take action to treat the stroke, and failed even to order a new CT scan or obtain a new stroke score.

*Dr. Johnson Fails to Identify Stroke on CT*

226. At 09:15, Radiologist Kevin Johnson read, and submitted a final report on, the same CT scan misread by Dr. Cooney. HMC 60.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

**INTERPRETED BY:** KEVIN JOHNSON MD on Jun 29 2019 9:15A  
**SIGNED BY:** KEVIN JOHNSON MD on Jun 29 2019 12:09P

HMC 60.

227. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus disease, or mastoid or middle-ear effusions. HMC 60. He also found that gray-white differentiation was “within normal limits.” HMC 60.

228. Dr. Johnson’s findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. HMC 60.

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<sup>2</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.

229. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. HMC 60.
230. Instead, contrary to the plain images, Dr. Johnson affirmatively concluded and reported that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Michaela Languishes without Assessments,  
Diagnosis, or Treatment*

231. At 08:35, Nurse Victoria Brock performed and documented a general assessment of Michaela. HMC 27-28.
232. At 08:57, Nurse Brock took Michaela's vitals. Two hours passed before Nurse Brock (or anyone else) took Michaela's vitals again, at 10:57. Nurse Brock then took Michaela's vitals at 11:15 and 11:37. HMC 26.



Vital Signs														
Sys	Dia	Mean	Pulse	Resp	SAT	O2 De	Temp (F)	Route	Pain Scale	Quality of P	Onset	Location	Taken at	User Name
150	68	98	102	15	97%	RA	99.2						6/29/2019 0826	Martin, Megan R.N.
137	66	93	75	16	98%	RA							6/29/2019 0857	Brock, Victoria R.N.
117	56	80	67	17	94%	RA							6/29/2019 1057	Brock, Victoria R.N.
			65	17	97%	RA							6/29/2019 1115	Brock, Victoria R.N.
106	63	80	82	17	97%	RA							6/29/2019 1137	Brock, Victoria R.N.
162	77	106	94	18	96%	RA							6/29/2019 1230	Herman, Gabe R.N.
			92	18	98%	RA							6/29/2019 1404	Herman, Gabe R.N.
			85	18	97%	RA							6/29/2019 1559	Herman, Gabe R.N.
132	97		89	18	98%	RA							6/29/2019 1746	Herman, Gabe R.N.

HMC 26.

233. At about 10:00, Nurse Lindsey Andrews called the Georgia Poison Center about Michaela's symptoms. The Center recommended a chest x-ray, and a head CT scan "to rule out something unrelated to the pepper spray incident." HMC 28.

Andrews, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

234. At 10:08, Dr. Hawkins ordered the recommended chest x-ray. HMC 15.

<b>Hamilton Medical Center</b>	
<i>PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180</i>	
<b>Radiology Services</b>	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB:	<b>MR/RAD #: 09199456/09199456</b> <b>ADMIT #: 101737594</b> <b>HOSP/SVC: EMR</b> <b>ORDER DATE: Jun 29 2019 10:08A</b> <b>ROOM #: ECD-RM2201</b> <b>REF #: 3948717</b>
<b>Ordering Dr: DAVID MD HAWKINS</b> <b>Attending Dr: DAVID MD HAWKINS</b>	

HMC 15.

- 235. But Dr. Hawkins did not order the recommended CT scan.
- 236. At 10:31, Dr. Johnson read the chest x-ray and concluded it was a “normal exam.” HMC 15, HMC 22.
- 237. Between 10:44 to 10:54, Nurse Brock performed a fingerstick glucose check, drew a blood culture, and gave Michaela intravenous fluids. HMC 28.

Brock, Victoria R.N. Created: 6/29/2019 1054 Last Entry: 1055
<b>Order(s) Begun:</b> <b>- IVF Normal Saline (Sodium Chloride 0.9%), Bolus 1,000mL IV piggyback once; Over 60 minutes - IV Site: left antecubital, Infusing via: pump, Begun: 6/29/2019 1054</b>
<b>Order(s) performed by "Nurse":</b> - FINGERSTICK BLOOD SUGAR - CULTURE - BLOOD - CULTURE - BLOOD
<b>Order Notes:</b> GLUCOSE CHECK - 6/29/2019 1044 91 mg/dl BLOOD DRAW - 6/29/2019 1047. Specimen obtained from Site: RAC after 1 attempt. Dressing applied. Specimen sent to lab. SALINE-LOCK INSERTED - 6/29/2019 1048 20ga left antecubital following 1 attempt(s). 10ml normal saline flush with blood drawn.

HMC 28.

- 238. At 11:14, Nurse Brock used a catheter to empty Michaela’s bladder, and sent a urine specimen to the lab for a urine screen. HMC 28.

Brock, Victoria R.N. Created: 6/29/2019 1114 Last Entry: 1115

Order(s) performed by "Nurse":

- URINE SCREEN
- UDS 8 TESTS

Order Notes:

STRAIGHT CATH - 6/29/2019 1114 16F inserted using sterile technique after site prepped with betadine. Bladder emptied with a return of 150ml clear yellow lab.

SPECIMEN COLLECTION - 6/29/2019 1114 - urine clean catch was collected and labeled at bedside by Brock, Victoria R.N. and was sent to the lab by pneumatic tube. Order for specimen verified and patient identified using two identifiers prior to specimen collection.

HMC 28.

239. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter[ed] mental status, after heavy physical activity and heat expo[sure].” HMC 23.

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ? HEAT EXPOS Stat	Complete	
	06/29/19 11:22			06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

240. During the hours she cared for Michaela, Nurse Brock, like Nurse Martin, failed to perform a full neurological assessment of Michaela. Nurse Brock also failed to perform hourly neurological assessments of Michaela. See HMC 26-28.

241. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

242. At 12:45, Dr. Hawkins consulted Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital, agreed to evaluate her in the ER, and agreed with the MRI “to distinguish function from organ cause.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 12:45 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

243. During the hours that had passed so far since Michaela's return to Hamilton, Dr. Hawkins and Dr. Glass failed to diagnose or treat Michaela's stroke.

*The MRI Confirms a Treatable Ischemic Stroke*

244. Between 12:45 and 13:29, Michaela underwent the brain MRI, for "altered mental status after physical activity." See HMC 16.



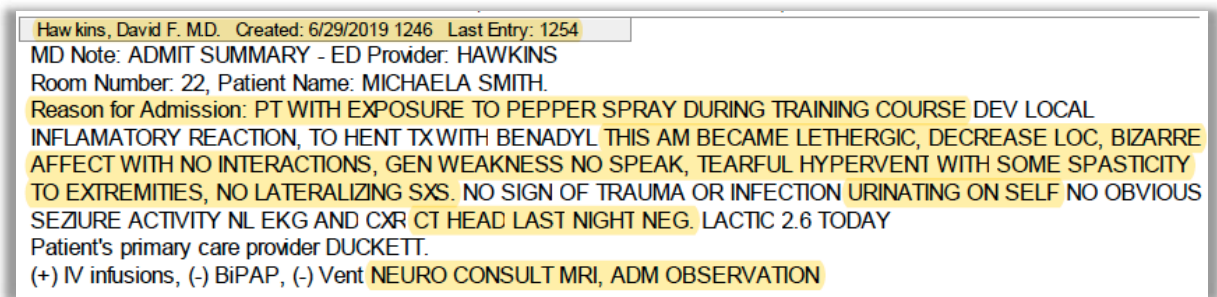
245. Though the MRI's DWI sequence showed that Michaela's brainstem was ischemic (confirming stroke), the MRI's FLAIR sequence remained normal.

246. That is, Michaela’s brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.

*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

247. At 12:54, Michaela continued manifesting signs and symptoms of stroke, including decreased consciousness, bizarre affect with no interactions, general weakness, lack of speech, tearfulness, spasticity to extremities, and incontinence. HMC 32.

248. Despite her severe deficits, Dr. Hawkins admitted Michaela for “observation,” noting that the head CT scan of “last night” was negative. HMC 32.



HMC 32.

249. Dr. Hawkins’s reason for the admission was: “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

250. At 13:29, Dr. Johnson interpreted Michaela’s MRI, and at 13:30, he discussed his findings with Dr. Hawkins. HMC 16.

IMPRESSION:  
NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.  
No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

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INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P  
SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P

HMC 16.

251. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.
252. The MRI also showed: gray-white differentiation within normal limits, normal flow voids maintained within the major intracranial vascular pedicles, and no sites of pathologic contrast enhancement. HMC 16.

**FINDINGS:** The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

253. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.
254. Dr. Johnson, however, failed to identify the brainstem ischemia visible in the DWI sequence. HMC 16.
255. Instead, contrary to the plain DWI imaging, Dr. Johnson concluded and reported that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.



COMPARISON: CT head 6/28/2019; no prior MRI

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

IMPRESSION:

NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

No definitive acute abnormalities are identified on this motion-compromised examination.

HMC 16.

256. In addition, Dr. Johnson again reviewed Michaela's CT scan, for "comparison" purposes. He thus had a second opportunity to interpret the CT scan. HMC 16.
257. Dr. Johnson failed again to recognize and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to recognize and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a "normal exam." See HMC 16, HMC 60.

*Michaela Continues to Languish without  
Assessments, Diagnosis, or Treatment*

258. At 12:30, Nurse Gabe Herman took Michaela's vitals. Nurse Herman then took Michaela's vitals at 14:04, 15:59, and 17:46. HMC 26.



Vital Signs													
Sys	Dia	Mean	Pulse	Resp	SAT	O2 De	Temp (F)	Route	Pain Scale	Quality of PO	Location	Taken at	User Name
150	68	98	102	15	97%	RA	99.2					6/29/2019 0826	Martin, Megan R.N.
137	66	93	75	16	98%	RA						6/29/2019 0857	Brock, Victoria R.N.
117	56	80	67	17	94%	RA						6/29/2019 1057	Brock, Victoria R.N.
			65	17	97%	RA						6/29/2019 1115	Brock, Victoria R.N.
106	63	80	82	17	97%	RA						6/29/2019 1137	Brock, Victoria R.N.
162	77	106	94	18	96%	RA						6/29/2019 1230	Herman, Gabe R.N.
			92	18	98%	RA						6/29/2019 1404	Herman, Gabe R.N.
			85	18	97%	RA						6/29/2019 1559	Herman, Gabe R.N.
132	97		89	18	98%	RA						6/29/2019 1746	Herman, Gabe R.N.

HMC 26.

259. At 14:05, Nurse Herman performed a partial neurological assessment of Michaela—limited only to her GCS score. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534
Nurse Note:
NEURO CHECK - 6/29/2019 1405
EYE OPENING: eyes open to verbal stimuli 3
VERBAL RESPONSE: verbal incomprehensible sounds 2,
MOTOR RESPONSE: motor flexion withdrawal 4
GLASGOW COMA TOTAL 7

HMC 29.

260. Despite the score, Nurse Herman failed to perform hourly neurological assessments of Michaela. See HMC 27-28.

261. Between 14:05 and 14:18, Internist Ananka Myrie called Dr. Hawkins, to inform him she wanted neurology and psychiatry evaluations before admitting Michaela. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
Results Reviewed by ED Physician:  
MRH BRAIN W/WO CONTRAST  
CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

262. Between 14:17 and 14:22, Dr. Hawkins informed Dr. Glass of Dr. Johnson's MRI findings. They discussed the facts that Michaela still appeared stuporous and interacted intermittently and primitively with her parents. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422  
MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

263. At 14:51, while the ED continued waiting for Dr. Glass's evaluation, Dr. Hawkins turned over Michaela's care to Dr. Jonathan Thompson. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451  
Results Reviewed by ED Physician:  
MRH BRAIN W/WO CONTRAST  
LACTATE  
MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Even After Seeing Michaela, Dr. Glass Does  
Not Diagnose or Treat the Stroke*

264. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

265. Michaela continued to exhibit clear signs of stroke, including: altered mental status, hyperreflexia, extensor posturing of all four extremities, intermittent

deconjugate gaze, inability to talk, inconsistent response to commands, bilateral Babinski, and bilateral Hoffmann's in her hands. HMC 6, HMC 3.

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann's in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

266. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with the pepper spray” and went to bed “doing fairly well,” and despite Michaela’s deficits, Dr. Glass still did not turn his attention to diagnosis of stroke. HMC 4, HMC 6-7.

267. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass focused on "a hypoxic event" and "seizures," each of which he recognized as improbable. HMC 6-7.
268. Dr. Glass even decided to order an EEG for the "unlikely" seizures. HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities--I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.

269. As a result, even after seeing Michaela's severe deficits, Dr. Glass failed to order vascular imaging, failed to diagnose stroke, and failed to treat the BAO.

*Dr. Glass Signs Off on Transfer to Erlanger*

270. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician” that they felt Michaela needed “a higher level of care and will try and arrange transfer” to another hospital. HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

271. Dr. Glass then agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

272. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.

273. At 17:35, Michaela was transferred to Erlanger. The reason was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.



**Appropriateness**

✓ — Appropriate transport service equipment and personnel are requested to provide appropriate level of care

✓ — Basic: \_\_\_ Advanced: ✓ Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_

✓ — Agency: Hamilton EMS

✓ — The receiving facility has available space for the patient.

✓ — Transferring physician has discussed patient status with accepting physician — Auto accept thru transfer center

✓ — the receiving facility has agreed to accept the patient and provided adequate treatment

Facility E-1 apt Time: \_\_\_\_\_

Name of Physician accepting patient Ben Smith Phone \_\_\_\_\_

Approved by \_\_\_\_\_ Title \_\_\_\_\_

✓ — Reason for Transfer altered mental status

Risk of Transfer transport, acute compromise

Benefits to Transfer neuro evaluation

✓ — It is medically necessary to transport the patient by ambulance

Signature of transferring physician: \_\_\_\_\_ Fax \_\_\_\_\_

Transferring facility: Ham. EMS Fax \_\_\_\_\_

Name of Patient's primary care physician none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother

Refusal to transfer signature/relationship: \_\_\_\_\_

Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

✓ — Report given to: OWENS RN By: John Adams RN Time: 1702

— — Police notified (if applicable). Agency: \_\_\_\_\_

— — Family notified. Name \_\_\_\_\_

✓ — Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS documented. Disposition of valuables \_\_\_\_\_

Signature of RN: John Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

274. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp	Financial Class	
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger*

275. At 18:32, Michaela arrived at the Erlanger ED by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

276. At 01:10, now June 30, 2019, Michaela was transferred from the ED to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

277. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.

278. Referring back to June 29, 2019, Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.” HMC 4.



1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

279. Meanwhile, Michaela's condition "progressively worsened" at Erlanger. BEH 41.

280. On July 1, 2019, she was placed on a ventilator. BEH 41.

281. On July 2, 2019, a brain CT scan produced an "urgent critical result," including "a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation." BEH 310.

282. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

**Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.**

BEH 41.

283. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

284. The studies found “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels.

BEH 319.

285. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

286. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

287. Michaela Elizabeth Smith was 26 years old. HMC 67, HMC 44.

## **Injury and Wrongful Death from Professional Negligence**

### *Count 1: Failure to Identify Stroke and Call Critical Values - Against Dr. Cooney and vRAD*

288. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
289. Radiologist Cooney violated the standard of care by failing to identify the abnormality in Michaela's CT scan indicating she had a BAO when she arrived at Hamilton on June 28, 2019.
290. Specifically, Dr. Cooney failed to identify the white hyperdense sign of basilar-artery thrombosis plainly visible in image 7/29 of the CT scan.
291. Specifically, Dr. Cooney failed to identify the white streak consistent with thrombus plainly visible in image 8/29 of the CT scan. HMC 61.
292. Dr. Cooney then violated the standard of care by failing to call critical values—failing immediately to call Dr. Holsonback or anyone else at the emergency department to notify them of the life-threatening abnormality. HMC 61.
293. Instead, Dr. Cooney also violated the standard of care by notifying Dr. Holsonback and by reporting, contrary to the images, that Michaela's CT scan showed "no acute intracranial abnormality." HMC 61.
294. As a direct result of Dr. Cooney's violations of the standard of care, the Hamilton ED failed to call a code stroke, and failed to diagnose and treat Michaela's stroke.
295. Instead, based on Dr. Cooney's misreading of the CT scan, Dr. Holsonback prematurely closed Michaela's case and discharged her, noting that the CT scan showed "no acute intracranial abnormality." HMC 72.
296. At the time of her CT scan, Michaela's stroke score was 0 (normal).
297. At the time of her discharge and even later when she went to bed that early morning, Michaela was doing "fairly well."

298. But-for Dr. Cooney's violations, therefore, Michaela likely would have undergone a thrombectomy, intravenous TPA, or other effective therapy, before the BAO caused permanent damage to her brain, much less her death.
299. Dr. Cooney's violations thus caused Michaela pain and suffering, injury, and death.
300. As Dr. Cooney's employer or other principal at the time of his negligence, vRAD is vicariously liable for Dr. Cooney's negligence, because he was acting within the scope of his employment or agency with vRAD at that time.

*Count 2: Failure to Identify Stroke and Call  
Critical Values - Against Dr. Johnson and NGR*

301. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
302. The morning of June 29, 2019, Radiologist Johnson violated the standard of care by failing to identify the abnormality in Michaela's CT scan indicating she had a BAO when she was discharged from Hamilton a few hours earlier.
303. Specifically, Dr. Johnson failed to identify the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of Michaela's CT scan. HMC 60.
304. Specifically, Dr. Johnson failed to identify the white streak consistent with thrombus plainly visible in image 8/29 of Michaela's CT scan. HMC 60.
305. At that time, Dr. Johnson also violated the standard of care by failing immediately to call Dr. Hawkins or anyone else at the emergency department to notify them of the life-threatening abnormality. HMC 60.
306. Instead, Dr. Johnson affirmatively violated the standard of care by reporting, contrary to the images, that the CT scan was a "normal exam." HMC 60.
307. As a direct result of these violations by Dr. Johnson, on the morning of June 29, 2019, the Hamilton ED failed to call a code stroke, and failed to diagnose and treat Michaela's stroke, including by a thrombectomy.
308. Dr. Johnson's own MRI findings demonstrated that Michaela's brainstem was ischemic but had not yet suffered permanent stroke changes even later that day.

309. But-for Dr. Johnson's violations, therefore, Michaela likely would have undergone an effective thrombectomy or other intervention.
310. These violations by Dr. Johnson thus caused Michaela pain and suffering, injury, and death.
311. As Dr. Johnson's employer or other principal at the time of his negligence, NGR is vicariously liable for Dr. Johnson's negligence, because he was acting within the scope of his employment or agency with NGR at that time.

*Count 3: Failure to Identify Stroke and Call  
Critical Values - Against Dr. Johnson and NGR*

312. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
313. The afternoon of June 29, 2019, Dr. Johnson reviewed Michaela's brain MRI, comparing it to her CT scan. Dr. Johnson thus had a second chance to identify the stroke—in both the MRI and the same CT scan.
314. Dr. Johnson again violated the standard of care by again failing to identify the signs of the BAO plainly visible in the CT imaging.
315. At the same time, Dr. Johnson failed to identify that Michaela's MRI confirmed that Michaela was likely having an ischemic stroke.
316. Specifically, Dr. Johnson failed to identify the brainstem ischemia visible in the DWI sequence of the MRI. In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.
317. After reading the MRI and reviewing the CT scan, Dr. Johnson again violated the standard of care by again failing to call critical values—failing immediately to call Dr. Hawkins or anyone else at the emergency department to notify them of the life-threatening abnormalities.
318. Instead, Dr. Johnson also violated the standard of care by reporting, contrary to the imaging, that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

319. As a direct result of these additional violations by Dr. Johnson, the Hamilton ED again failed to diagnose and treat Michaela's stroke, including by a thrombectomy, on the afternoon of June 29, 2019.
320. Instead, relying on Dr. Johnson's misreading of the CT scan and the MRI, after hours of additional delay, the Hamilton ED transferred Michaela to Erlanger, without taking any steps to treat her stroke.
321. But-for these violations by Dr. Johnson, Michaela's stroke would have been diagnosed and she would have undergone a thrombectomy or other intervention.
322. The FLAIR sequence in Michaela's MRI showed that her brainstem had not yet suffered permanent stroke changes on the afternoon of June 29, 2019.
323. Dr. Johnson himself found no definite sites of diffusion restriction and no abnormal sites of FLAIR signal. He also found that the "gray-white differentiation appears within normal limits" and that "normal flow voids are maintained within the major intracranial vascular pedicles." HMC 16.
324. Dr. Johnson's own findings thus confirmed that Michaela's brainstem had not yet suffered permanent stroke changes.
325. The MRI thus showed that Michaela likely would have recovered had Dr. Johnson identified the BAO, in either her CT scan or her MRI, even on the afternoon of June 29, 2019. A thrombectomy, therefore, likely would have been effective, even at that time.
326. These additional violations by Dr. Johnson thus caused Michaela pain and suffering, injury, and death.
327. As Dr. Johnson's employer or other principal at the time of his negligence, NGR is vicariously liable for Dr. Johnson's negligence, because he was acting within the scope of his employment or agency with NGR at that time.

*Count 4: Failure to Provide Emergent Care –  
Against the Hamilton Defendants*

328. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.

329. When a patient arrives at an emergency room with serious neurological deficits concerning for stroke, the standard of care requires the triage nurse to notify the attending ER physician immediately; provide emergent care to the patient; and call a code stroke or initiate a stroke protocol insofar as the nurse has the authority to do so under the hospital's policies.
330. On June 29, 2019, Michaela returned to the Hamilton ER with serious neurological deficits concerning for stroke. In addition, Nurse Martin suspected a stroke.
331. Nurse Martin nevertheless failed immediately to notify Dr. Hawkins (or another physician) of Michaela's condition, failed to provide emergent care to Michaela, and failed to exercise whatever authority she had to call a code stroke or initiate a stroke protocol.
332. Nurse Martin's failure to provide Michaela emergent care fell grossly short of the standard of care.
333. As a result of these failures by Nurse Martin, Michaela did not undergo rapid evaluation, expedited radiology-imaging, or emergent treatment for her stroke.
334. Because time is brain, a delay in the recognition, diagnosis, or treatment of a stroke causes harm to the patient.
335. Nurse Martin's failures thus caused harm to Michaela.
336. Nurse Martin's violations of the standard of care thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.
337. As Nurse Martin's employer or other principal at the time of her negligence, one or both of the Hamilton Defendants are vicariously liable for her negligence, because she was acting within the scope of her employment or agency with one or both of the Hamilton Defendants at that time.

*Count 5: Failure to Triage and Assess –  
Against the Hamilton Defendants*

338. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.



339. The standard of care requires an emergency-room nurse to assign, document, and report an accurate acuity level (also known as “triage score”).
340. When Michaela returned to the Hamilton ER, Nurse Megan Martin violated these requirements by assigning and documenting an acuity level of 3 for Michaela, where her neurological deficits indicated a level 2.
341. The standard of care also requires an emergency-room nurse to perform, document, and report a full neurological assessment when a patient arrives with significant neurological deficits.
342. When Michaela returned to the Hamilton ER, Nurse Martin violated these requirements by failing to perform, document, and report a full neurological assessment of Michaela.
343. A patient’s acuity level and initial assessment are critical because they determine the level and urgency of care the patient receives downstream.
344. Nurse Martin’s failures to triage and assess Michaela fell grossly short of the standard of care.
345. Nurse Martin’s failures to triage and assess Michaela delayed the recognition, diagnosis, and treatment of Michaela’s stroke, by setting a baseline for Michaela’s condition that did not reflect its true urgency and severity.
346. As a result of these violations, Michaela was not evaluated by a physician for about an hour at minimum, did not undergo rapid radiology-imaging to confirm or rule out stroke, and did not receive a neurological assessment for hours.
347. Because time is brain, a delay in the recognition, diagnosis, or treatment of a stroke causes harm to the patient.
348. These additional violations of the standard of care by Nurse Martin thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.
349. As Nurse Martin’s employer or other principal at the time of her negligence, one or both of the Hamilton Defendants are vicariously liable for her negligence, because she was acting within the scope of her employment or agency with one or both of the Hamilton Defendants at that time.

*Count 6: Failure to Diagnose Stroke - Against  
Dr. Hawkins and ECC, and Dr. Glass and the  
Hamilton Defendants*

350. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
351. In stark contrast to her presentation as an ambulatory patient a few hours earlier, Michaela returned to the Hamilton ED on a stretcher, with altered mental status, decerebrate posturing, and other serious neurological deficits.
352. On June 29, 2019, Dr. Hawkins and Dr. Glass each violated the standard of care by failing to diagnose Michaela's stroke.
353. First, even though they extensively documented Michaela's signs and symptoms, Dr. Hawkins and Dr. Glass failed to recognize the clinical significance of those signs and symptoms, namely, that they pointed to a neurological emergency.
354. For example, Michaela's extensor posturing by itself suggested she was suffering massive brain injury, likely from a brainstem stroke.
355. Dr. Hawkins and Dr. Glass thus failed to make an accurate clinical diagnosis.
356. Second, Dr. Hawkins and Dr. Glass failed to order stat vascular imaging—a timely and definitive diagnostic study capable of identifying the source of Michaela's neurological deficits. That study would have investigated blood-flow in Michaela's brain and would have definitively confirmed the BAO.
357. Third, Dr. Hawkins failed to perform even basic screening tests to confirm or rule out stroke, including a new CT scan and stroke score, each of which would have taken at most a few minutes to complete.
358. Dr. Hawkins's failure to use vascular imaging and other tools to investigate and diagnose Michaela's condition is all the more confounding because he documented stroke as a lead differential diagnosis.
359. Dr. Hawkins's failure to diagnose fell grossly short of the standard of care.

360. But-for these violations of the standard of care by each Dr. Hawkins and Dr. Glass, Michaela would have undergone a thrombectomy or other effective treatment.
361. Michaela's MRI demonstrated that her brainstem had not yet suffered permanent stroke changes, even on the afternoon of June 29, 2019.
362. A thrombectomy, therefore, likely would have been effective even at that time.
363. These violations by Dr. Hawkins and Dr. Glass thus caused Michaela pain and suffering, injury, and death.
364. As Dr. Hawkins's employer or other principal at the time of his negligence, ECC is vicariously liable for Dr. Hawkins's negligence, because he was acting within the scope of his employment or agency with ECC at that time.
365. As Dr. Glass's employer or other principal at the time of his negligence, one or both of the Hamilton Defendants are vicariously liable for Dr. Glass's negligence, because he was acting within the scope of his employment or agency with one or both of the Hamilton Defendants at that time.

*Count 7: Failure to Provide Emergent Care -  
Against Dr. Hawkins and ECC, and Dr. Glass  
and the Hamilton Defendants*

366. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
367. The standard of care requires an emergency-medicine physician to initiate a stroke protocol or otherwise provide emergent care when a patient presents with significant neurological deficits concerning for stroke.
368. The standard of care also requires a consulting neurologist to provide emergent care to such a patient.
369. Insofar as they focused on a possible stroke at all, Dr. Hawkins and Dr. Glass failed to provide Michaela emergent care and instead wasted precious time, in violation of the standard of care.

370. Even though Michaela arrived by ambulance on a stretcher no later than 08:19, Dr. Hawkins failed to examine her until 9:12, at the very earliest.
371. Dr. Hawkins then failed to order a brain MRI until 11:22—over three hours after her arrival. The MRI was administered at 12:45, and was read at 13:29—over five hours after her arrival.
372. Dr. Hawkins then failed to consult with Dr. Glass until 12:45—nearly four-and-a-half hours after Michaela’s arrival.
373. Dr. Glass did not examine Michaela until 15:54—nearly eight hours after her arrival.
374. In fact, Dr. Hawkins apparently did not admit Michaela to the hospital floor until 12:54, and then only for observation.
375. Moreover, while precious minutes and hours ticked away, Dr. Hawkins wasted time attempting to rule out allergies, poisoning, and dystonia.
376. Dr. Hawkins also wasted valuable time trying to rule out unfounded psychiatric issues, including drug abuse, eating disorder, and schizophrenia.
377. In light of her deficits, the standard of care required Dr. Hawkins, as attending ER physician, to examine Michaela, order vascular imaging, consult with Dr. Glass, and otherwise investigate and treat her deficits—all emergently.
378. Dr. Hawkins thus violated the standard of care by repeatedly failing to provide Michaela emergent care.
379. These violations by Dr. Hawkins are all the more egregious and inexplicable because he himself twice identified stroke in his differential diagnosis.
380. Dr. Hawkins’s failure to provide Michaela emergent care fell grossly short of the standard of care.
381. Likewise, Dr. Glass failed to provide emergent care and wasted precious time.
382. Dr. Hawkins consulted with Dr. Glass at 12:45—nearly four-and-a-half hours after Michaela’s arrival.

383. Instead of examining Michaela without further delay, Dr. Glass merely agreed to see Michaela in the ER for evaluation—at an unspecified time.
384. Dr. Glass did not examine Michaela until 15:54—over three hours after his consultation with Dr. Hawkins and nearly eight hours after her arrival.
385. Although Dr. Glass then saw for himself that Michaela had a constellation of classic stroke symptoms, he still did not order vascular imaging at all, much less on an expedited basis.
386. Instead, acknowledging he was having difficulty tying the patient's symptoms together, Dr. Glass focused on conditions he deemed improbable, including hypoxia and seizures.
387. All this while precious minutes and then hours ticked away.
388. Dr. Glass then signed off on transferring Michaela to Erlanger, still without diagnosing and treating her stroke.
389. In light of her presentation, the standard of care required Dr. Glass to examine Michaela, order vascular imaging, and otherwise investigate and treat her deficits—all on an emergent basis. This was especially the case because Dr. Hawkins had already identified stroke as a leading differential diagnosis.
390. Dr. Glass thus violated the standard of care by repeatedly failing to provide Michaela emergent care.
391. But-for these violations by each Dr. Hawkins and Dr. Glass, Michaela would have undergone a thrombectomy or other effective treatment.
392. Michaela's MRI demonstrated that her brainstem had not yet suffered permanent stroke changes, even on the afternoon of June 29, 2019.
393. A thrombectomy, therefore, likely would have been effective even at that time.
394. These additional violations by Dr. Hawkins and Dr. Glass thus caused Michaela pain and suffering, injury, and death.

395. As Dr. Hawkins's employer or other principal at the time of his negligence, ECC is vicariously liable for Dr. Hawkins's negligence, because he was acting within the scope of his employment or agency with ECC at that time.
396. As Dr. Glass's employer or other principal at the time of his negligence, one or both of the Hamilton Defendants are vicariously liable for Dr. Glass's negligence, because he was acting within the scope of his employment or agency with one or both of the Hamilton Defendants at that time.

*Count 8: Failure to Perform Neuro Checks -  
Against the Hamilton Defendants*

397. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
398. The standard of care requires an emergency-room nurse to perform, document, and report, at minimum, hourly neurological assessments of a patient with significant neurological deficits.
399. On June 29, 2019, Nurse Victoria Brock and Nurse Gabe Herman each violated these requirements.
400. During the hours she cared for Michaela, Nurse Brock did not perform any neurological assessments of Michaela.
401. During the hours he cared for Michaela, Nurse Herman performed one, incomplete neurological assessment of Michaela, limited to her level of consciousness.
402. Nurse Brock's and Nurse Herman's failure to perform assessments of a deteriorating patient with severe neurological deficits fell grossly short of the standard of care.
403. Because time is brain, a failure to recognize, diagnose, and treat a stroke causes harm to the patient.
404. Especially because Michaela deteriorated under the care of Nurse Brock and Nurse Herman, each assessment they failed to perform was yet another wasted opportunity to recognize Michaela's actual acuity level, to recognize the need for and order vascular imaging, and to diagnose and treat Michaela's stroke.



405. Each missed assessment thus caused harm to Michaela.
406. These violations by each Nurse Brock and Nurse Herman thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.
407. As Nurse Brock's and Nurse Herman's employer or other principal at the time of their negligence, one or both of the Hamilton Defendants are vicariously liable for their negligence, because Nurse Brock and Nurse Herman were acting within the scope of their employment or agency with one or both of the Hamilton Defendants at that time.

*Count 9: Failure to Treat Stroke –  
Against Dr. Hawkins and ECC, and Dr. Glass  
and the Hamilton Defendants*

408. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
409. Dr. Hawkins and Dr. Glass failed to take the steps necessary for Michaela to undergo a thrombectomy or other effective intervention. Dr. Hawkins and Dr. Glass did not even order a neurology consult for a thrombectomy.
410. Dr. Hawkins's failure even to order a neurology consult for a thrombectomy fell grossly short of the standard of care.
411. But-for these additional violations by each Dr. Hawkins and Dr. Glass, Michaela would have undergone a thrombectomy or other effective treatment.
412. Michaela's MRI demonstrated that her brainstem had not yet suffered permanent stroke changes, even on the afternoon of June 29, 2019.
413. A thrombectomy, therefore, likely would have been effective even at that time.
414. These additional violations by each Dr. Hawkins and Dr. Glass thus caused Michaela pain and suffering, injury, and death.
415. As Dr. Hawkins's employer or other principal at the time of his negligence, ECC is vicariously liable for Dr. Hawkins's negligence, because he was acting within the scope of his employment or agency with ECC at that time.

416. As Dr. Glass's employer or other principal at the time of his negligence, one or both of the Hamilton Defendants are vicariously liable for Dr. Glass's negligence, because he was acting within the scope of his employment or agency with one or both of the Hamilton Defendants at that time.

*Causation – As to All Counts*

417. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.

418. At 23:54 on June 28, 2019, during her first visit to Hamilton, Michaela underwent a non-contrast head CT scan. At 0:18 on June 29, 2019, Radiologist Michael Cooney read and reported on the CT scan.

419. Dr. Cooney did not identify or report the hyperdensity of Michaela's thrombosed basilar artery visible in the CT scan imaging.

420. At 2:27, Michaela was discharged from Hamilton looking neurologically normal.

421. In light of those facts and of her age and medical history, Michaela was a candidate for mechanical thrombectomy, should her condition have worsened at that point in time.

422. At that time, moreover, mechanical thrombectomy likely would have led to a full and normal recovery.

423. At 9:15 on June 29, 2019, during Michaela's second visit to Hamilton, Radiologist Kevin Johnson reviewed and submitted a final report on the same CT scan.

424. Dr. Johnson also did not identify or report the hyperdensity of Michaela's thrombosed basilar artery.

425. At that time, in light of her age and medical history, Michaela remained a candidate for mechanical thrombectomy.

426. At that time, moreover, mechanical thrombectomy likely would have led to a functional recovery.

427. At 12:45 on June 29, 2019, Michaela's brain MRI showed that her brainstem, although ischemic, had not yet suffered permanent stroke changes.
428. Specifically, the FLAIR sequence of the MRI demonstrated that Michaela's brainstem had not yet suffered permanent stroke changes and generally remained normal, despite the occlusion in her basilar artery.
429. In light of those findings and of Michaela's age and medical history, she remained at that time a candidate for mechanical thrombectomy.
430. At that time, moreover, mechanical thrombectomy likely would have led to a functional recovery.
431. In addition, in light of those findings and of Michaela's age and medical history, mechanical thrombectomy likely would have led to a functional recovery had it been performed that day, before or upon Michaela's transfer to Erlanger.
432. Thus, each failure promptly to diagnose and treat Michaela's stroke while she was at Hamilton caused Michaela Smith pain and suffering, injury, and death.

*OCGA § 13-6-11 Claims -  
Against All Defendants*

433. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
434. Plaintiffs show that Defendants have acted in bad faith, have been stubbornly litigious, and have caused Plaintiffs unnecessary trouble and expense.
435. Plaintiffs are thus entitled to their expenses of litigation pursuant to OCGA § 13-16-11, including reasonable attorneys' fees.

- 
436. Pursuant to OCGA Title 51, Chapter 4, Plaintiffs are entitled to recover from all Defendants for all damages caused by the Defendants' professional negligence.

## Damages

### *Survival Action – Estate Claim*

437. Plaintiffs incorporate by reference all paragraphs of this Complaint as though fully set forth herein.
438. Plaintiffs Annette and Michael Smith are entitled to damages for their daughter Michaela’s conscious pain and suffering over the hours and days she endured—and gradually perished from—an untreated stroke.
439. After she returned to Hamilton on June 29, 2019, although she was unable to speak, Michaela reacted with “whining or crying” depending on what her parents said or who was in the room. HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

440. On that day, Michaela was “tearful” and “crying at times.” HMC 31.

GENERAL APPEARANCE: somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2

HMC. 31.

441. Michaela responded “when family members would come in” and her parents believed she heard them. HMC 2.
442. Indeed: “She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.” HMC 2. At times, Michaela seemed to cry and moan appropriately. HMC 3.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

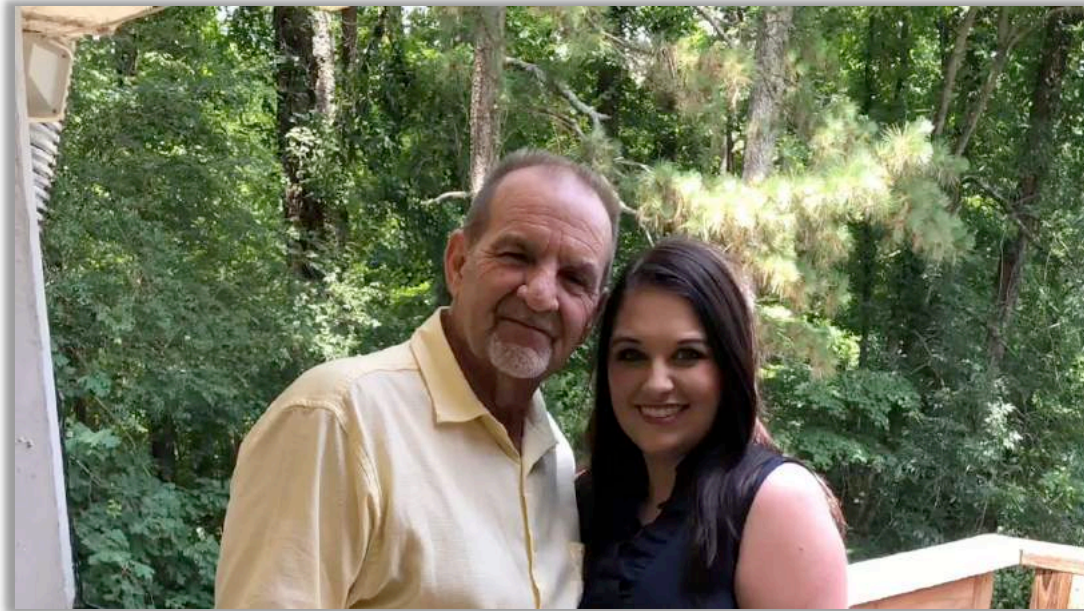
HMC 2.

GENERAL: The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. NECK: Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. CRANIAL NERVE EXAMINATION: Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

### *Wrongful Death Claim*

443. Plaintiffs incorporates by reference all paragraphs of this Complaint, as though fully set forth herein.



444. Plaintiffs are also entitled to damages for Michaela’s wrongful death.
445. Michaela was a normal, active, well-adjusted 26-year-old, who had a promising future and was “just getting started.”
446. Michaela graduated from Dalton State College (of the University of Georgia system), with a major in criminal justice and a minor in psychology.
447. She previously worked at the District Attorney’s Office for Whitfield and Murray Counties, helping attorneys prepare for trial. Michaela planned to return to work for the D.A. later in her career.
448. In early 2019, Michaela became a sworn deputy for the Murray County Sheriff’s Department, serving as a detention officer in a facility for female inmates. She secured that position after a lengthy job search, thanks in part to a recommendation from the D.A.
449. Michaela often voiced gratitude for her job, reflecting that it was where God wanted her to be.
450. Michaela treated the inmates she served with dignity and respect. Because prison garments were at different stages of fading, Michaela would take time to pair up tops and bottoms, so that they matched. Each day, before her shift



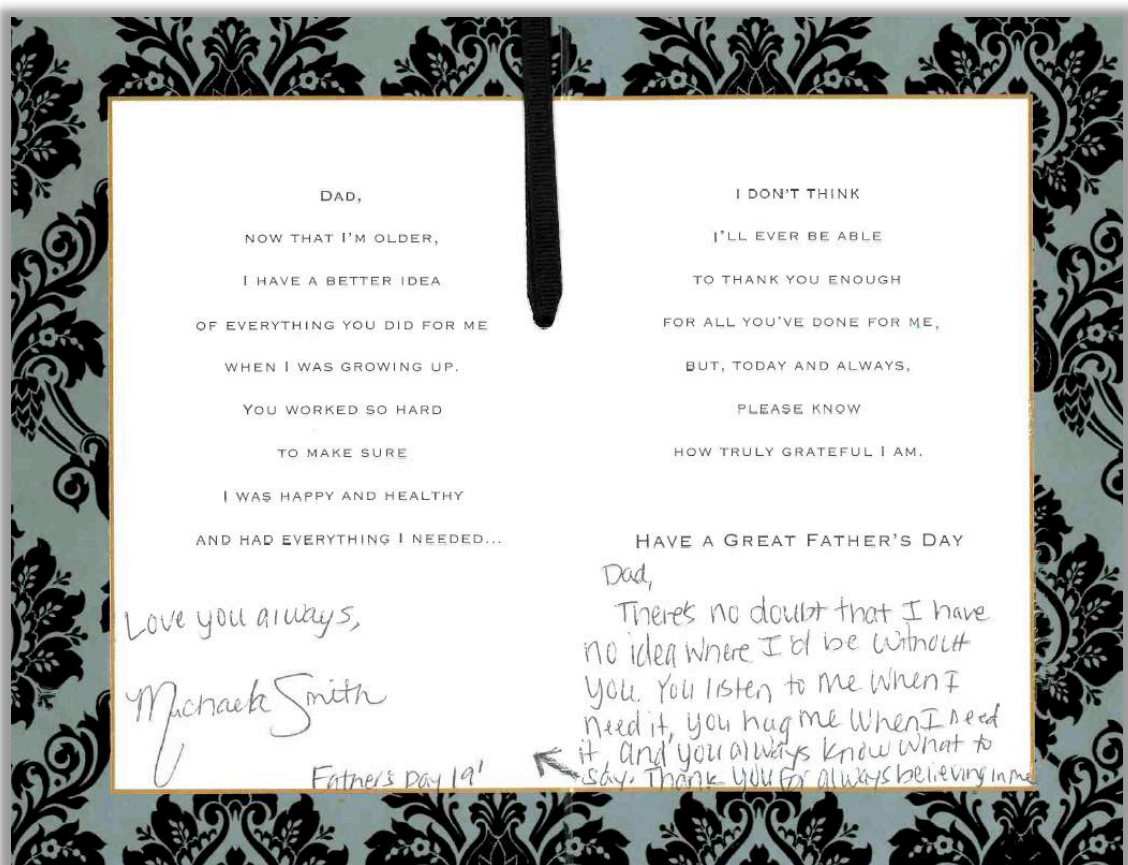
ended, Michaela asked the inmates if they had what they needed for the night. The inmates often said that Michaela was “a jailer who gets it.”

451. Michaela had a huge heart. She believed deeply in treating people with decency and had an unshakable faith that they would respond in kind.
452. Going back to her college days, Michaela was involved in efforts to combat domestic violence and human trafficking.
453. Michaela had strong, loving, and productive relationships with family, friends, neighbors, and others.
454. She was a huge University of Alabama football fan. She would not miss watching a game with her family and friends. Before her death, Michael and Annette were thinking of surprising her with tickets to a game.
455. Michaela had a close-knit group of friends at church. *See Appendix.*



456. She always made room for others in her life. In college, for example, she would often come home with a classmate who had nowhere to go for a break or holiday.
457. At church, she served as nursery teacher for pre-school children. She loved singing hymns and gospel songs—at church, in the car, in the shower.

458. Michaela dated a young man starting at the age 18, but that relationship ended two years before her death. By 2019, Michaela had moved on and was actively dating again. She had plans and hopes to marry and have children in due time.
459. Michaela was an only child. Annette and Michael adopted her as a baby, after they had been married, and had tried to have or adopt a child, for 16 years.
460. At that time, Annette was systematically contacting lawyers, to see if they knew anyone who was looking to place a baby. She crossed paths with a former classmate, who connected her with a young mother.
461. Michaela would constantly express gratitude to her parents for adopting her. She felt she had “gained” rather than “lost” something by being adopted.
462. This is the last Father’s Day card Michael received from Michaela.



463. Annette and Michael considered Michaela “a gift from God” for the 26 years of her abridged life. They still think of her that way.

464. Annette and Michael say that were “committed to Michaela before she was even born,” and once she came into their lives, they “never yearned for another child.”
465. According to them, “Michaela was a better person than her parents.”
466. Michaela enjoyed watching television series with her parents. She could recite dialogue from *Gray’s Anatomy* by memory.
467. Michaela and her parents took regular vacations to Florida. At the time of her death, she was starting to plan the next family vacation.
468. Unbeknownst to her parents, Michaela had signed up to be an organ donor. They learned of that fact after she died. Annette and Michael were asked to write a letter to the doctors and nurses harvesting Michaela’s organs in the operating room. This is what they wrote.

After many years of infertility God allowed us the beautiful gift of adoption and Michaela Elizabeth Smith, born Dec. 18, 1992 came to complete our family. For 26 years she has been the light in our home, and what a beautiful light she is. Michaela has this great big easy smile that lights up everything around her. Her love & acceptance of others lights up a world that is something sometimes judgemental & cynical, and her fiery temper has lit me up a few times if I sounded a little too judgemental of someone else. ~~How can I argue to myself down~~

Michaela knows how to be a true friend, a loving friend, a forgiving friend. She's a friend anyone would be lucky to call their own.

Michaela graduated Dalton State with a Bachelors degree in criminal justice and minor in psychology. Michaela's occupation was a detention officer, a jailer. (Does she look intimidating to you?) It's said that her inmates respected her because she showed them respect. She always said they just made a poor decision and deserved human respect and another chance.

Michaela loved children & worked with them at church. I've seen her tear up over a child saying something profound or doing something kind for someone else.

Michaela loved her some ALABAMA football and could coach any game from the comfort of our sofa. (took out Dick Saben)

God gave us 26 years with Michaela and if that's all we have, we will take it and feel blessed for it.

Mike & Annette Smith

469. Michaela’s organs were donated to five recipients, whose lives were likely saved.

470. Michaela's heart went to a 14-year-old girl, who lived.
471. In February 2020, the Murray County Sheriff's Department announced the creation of the Michaela Smith Scholarship Fund, which will provide an annual college scholarship to a student from each of the two high schools in Murray County who plans to pursue a career in criminal law or law enforcement.



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472. As a direct and proximate result of the Defendants' conduct, Plaintiffs are entitled to recover from Defendants reasonable compensatory damages in an amount exceeding \$10,000.00 to be determined by a fair and impartial jury for all damages Plaintiffs suffered, including physical, emotional, and economic injuries.

WHEREFORE, Plaintiffs demand a trial by jury, and judgment against the Defendants as follows:

- a. Compensatory damages in an amount exceeding \$10,000.00 to be determined by a fair and impartial jury;
- b. All costs of this action;
- c. Expenses of litigation pursuant to OCGA 13-6-11, including attorneys' fees;
- d. Punitive damages; and
- e. Such other and further relief as the Court deems just and proper.

Respectfully submitted,

/s/ Lloyd N. Bell

Lloyd N. Bell

Georgia Bar No. 048800

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Attorneys for Plaintiffs



## APPENDIX







**AFFIDAVIT OF ANTHONY MANCUSO, M.D., REGARDING  
MICHAELA ELIZABETH SMITH**

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Anthony Mancuso, M.D., who after first being duly sworn, states as follows.

**Introduction**

1. This affidavit addresses medical negligence that occurred during Michaela Smith's visit to Hamilton Medical Center ("Hamilton") in Dalton, Georgia, on June 28 and 29, 2019.
2. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.
3. This affidavit addresses matters that Plaintiffs' counsel have asked me to address. I have not attempted to identify all standard-of-care violations. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues the Defense might raise or that otherwise might arise as the case unfolds.
4. I use the term "standard of care" to refer to that degree of care and skill ordinarily exercised by members of the medical profession generally under the same or similar circumstances and like surrounding conditions as pertained to the medical providers I discuss here.
5. Plaintiffs' counsel drafted this affidavit after consulting with me, and I reviewed the draft and edited it to make sure it correctly states my views.
6. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details.
7. I hold all the opinions expressed below to a reasonable degree of medical certainty — that is, more likely than not. If additional information becomes available later, my views may change.

8. I understand that Plaintiffs' counsel will provide this affidavit to the Defendants, and that their insurance company will hire lawyers and medical experts to review this case and to review this affidavit. If anyone on the Defense believes that I have not been given, or have overlooked or misconstrued, any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiffs' counsel. The Defense need not wait to take my deposition to communicate with me. I will consider any information the Defense wishes to bring to my attention, and, if appropriate, I will provide a supplemental affidavit.

### Evidence Considered

9. I have reviewed medical records from Hamilton pertaining to Michaela Smith's visits on June 28 and 29, 2019. I have also reviewed medical records from Baroness Erlanger Hospital, the facility where Michaela was hospitalized and died, after her discharge from Hamilton.

### Principal Opinions

10. My principal opinions are summarized here. In deposition or trial testimony, I may elaborate upon these principal opinions, and in doing so, I may offer related, subsidiary, or incidental opinions.

- i. **Task & Requirement:** Interpreting and reporting on radiology.

*Standard of care requirement:* The standard of care requires a radiologist to identify and accurately report abnormalities in radiology imaging, including any sign of a possible stroke on a CT scan or MRI

*Violations:* Dr. Michael Cooney and Dr. Kevin Johnson each violated these requirements when each interpreted and reported Michaela's brain CT scan of 06/28/2019 as normal, when in fact there was a hyperdensity indicating a thrombosed basilar artery.

Specifically, Dr. Cooney and Dr. Johnson each failed to identify and report the white hyperdense sign of basilar-artery thrombosis plainly visible in image 7/29, and each also failed to identify and report the white streak consistent with thrombus visible in image 8/29.



Dr. Johnson also violated these requirements when he interpreted and reported Michaela's brain MRI of 06/29/2019 as normal, when in fact there were changes consistent with brainstem ischemia on the DWI sequence.

*Causation:* As a result of each of these violations, Michaela's stroke was not diagnosed or treated during her visits to Hamilton, and Michaela thereby suffered preventable brain injury and death. At about 23:54 on June 28, 2019, Michaela's stroke score was 0 (normal). She then went to bed at about 3:45 on June 29, 2019, feeling "fairly well." At 12:45 that same day, an MRI showed that her brainstem, although ischemic, had not yet suffered permanent stroke changes. But-for each of these violations, therefore, Michaela's stroke would have been diagnosed and treated.

*Damages:* Each of these violations thus caused Michaela pain and suffering, injury, and death.

ii. **Task & Requirement:** Calling critical values.

*Standard of care requirement:* The standard of care requires a radiologist to call critical values when a CT scan or MRI is concerning for stroke, including when the study reveals a sign of basilar-artery occlusion (BAO).

*Violations:* Dr. Cooney and Dr. Johnson each violated this requirement by failing immediately to report to the Hamilton emergency department the signs of a BAO in Michaela's CT scan.

Dr. Johnson also violated this requirement by failing immediately to report to the Hamilton emergency department the changes consistent with brainstem ischemia visible on the DWI sequence of Michaela's MRI.

*Causation:* As a result of each of these violations, Michaela's stroke was not diagnosed or treated during her visits to Hamilton, and Michaela thereby suffered preventable brain injury and death.

*Damages:* Each violation thus caused Michaela pain and suffering, injury, and death.

## Qualifications

11. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based on my own personal knowledge and belief.

12. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.

13. My Curriculum Vita, which is attached as Exhibit A, provides further detail about my qualifications. I incorporate and rely on that information here.

14. The events at issue here occurred in June 2019.

15. I am qualified to provide expert testimony pursuant to OCGA 24-7-702.

- a. In June 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of Florida to practice as a physician. That is where I was practicing in June 2019.

- b. In June 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to — specifically, the tasks identified above on which I offer standard-of-care opinions.

I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to June 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am a physician specializing in radiology, neuroradiology, and diagnostic radiology in the settings of hospitals and other long-term care facilities, and for many years I have had great familiarity with each of the tasks on which I offer standard-of-care opinions here.

### Attached Documents

16. The documents identified below are attached to this affidavit largely for the benefit of the insurance adjustors responsible for evaluating this case on behalf of the Defendants, and for the lawyers provided by the insurance company.

17. Attached to this affidavit is a document that recites medical principles that apply here. The Defendants themselves will not need that recitation of basic medical information. Plaintiff's counsel created the medical-principles document for the benefit of the Defense. I have reviewed the document, and the principles stated there are correctly stated and apply here.

18. Also attached to this affidavit is a chronology of facts pertaining to this case. In forming my substantive view of the case, I have relied on the medical records themselves, not the chronology. The chronology, however, provides a useful reference for relevant facts contained in the records in less-organized fashion. Plaintiff's counsel created the chronology. I have not edited it.

### Supporting Literature

19. The general points discussed above are elementary, are likely well known to the Defendants, and should not require a literature search. Insofar as any Defendant consulted or should have consulted reliable authorities on these points in treating Michaela Smith, the literature cited in the attached medical-principles document represents such authorities, which here may also prove helpful to adjustors and lawyers in their evaluation of this case.

*AA Mancuso*

Anthony Mancuso, M.D.

SWORN TO AND SUBSCRIBED before me

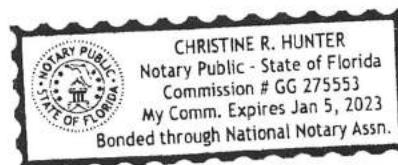
this 7<sup>th</sup> day of ~~February~~ <sup>April</sup>, 2021.

*Christine R. Hunter*

NOTARY PUBLIC

My Commission Expires: 1-5-2023

*Personally Known*





# CURRICULUM VITAE

## PERSONAL DATA

NAME: Anthony A. Mancuso, M.D.  
DATE OF BIRTH: August 16, 1947  
PLACE OF BIRTH: Brooklyn, New York  
CITIZENSHIP: U.S. Citizen

## EDUCATION

1965-1967 Miami Dade Junior College  
Miami, Florida  
A.A.  
1967-1969 Florida State University  
Tallahassee, Florida  
B.S.  
1969-1973 University of Miami School of Medicine  
Miami, Florida  
M.D.  
1973-1974 Internship, Mercy Hospital  
San Diego, California  
1974-1977 Residency, UCLA, CHS, Diagnostic Radiology  
Los Angeles, California

## PROFESSIONAL EXPERIENCE

### Appointments:

1977-1978 Adjunct Instructor, UCLA, Fellowship in Head and Neck Radiology and  
Computerized Tomography/Ultrasound, Los Angeles, California  
1978-1979 Adjunct Assistant Professor, Department of Radiology, UCLA/  
Co-Chief, CT and Ultrasound Section (1979-1980), Los Angeles, California  
1979-1981 Assistant Professor in Residence - Department of Radiology, UCLA/Chief, CT  
Section (1980-1981), Los Angeles, California  
Fellowship in Neuroradiology (February 1 - July 31, 1981)  
1981-1983 Associate Professor of Radiology (Neuroradiology Section). Department of  
Radiology, University of Utah School of Medicine,



1983-1984	Associate Professor of Radiology, University of Florida College of Medicine and Chief of Radiology, Veterans Administration Medical Center, Gainesville, Florida
1984-1989	Clinical Director of MRI, Shands Hospital, University of Florida College of Medicine, Gainesville, Florida
1986-present	Professor of Radiology, University of Florida College of Medicine, Gainesville, Florida
1990-1992	Clinical Director, Radiology Research, University of Florida College of Medicine, Gainesville, Florida
1998-2001	Associate Chairman for Research, Department of Radiology, University of Florida College of Medicine, Gainesville, Florida
5/2000-3/2001	Interim Chairman of Department of Radiology, University of Florida College of Medicine, Gainesville, Florida
4/2001-present	Chairman of Department of Radiology, University of Florida College of Medicine, Gainesville, Florida

**Visiting Professorships:**

- University of California at San Francisco, Department of Radiology, San Francisco, California, March 5, 1979
- Loyola University Medical School, Department of Radiology, Chicago, Illinois, March 27-28, 1979
- University of Washington, Department of Radiology, Seattle, Washington, May 5-7, 1983
- University of Miami, Department of Radiology, Miami, Florida, March 21-23, 1984
- University of Kentucky, Department of Radiology, Lexington, Kentucky, October 1984
- Columbia University College of Physicians and Surgeons, Department of Radiology, New York, New York, April 1986
- University of Texas Health Science Center at Dallas, Department of Radiology, Dallas, Texas, October 21-22, 1986
- Columbia University College of Physicians and Surgeons, Department of Radiology, New York, New York, April 1988
- Harvard University, Massachusetts General Hospital, Department of Radiology, Boston, Massachusetts, April 1988
- University of Pittsburgh, Department of Radiology, Pittsburgh, Pennsylvania, March 13-14, 1991
- University of Virginia, Department of Radiology, Charlottesville, Virginia, January 21-22, 1993
- Wayne State University, Department of Radiology, Detroit, Michigan, February 2-4, 1994
- University of Toronto, Department of Radiology, Toronto, Canada October 1-3, 1995
- University of Texas-M.D. Anderson Hospital, Houston, Texas--Doubleday Lecturer, May 20-21, 1996
- Allegheny University Hospitals, Pittsburgh --May 7<sup>th</sup> and 8<sup>th</sup>, 1998
- University of Virginia- Keat's Society Endowed Honorary Lectureship- May 13-15,2011

### Committee Service

- Member, Research Advisory Committee - Department of Radiology, UCLA, Los Angeles, California, 1979-1981
- Member, Resident Selection Committee - Department of Radiology, UCLA, Los Angeles, California, 1979-1981
- Member, Medical Care Evaluation Committee, Shands Hospital, Gainesville, Florida, 1984-1985
- Member, Emergency Room Advisory Committee, Shands Hospital, Gainesville, Florida, 1984-1985
- Member, Department of Radiology Finance Committee, Shands Hospital, Gainesville, Florida, 1984-1986
- American College of Radiology (ACR) - Coding Index and Thesaurus Committee, 1985-1990
- Member, Radiological Society of North America (RSNA) Program Committee, Neuroradiology/ Head and Neck Radiology, 1986-1991
- American College of Radiology (ACR) - Malpractice Awareness Task Force/Expert Witness Program, 1986-1990
- Association of University Radiologists (AUR) - Stauffer Award Committee (Research Award), 1986-1987
- Medical Care Evaluation Committee, Shands Hospital, 1987-1990
- American College of Radiology (ACR) - Interdisciplinary Committee on Diagnostic Imaging in Cancer Management, 1986-1987
- American Medical Association - Panel on Magnetic Resonance Imaging, 1984-1988
- Brain Institute Task Force, University of Florida College of Medicine, 1990-1992
- American Society of Head and Neck Radiology, Publications Committee, 1990-1991
- Search Committee for Chairman of Radiation Oncology, 1991-1992
- MRI Research Committee, Department of Radiology, University of Florida College of Medicine, 1991-2001
- Finance Committee, Department of Radiology, University of Florida College of Medicine, 1991-1998
- CT Quality Assurance Committee, Department of Radiology, University of Florida College of Medicine, 1992-1994
- University of Florida Research Advisory Committee, University of Florida College of Medicine, 1992-1994
- American Board of Radiology - Committee on Certificate of Added Qualifications for Neuroradiology, 1992-1995

- Masters Thesis Committee - Jason Rosenberg, 1992-1993
- Second World Congress on Laryngeal Cancer - Advisory Committee, 1993-1994
- American Society of Head and Neck Radiology Publications Committee, 1993-1995
- UFCOM Search Committee for Anatomy and Cell Biology Chair, Spring, 1995
- CQI Committees Read and Return; Communications; MRI (Radiology Department), 1996-1998
- UFCOM Neurology Chairman Search Committee, 1999 and 2000-2001
- Ad Hoc Committee UF AGH—UF Shands Consolidation, 1998-1999
- UF COM College Incentive Fund Review Committee-2000-2001
- Medical Executive Committee, Shands at AGH, May 2001-2006
- Medical Executive Committee, Shands at UF, 2001-present
- Florida Group Practice Executive Committee, 2001-present
- Otolaryngology Chairman Search Committee-- Chairman, 2001-2002 and 2003-2004
- UF COM Promotion and Tenure Committee-Associate Chairman-2002 and Chairman 2003
- UF Group Practice Association—3<sup>rd</sup> Vice President- 2008 to present
- UF Executive Fiscal Advisory Committee—2008 to present
- Pathology Chairman Search Committee-- Chairman, 2010
- Chairman UF Executive Fiscal Advisory Committee—2010 to present
- UF Group Practice Association—President- 2010 to present

#### **Membership in Scholarly Societies:**

- Radiological Society of North America
- American Society of Head and Neck Radiology (Secretary, 1982-1985; Executive Committee, 1985-1986; Vice President, 1988; President Elect, 1989-1990; President, 1990-1991; Past President 1991-1992)
- American Society of Neuroradiology, Senior Member
- American Society for Head and Neck Surgery, Honorary Member
- European Society of Head and Neck Radiology, Honorary Member, 2011

### Editorial Experience:

- Editorial Board: American Journal of Neuroradiology (1992-2000); Journal of Computed Axial Tomography (1993-2006); Acta Radiologica Portuguesa (1993-1995); International Journal of Radiation Oncology, Biology and Physics (1998-2006)
- Referee for following journals: Radiology, Journal of Magnetic Resonance in Medicine, Journal of Computer Assisted Tomography, International Journal of Radiation Oncology, Biological Physics, Investigative Radiology, Head and Neck, Cancer, AJNR
- Review of proposed texts for Williams and Wilkins, Lea and Febiger, C. V. Mosby

### Grants:

- National Research Service Award Fellowship for training in Academic Radiology from NIH/PHS, 1976-1980 (Principal Investigator).
- Grant-in-aid from Berlex Corporation to study Gadolinium-DTPA in cerebral lesions, 1985 (\$35,000). Renewal 1986 (\$35,000). New study in pediatric patients on same contrast, 1987 (\$35,000) (Principal Investigator).
- Division of Sponsored Research, University of Florida granted the Department of Radiology \$150,000 for support of second whole body imager (Principal Investigator).
- NIH-NCI grant #U01 CA 54026-01, "Comparison of CT and MRI in Staging of Cervical Metastases." \$400,000 over 4 years. Funded October 1991 (Principal Investigator).
- RSNA seed grant, "Detection of Unknown Primary Tumors of the Head and Neck Using 2-[F-18] Fluoro-2-Deoxy-D-Glucose."—Principal Investigator: Suresh K. Mukherji, M.D. \$20,000. Funded Spring 1993 (Co-Principal Investigator).
- Eli Lilly Olanzapine Research Study—Co-Principal Investigator: Katherine N. Scott, Ph.D. Funded February 1998 (Consultant and over-reading of films).
- K-30 Fellowship Funding, "Evidence Based Radiology"—Principal Investigator: Christopher Sistrom, M.D. \$40,000. Funded 1999 (Mentor).
- Magnetic Resonance Imaging (MRI) of the Upper Trachea During Respiration and Valsalva maneuver. Mallinckrodt—Principal Investigator: Ilona M. Schmalfluss, M.D. Funded 1999 (Co-Principal Investigator).
- AHA Women and Minorities Access to Research Grant, "Pilot Study of Cerebral Vascular Reserve as a Risk Factor for Stroke in Pediatric Sickle Cell Disease"—Principal Investigator: Lorna Sohn Williams, M.D. \$59,900. Funded 2000 (Co-Principal Investigator).
- "Study of the Dynamic Motion of Oropharynx." Kos Pharmaceuticals—Principal Investigator: Ilona M. Schmalfluss, M.D. \$41,888. Funded February 2000 (Co-Principal Investigator).
- "Muscle Composition and Function for Swallowing in Head/Neck Cancer Patients Undergoing Radiotherapy." University of Florida (Opportunity Grant). Phormax—Co-Principal Investigator: Ilona M. Schmalfluss, M.D. \$10,000. Funded October 2000 (Co-Principal Investigator).

- "New Faculty Start-Up." HHMI funding —Principal Investigator: Christopher L. Siström, M.D. \$115,000. Funded March 2001 (Mentor).
- "Free Text Versus Structure Format for Radiology Reports: Measuring Performance and Preference of Selected Medical Personnel in Extracting Case Specific Information." GE funding—Principal Investigator: Christopher L. Siström, M.D. \$50,000. Funded July 2001 (Mentor).

**Gift:**

- Secured, as a gift to the Department of Radiology, University of Florida, College of Medicine a 0.15 T whole body imager from Technicare Corporation for dedicated research on coil development and proton imaging, 1985. Included were warranty and installation. Total worth \$950,000 - 1,000,000.

**Patent:**

- Patent received: Angled segment receiver coil for NMR imaging of the head. Filed U. S. Patent Court, 1986. Patent #4,784,146.
- Patent received: Method for improving delivery of pharmaceutical aerosols. Patent #6,567,686.



## **SCHOLASTIC HONORS**

### **Honorary Societies:**

- National Beta Honor Society (High School)
- Phi Theta Kappa (Miami Dade Junior College)
- Alpha Omega Alpha (junior year, University of Miami Medical School, Vice President, senior year)

### **Awards and Honors:**

1967-1968	Haydon Burns Scholarship (Miami Dade Junior College)
1969-1973	Complete tuition scholarship to University of Miami School of Medicine
1969	B.S., Magna Cum Laude
1973	M.D. with honors - graduating second in class of 115
1978	Summa Cum Laude award. Radiological Society of North America for exhibit: Correlated CT Anatomy and Pathology of the Larynx. Annual Scientific Assembly and Meeting of the Radiological Society of North America, Chicago, Illinois, November 26 - December 1, 1978
1979	Certificate of Special Merit. American Roentgen Ray Society for exhibit: Correlated CT anatomy and Pathology of the Larynx. Annual American Roentgen Ray Society Meeting, Toronto, Canada, March 1979
1979	Certificate of Special Merit. American Roentgen Ray Society for exhibit: CT of the Nasopharynx - Normal Variations of Normal and Pathological Correlations. Annual American Roentgen Ray Society Meeting, Toronto, Canada, March 1979
1980	Gold Medal. American Society of Neuroradiology for exhibit: High Resolution CT of the Temporal Bone, Los Angeles. Annual Meeting of the American Society of Neuroradiology, 1980
1991	Certificate of Merit. Morphologic Characteristics Useful in Guiding the Diagnostic Work-up of Infiltrative Diseases of the Head and Neck. Exhibit presented at the Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1991
1992	Certificate of Merit. CT of Normal and Abnormal Facial Nodes. Exhibit presented at the Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1992

- 1993 Cum Laude Certificate. Radiographic Appearance of the Irradiated Larynx and Hypopharynx by Computed Tomography. Exhibit presented at the Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1993
- 1994-present Listed in *Best Doctors in America®: Southeast Region*
- 1995 Examiner for American Board of Radiology Certificate of Added Qualifications in Neuroradiology Oral Examinations
- 1996 Leonard C. Doubleday Lecturer and Honorary Membership in The Houston Radiologic Society
- 1996 Keynote Speaker-International Congress on Head and Neck Cancer Toronto, Canada
- 1997 Presidential Citation—American Society for Head and Neck Surgery
- 2005 Gold Medal Recipient—American Society of Head and Neck Radiology, San Francisco, California, September 2005
- 2100 Lifetime Achievement Award – European society of Head and Neck Radiology, September 2011

## **LICENSURE AND CERTIFICATION**

LICENSURE: Florida, #ME0042665  
California, #G027974

CERTIFICATION: 1978, Diplomate of the American Board of Radiology  
1995, American Board of Radiology Certificate of Added Qualifications in Neuroradiology

## **BIBLIOGRAPHY**

### **REFEREED PUBLICATIONS:**

1. Mancuso AA, Hanafee WN, Julliard GJ, Winter J, Calcaterra TC. The role of computed tomography in the management of cancer of the larynx. *Radiology* 1977; 124 (1):243-244.
2. Mancuso AA, Hanafee WN, Winter J, Ward P. Extensions of paranasal sinus tumors and inflammatory disease as evaluated by CT and pluridirectional tomography. *Neuroradiology* 1978; 16(2):449-453.
3. Mancuso AA, Calcaterra TC, Hanafee WN. Computed tomography of the larynx. *Radiol Clin North Am* 1978; 16(2):195-208.
4. Bein ME, Mancuso AA, Mink JH, Hansen GC. Computed tomography in the evaluation of mediastinal lipomatosis. *J Comput Assist Tomogr* 1978; 2(4):379-383.
5. Mancuso AA. Computed tomographic scanning of the larynx. *West J Med* 1979; 130(5):445-446.
6. Mancuso AA, Rice D, Hanafee WN. Computed tomography with simultaneous sialography in the evaluation of salivary gland tumors. *Radiology* 1979; 132(5 Pt 1):211.
7. Hanafee WN, Mancuso AA, Jenkins HA, Winter J. Computerized tomography scanning of the temporal bone. *Ann Otol Rhinol Laryngol* 1979; 88(5 Pt 1):721-728.
8. Mancuso AA, Hanafee WN. A comparative evaluation of computed tomography and laryngography. *Radiology* 1979; 133(1):131-138.
9. Mancuso AA, Hanafee WN. Computed tomography of the injured larynx. *Radiology* 1979; 133(1):139-144.
10. Pagani JU, Thompson J, Mancuso A, Hanafee W. Lateral wall of the olfactory fossa in determining intracranial extensions of sinus cancer. *AJR* 1979; 133:497-501.
11. Ward P, Hanafee WN, Mancuso A, Shallit J, Berci G. Evaluation of computerized tomography, cinelaryngoscopy and laryngography in determining the extent of laryngeal disease. *Ann Otol* 1979; 88:454-462.
12. Rice DH, Mancuso AA, Hanafee WN. Computerized tomography with simultaneous sialography in evaluating parotid tumors. *Arch Otolaryngol* 1980; 106(8):472-473.
13. Hanafee WN, Mancuso A, Winter J, Jenkins H, Bergstrom JF. Edge enhancement CT scanning in inflammatory lesions of the middle ear. *Radiology* 1980; 136:771-775.
14. Mancuso AA, Tamakwa Y, Hanafee WN. CT of the fixed vocal cord. *AJR* 1980; 135(3):7529-7534.
15. Bentson JR, Mancuso AA, Winter J, Hanafee WN. Combined gas cisternography and edge-enhanced computed tomography of the internal auditory canal. *Radiology* 1980; 136(3):777-779.
16. Mancuso AA, Bohman L, Hanafee W, Maxwell D. Computed tomography of the nasopharynx: normal and variants of normal. *Radiology* 1980; 137(1 Pt 1):113-121.
17. Bohman LG, Mancuso AA, Thompson J, Ward PH, Hanafee WN. A CT approach to benign nasopharyngeal masses. *AJR* 1981; 136(1):173-180.

18. Schwimer SR, Bassett LW, Mancuso AA, Mirra JM, Dawson EG. Giant cell tumor of the cervicothoracic spine. *AJR* 1981; 136(1):63-67.
19. Mancuso AA, Maceri D, Rice D, Hanafee W. CT of cervical lymph node cancer. *AJR* 1981; 136(2):381-385.
20. Stone DN, Mancuso AA, Rice D, Hanafee WN. Parotid CT sialography. *Radiology* 1981; 138(2):393-397.
21. Centeno RS, Bentson JR, Mancuso AA. CT scanning in rhinocerebral mucormycosis and aspergillosis. *Radiology* 1981; 140(2):383-389.
22. Larsson SG, Mancuso AA, Hoover L, Hanafee WN. Differentiation of pyriform sinus cancer from supraglottic laryngeal cancer by computed tomography. *Radiology* 1981; 141:427-432.
23. Fon GT, Bein ME, Mancuso AA, Keeseey JC, Lupetin AR, Wong WS. Computed tomography of the anterior mediastinum in myasthenia gravis. A radiologic-pathologic correlative study. *Radiology* 1982; 142(1):135-141.
24. Lufkin R, Barni JJ, Glen W, Mancuso AA, et al. Comparison of computed tomography and pluridirectional tomography of the temporal bone. *Radiology* 1982; 143:715-717.
25. Larsson SG, Mancuso AA, Hanafee WN. Computed tomography of the tongue and floor of the mouth. *Radiology* 1982; 143:493-500.
26. Koehler PR, Mancuso AA. Pitfalls in the diagnosis of retroperitoneal adenopathy. *J Can Assoc Radiol* 1982; 33(3):197-201.
27. Hanson DG, Mancuso AA, Hanafee WN. Pseudomass lesions due to occult trauma of the larynx. *Laryngoscope* 1982; 92(11):1249-1253.
28. Maceri DR, Mancuso AA, Canalis R. Value of computed axial tomography in severe laryngeal injury. *Arch Otolaryngol* 1982; 108(7):449-451.
29. Osborn AG, Hanafee WH, Mancuso AA. Normal and pathologic CT anatomy of the mandible. *AJR* 1982; 139(3):555-559.
30. Mancuso AA, Hanafee WN. Elusive head and neck carcinomas beneath intact mucosa. *Laryngoscope* 1983; 93(2):133-139.
31. Halden WJ, Harnsberger HR, Mancuso AA. Computed tomography of esophageal varices after sclerotherapy. *AJR* 1983; 140(6):1195-1196.
32. Mancuso AA, Harnsberger HR, Muraki AS, Stevens MH. Computed tomography of cervical and retropharyngeal lymph nodes: normal anatomy, variants of normal, and applications in staging head and neck cancer. Part I: normal anatomy. *Radiology* 1983; 148(3):709-714.
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35. Harnsberger HR, Mancuso AA, Muraki AS, Parkin JL. The upper aerodigestive tract and neck: CT evaluation of recurrent tumors. *Radiology* 1983; 149(2):503-509.

36. Kalovidouris A, Mancuso AA, Sarti D. Static gray scale parathyroid ultrasonography. (Is high-resolution real time technique required?) *Clinical Radiology* 1983; 34:385-393.
37. Mancuso AA. Cervical lymph node metastases: oncologic imaging and diagnosis. *Int J Radiat Oncol Biol Phys* 1984; 10(3):411-423.
38. Kalovidouris A, Mancuso AA, Dillon W. A CT-clinical approach to patients with symptoms related to the V, VII, IX-XII cranial nerves and cervical sympathetics. *Radiology* 1984; 151(3):671-676.
39. Dudley JP, Mancuso AA, Fonkalsrud EW. Arytenoid dislocation and computed tomography. *Arch Otolaryngol* 1984; 110(7):483-484.
40. Lawry GV, Finerman ML, Hanafee WN, Mancuso AA, Fan PT, Bluestone R. Laryngeal involvement in rheumatoid arthritis. A clinical, laryngoscopic and computerized tomographic study. *Arthritis Rheum* 1984; 27(8):873-882.
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42. Muraki AS, Mancuso AA, Harnsberger HR. Metastatic cervical adenopathy from tumors of unknown origin: the role of CT. *Radiology* 1984; 152(3):749-753.
43. Pettersson H, Hamlin DJ, Mancuso AA. MRI of the musculoskeletal system. Review article. *Acta Radiol* 1985; 26:225-235.
44. Fitzsimmons JR, Thomas RG, Mancuso AA. Proton imaging with surface coils on a 0.15-T resistive system. *Magn Reson Med* 1985; 2(2):180-185.
45. Hall MG, Artega DM, Mancuso AA. Use of computed tomography in localization of head and neck space infections. *J Oral Maxillofac Surg* 1985; 43:978-980.
46. Stevens MH, Harnsberger HR, Mancuso AA, Davis RK, Johnson LP, Parkin JL. Computed tomography of cervical lymph nodes. Staging and management of head and neck cancer. *Arch Otolaryngol* 1985; 111(11):735-739.
47. Virapongse C, Mancuso AA, Fitzsimmons JR. Value of magnetic resonance in assessing bone destruction in head and neck lesions. *Laryngoscope* 1986; 96(3):284-291.
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49. Akins EW, Fitzsimmons JR, Mancuso AA, Angus LB, Boucher M. Double loop receiver coil for MR imaging at 0.15T. *J Comput Assist Tomogr* 1986; 10(6):1083-1088.
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52. Akins EW, Carmichael MJ, Hill JA, Mancuso AA. Preoperative evaluation of the thoracic aorta using MRI and angiography. *Ann Thoracic Surg* 1987; 44(5):499-507.
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61. Russel EJ, Schaible TF, Dillon W, Drayer B, Lipuma J, Mancuso AA, et al. Multicenter double blind placebo controlled study of Gadolinium-DTPA/Dimeglumine as an MRI contrast agent in patients presenting with cerebral lesions. *AJNR* 1989; 10:53.
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64. Guy J, Fitzsimmons J, Ellis EA, Mancuso AA. Gadolinium-DTPA-enhanced magnetic resonance imaging in experimental optic neuritis. *Ophthalmology* 1990; 97(5):601-607.
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66. Hamed L, Mancuso AA. Inferior rectus muscle contracture syndrome after retrobulbar anesthesia. *Ophthalmology* 1991; 98:1506-1512.
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70. Zadvinskis DP, Benson MT, Kerr HH, Mancuso AA, Cacciarelli AA, Madrazo BL, Mafee MF, Dalen K. Congenital malformations of the cervicothoracic lymphatic system: embryology and pathogenesis. *Radiographics* 1992; 12(6):1175-1189.
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74. Guy J, Fitzsimmons JR, Ellis A, Beck B, Mancuso AA. Intraorbital optic nerve and experimental optic neuritis: correlation of fat suppression magnetic resonance imaging and electron microscopy. *Ophthalmology* 1992; 99:720-725.
75. Saleh EM, Mancuso AA, Stringer SP. Relative roles of computed tomography and endoscopy for determining the inferior extent of pyriform sinus carcinoma: correlative histopathologic study. *Head Neck* 1993; 15(1):44-52.
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77. Kasper ME, Parsons JT, Mancuso AA, Mendenhall WM, Stringer SP, Cassisi NJ, Million RR. Radiation therapy for juvenile angiofibroma: evaluation by CT and MRI, analysis of tumor regression, and selection of patients. *Int J Radiat Oncol Biol Phys* 1993; 25(4):689-694.
78. Lee WR, Mancuso AA, Saleh EM, Mendenhall WN, Parsons JT, Million RR. Can pretreatment computed tomography findings predict local control in T3 squamous cell carcinoma of the glottic larynx treated with radiotherapy alone? *Int J Radiat Oncol Biol Phys* 1993; 25(4):683-687.
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81. Tart RP, Mukherji SK, Avino AJ, Stringer SP, Mancuso AA. Facial lymph nodes: normal and abnormal CT appearance. *Radiology* 1993; 188(3):695-700.
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19. Mancuso AA. Diagnostic Imaging (Chapter 7) In: Weber RS, Miller M, Goepfert H. (eds.) Basal and Squamous Cell Skin Cancers of the Head and Neck. Philadelphia: Lee and Febiger, 1995.
20. Larson SG, Mancuso AA. Head and Neck. In: Peterson Holger (ed.) Nicer Centennial Book 1995 - A Global Textbook of Radiology 1995.
21. Janecka IP, Kapadia S, Mancuso A, Prasad S, Moffat DA, Pribaz J. Surgical management temporal bone cancer. In: Harrison L, Sessions R (eds.) Lippincott-Raven, 1997.
22. Schmalfluss IM, Mancuso AA. Diagnostic Imaging. In: Shah, JT (ed.) Essentials of Head and Neck Oncology. New York: Thieme, 1998.
23. Schmalfluss IM, Mancuso AA. Head and Neck in Helical (Spiral) Computed Tomography: A Practical Approach to Clinical Protocols. In: Silverman P (ed.) Philadelphia: Lippincott-Raven Publishers, 1998.
24. MENDENHALL WM, MANCUSO, AA; AMDUR RJ, M.D: MANAGEMENT OF THE NECK INCLUDING UNKNOWN PRIMARY TUMOR JOHN W. WERNING, M.D. IN: PRINCIPLES AND PRACTICE OF RADIATION ONCOLOGY (2005)
25. Mendenhall WM MD, Mancuso AA, Kirwan J, Werning JW, Flowers FP: Skin Carcinoma, IN: PRINCIPLES AND PRACTICE OF RADIATION ONCOLOGY (2005)

**ARTICLES SELECTED FOR ABSTRACTING, PROCEEDINGS:**

1. Mancuso AA, Hanafee WN, Winter J, Ward P. A comparison of computed tomography and conventional pluridirectional tomography in the evaluation of paranasal sinus pathology. *J Comput Assist Tomogr* 1978; 2.
2. Mancuso AA, Hanfee WN, Calcaterra T. CT scanning of the larynx. *J Comput Assist Tomogr* 1978; 2:522.
3. Bein ME, Mancuso AA, Mink JH, Hansen GC. Computed tomography in the evaluation of mediastinal lipomatosis. *J Comput Assist Tomogr* 1978; 2.
4. Mancuso AA, Bohman L, Hanafee WN, Maxwell, Ward BH. Nasopharynx - Normal variations of normal and pathological correlations. *AJR* 1979; 133(2):345.
5. Mancuso AA, Hanafee WN, Ward PH, Calcaterra T. Correlated CT anatomy and pathology of the larynx. *AJR* 1979; 133(2):345.
6. Mancuso AA. In: Moss A, Goldberg H (eds.) *Pediatric ultrasound: Four common clinical problems. Computed tomography, ultrasound and x-ray: An integrated approach.* UCSF, Department of Radiology Postgraduate Education Division, 1980.
7. Mancuso AA. In: Moss A, Goldberg H (eds.) *Ultrasound of the neck. Computed tomography, ultrasound and x-ray: An integrated approach.* UCSF, Department of Radiology Postgraduate Education Division, 1980.
8. Rice D, Mancuso AA, Hanafee WN. Computed tomography with simultaneous contrast sialography, epitomes of progress - Otolaryngology. *West J Med* 1981; 133(4):321-322.
9. Mancuso AA. Cervical lymph node cancer. *OR Digest* 1981; 13-14.
10. Mancuso AA, Hanafee WN. Elusive head and neck carcinoma beneath intact mucosa. *OR Digest* 1984; 13-14.
11. Mancuso AA, Harnsberger HR, Mauaki AS, et al. Computed tomography of cervical and retropharyngeal lymph nodes: Normal anatomy, variants of normal and applications in staging head and neck cancer. Parts I and II. *Radiology* 1983; 148:709-723. Abstract in *Year Book of Diagnostic Radiology*, Kieffer SA (ed.).
12. Mancuso AA, Virapongse C, Quisling RG. Early clinical experience with Gd-DTPA enhanced MRI in acute cerebral infarction and chronic ischemic changes. In: *Excerpta Medica, Contrast Agents in Magnetic Resonance Imaging.* Elsevier Science, 1986.
13. Mancuso AA. Impact of CT and MRI on the diagnosis of head and neck cancer. *Excerpta Medica, Proceedings of VI European Congress of Radiology.* Elsevier Science, 1987.
14. Tart RP, Mancuso AA, et al. Facial lymph nodes: Normal and abnormal CT appearance. *Radiology* 1993; 188:695-700. *Year Book of Neuroradiology* 1995; (in press)
15. Mukherji SK, Mancuso AA, et al. Irradiated paragangliomas of the head and neck: CT and MR appearance. *AJNR* 1994; 15:357-363. *Year Book of Neuroradiology* 1995 (in press)

## **PRESENTATIONS AT SCIENTIFIC MEETINGS**

1. Mancuso AA, Calcaterra TC, Hanafee WN. The role of CT scanning in the management of cancer of the larynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1976.
2. Mancuso AA. CT scanning of the larynx and nasopharynx. The Eleventh Annual Conference on Radiology in Otolaryngology and Ophthalmology. American Otolaryngologic Association, Los Angeles, California, May 21-23, 1977.
3. Mancuso AA. CT screening of the paranasal sinuses. Western Neuroradiologic Society, Palm Springs, California, October 7-9, 1977.
4. Participation in a panel on "Adult Head and Neck Problems" by invitation of Paul Ward, M.D., Chief of the Department of Head and Neck Ophthalmology and Otolaryngology. American Otolaryngologic Association, Los Angeles, California, January 23, 26, 1978.
5. Mancuso AA, Hanafee WN. CT scanning of the larynx. International Symposium on Computed Tomography. Harvard University, Miami, Florida, March 19-24, 1978.
6. Mancuso AA, Hanafee WN. A comparison of CT scanning and pluridirectional tomography in the evaluation of paranasal sinus pathology. International Symposium on Computed Tomography. Harvard University, Miami, Florida, March 19-24, 1978.
7. Mancuso AA, Hanafee WN. A comparison of computed tomography and laryngography in the evaluation of laryngeal pathology. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 30, 1978.
8. Mancuso AA, Rice D, Hanafee WN. CT scanning of the parotid gland during contrast sialography. Computed tomography: International Symposium and Course. Harvard University, Las Vegas, Nevada, April 1979.
9. Mancuso AA, Hanafee WN, Ward P. Comparison of CT scanning and laryngography in laryngeal cancer. Computed tomography: International Symposium and Course. Harvard University, Las Vegas, Nevada, April 1979.
10. Featured speaker by invitation: Computed tomography of the larynx; CT of the paranasal sinuses and nasopharynx. Western Society of Neuroradiology, Carmel, California, October 5-7, 1979.
11. Mancuso AA, Bohman LG, Hanafee WN, Maxell DS. CT of the nasopharynx: Normal and variants of normal. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Atlanta, Georgia, November 1979.
12. Mancuso AA. New techniques in otolaryngologic diagnosis. Pacific Coast Otolaryngologic Society, San Diego, California, May, 1980.
13. Mancuso AA, Maceri D, Rice D, Hanafee WN. CT diagnosis of cervical lymph node cancer. Western Neuroradiologic Society, San Diego, California, October 1980.
14. Stone D, Mancuso AA, Rice D, Hanafee WN. CT parotid sialography. Western Neuroradiologic Society, San Diego, California, October 1980.
15. By invitation: One of five panelists of Oncodiagnosis Symposium. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Dallas, Texas, November 1980.

16. By invitation: Workshop on CT of the larynx, nasopharynx, parapharyngeal space, paranasal sinuses, salivary glands. Los Angeles Radiological Society Mid-Winter Conference, Los Angeles, California, January 1981.
17. Radiological Society of North America Refresher Course: Computed tomography of the head and neck. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1981.
18. Radiological Society of North America Categorical Course : Radiation therapy, head and neck cancer imaging. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1981.
19. Radiological Society of North America Refresher Course: Computed tomography of the upper aerodigestive tract and neck. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1982.
20. Mancuso AA. CT of the larynx tumor and trauma. American Society of Head and Neck Radiology Postgraduate Course, Los Angeles, California, May 1981.
21. Mancuso AA. Ultrasound, CT and NMR in head and neck disease and radiology of the sinuses. International Congress and Postgraduate Course on Radiology in Otolaryngology, Paris, France, June 1982.
22. Mancuso AA. CT of cervical and retropharyngeal lymph nodes: Normal, variations of normal and applications in staging head and neck cancer. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1982.
23. Mancuso AA. The CT evaluation of recurrent and residual cancer of the upper aerodigestive tract and neck. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1982.
24. Mancuso AA. The CT-clinical approach to patients with symptoms related to cranial nerves V, VII, IX-XII and cervical sympathetics. American Society of Head and Neck Radiology Meeting and Postgraduate Course, Boston, Massachusetts, May 1983.
25. Radiological Society of North America Refresher Course: Computed tomography of the pharynx, larynx and neck. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1983.
26. A CT-clinical approach to patients with symptoms related to cranial nerves V, VII, IX-XII and cervical sympathetics. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1983.
27. By invitation of the American College of Surgery, Otolaryngology Interdisciplinary Panel Discussion. 69th Clinical Congress of the American College of Surgeons, Atlanta, Georgia, 1983.
28. Mancuso AA. MRI of the upper pharynx and neck: Variations of normal and possible applications in detecting and staging malignant tumors. Society of Magnetic Resonance in Medicine, New York, August 1974.
29. Radiological Society of North America Refresher Course: MRI and CT of the pharynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Washington, D. C., November 1984.
30. Mancuso AA. MRI of the upper pharynx and neck: Variations of normal and possible applications in detecting and staging malignant tumors. Part I - Normal variations. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Washington, D. C., November 1984.

31. Mancuso AA. MRI of the upper pharynx and neck: Variations of normal and possible applications in detecting and staging malignant tumors. Part II - Pathology. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Washington, D. C., November 1984.
32. Radiological Society of North America Refresher Course: MRI and CT of the pharynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1985.
33. Mancuso AA. High performance receiver coils for imaging the head and neck and 0.15 T: Clinical experience with thin section studies. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, 1985.
34. Mancuso AA. 1. CT and MRI of facial nerve disorders. 2. Imaging of the thyroid and parathyroids. 3. CT and MRI of the pharynx. Annual Meeting of the American Society of Head and Neck Radiology, Seattle, Washington, May 1986.
35. Invited speaker/panelist: Management of parotid tumors. American College of Surgeons Clinical Congress, New Orleans, Louisiana, November 1986.
36. Invited speaker/panelist: Magnetic resonance imaging seminar. Los Angeles Radiologic Society, Los Angeles, California, November 1986.
37. Radiological Society of North America Refresher Course: MRI and CT of the pharynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1986.
38. Invited guest: Radiological Society of North America sponsored lecturer for VI European Congress of Radiology, Lisbon, Portugal, June 1987.
  - a. Keynote lecture: Impact of CT and MRI in the diagnosis of head and neck cancer.
  - b. Refresher Course: Cervical lymph node metastases - oncologic imaging and diagnosis.
39. Invited guest: European Society for Therapeutic Radiology and Oncology: Practical planning problems in radiotherapy of head and neck cancer, Lisbon, Portugal, May 1987.
40. Radiological Society of North America Refresher Course: MRI and CT of the pharynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1987.
41. Radiological Society of North America Refresher Course: Oncodiagnostic Panel. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1987.
42. Scientific Committee and Faculty: XI International Congress of Head and Neck Radiology. European Society of Head and Neck Radiology, Uppsala, Sweden, June 6-11, 1988.
43. Invited speaker: Second International Conference on Head and Neck Cancer. American Society for Head and Neck Surgery Sponsor, Boston, Massachusetts, August 1988.
44. Invited panelist: Cervical metastasis in aerodigestive cancer. American Academy of Otolaryngology and Head and Neck Surgery, Washington, D. C., September 1988.
45. Radiological Society of North America Refresher Course: MRI and CT of the pharynx and floor of the mouth. Scientific Assembly and Annual Meeting of the RSNA, Chicago, Illinois, 1988.
46. Invited lecturer and panelist: The impact of new imaging technique on cancer staging and curability. International Congress of Radiation Oncology. Paris, France, July 1989.



47. Invited lecturer, panelist, moderator: 17th International Congress of Radiology. Paris, France, July 1989.
48. Invited lecturer, panelist: American College of Surgeons Clinical Congress Postgraduate Course: Otorhinolaryngology: Carcinoma of the tongue. Atlanta, Georgia, October 1989.
49. Radiological Society of North America Refresher Course: CT and MRI of the pharynx and floor of the mouth. Also Moderator of Scientific Session, Chicago, Illinois, 1989.
50. Magnetic Resonance Imaging 1990: National Symposium: MRI of lower cranial nerves; MR and CT of the temporal bone; MR and CT of the paranasal sinuses, Las Vegas, Nevada, April 1990.
51. American Society of Head and Neck Radiology: Special Focus Session - Cases and controversies in head and neck cancer, New Orleans, Louisiana, May 1990.
52. Invited lecturer (four lectures): The Royal Australian College of Radiologists Annual Meeting, Perth, Western Australia, October 1990.
53. Radiological Society of North America, Chicago, Illinois, December 1990:
  - a. Refresher course: CT and MRI of the pharynx and floor of the mouth
  - b. Moderator: Scientific session
  - c. Scientific presentation: Barreda R, Mancuso AA, Stringer S. Suppurative retropharyngeal lymphadenitis: A medical or surgical disease?
54. American Society of Head and Neck Radiology, Boston, Massachusetts, April 3-6, 1991:
  - a. Paper: CT of submucosal laryngeal masses.
  - b. Lectures: Imaging of major salivary glands and normal anatomy of deep spaces of the face and suprahyoid neck.
55. Invited Panelist on New Advances in Head and Neck Imaging. American Society of Neuroradiology, Washington D. C., June 1991.
56. Radiologic Society of North America, Chicago, Illinois, December 1991.
  - a. Moderator: Scientific session
  - b. Refresher course: Imaging of the larynx and hypopharynx
  - c. Scientific presentation: CT of submucosal laryngeal masses
57. American Society of Head and Neck Radiology: Imaging of the thyroid and parathyroids, Chicago, Illinois, April 22-26, 1992.
58. Invited Panelist on Cancer of the Paranasal Sinuses. Third International Conference on Head and Neck Cancer, San Francisco, California, August 1992.
59. Radiologic Society of North America, Chicago, 1992.
  - a. Moderator: Scientific session
  - b. Refresher Course: Imaging of the larynx and hypopharynx
  - c. Scientific presentations: Coauthored three papers presented by Tart RP and Mukherji SK.
60. American Society of Head and Neck Radiology/American Society of Neuroradiology Course and Meeting: Imaging of the oral cavity and oropharynx, Vancouver, May 1993.
61. Radiologic Society of North America, Chicago, 1993
  - a. Refresher Course: Imaging of the larynx and hypopharynx
  - b. Scientific presentations: Coauthored five papers, presented by Mukherji SK
62. Invited Speaker and Panelist: Second World Congress on Laryngeal Cancer, Sydney, Australia, February 21-24, 1994.
  - a. Workshop on imaging advances
  - b. Salvage treatment for early glottic failure (Panelist)

- c. Favorable supraglottic cancer (Panelist)
  - d. Pyriform sinus cancer (Panelist)
63. American Society of Neuroradiology, Nashville, TN, May 1994. Core Curriculum Course in Neuroradiology: Suprahyoid neck diseases
  64. International Congress of Head and Neck Radiology, Washington, DC, June 15-19, 1994.
    - a. Imaging of airway and speech disorders (Invited Speaker)
    - b. Moderator/Panelist: Special focus session on controversies of modern nodal imaging alternatives
    - c. Paper: The value of pretreatment CT as a predictor of outcome and supraglottic carcinoma treated with RT alone
  65. Radiologic Society of North America, Chicago, 1994. Refresher Course: Imaging of the larynx and pharynx.
  66. American Society of Head and Neck Radiology, Pittsburgh, May 1995. Speaker and Moderator of a panel on "Diseases of the Larynx and Pharynx."
  67. Radiologic Society of North America, Chicago, December 1995. Refresher Course: Imaging of the larynx and Pharynx.
  68. American Society of Head and Neck Radiology, Los Angeles April 1996. Invited Lecture: Imaging of Lymph Nodes.
  69. International Conference on Head and Neck Cancer. Toronto, July 28 to August 1, 1996. Invited Keynote Speaker: Imaging Techniques Now and in the 21st Century
  70. Radiologic Society of North America, Chicago, December 1996. Update Course in Head and Neck Imaging: Imaging of the Major Salivary Glands.
  71. American Society of Head and Neck Radiology, Toronto, May 1996. Unknown Case Panelist; Lecture on Volume Acquisition CT Techniques
  72. Radiologic Society of North America, Chicago, December 1997. Update Course in Head and Neck Imaging.
  73. American Society of Head and Neck Radiology, Phoenix, April 1997. Imaging of Recurrent Head and Neck Cancer
  74. Symposium Neurodiagnosticum, Philadelphia, May 1998. Program Committee, Focused Panel Coordinator, Presentation-Post treatment evaluation of Head and Neck Cancer: When is it cancer and when is it not?
  75. Combined ASNR/American Society of Head and Neck Radiology Meeting, San Diego, April 1999. Imaging of Head and Neck Cancer
  76. Radiologic Society of North America, Chicago, 1998. Update Course in head and Neck Imaging.
  77. Radiologic Society of North America, Chicago, 1999. Course in Advanced Topics in Head and Neck Cancer
  78. Radiologic Society of North America, Chicago, 2000. Course in Advanced Topics in Head and Neck Cancer

79. Combined ASNR/American Society of Head and Neck Radiology Meeting, Boston, MA, April 2001
  - a. CT Findings at the Primary Site of Oropharyngeal Squamous Cell Carcinoma about 6 Weeks Following Definitive Radiotherapy as Predictors of Primary Site Control
  - b. Post-RT CT Results as a Predictive Model for Establishing the Necessity of Planned Post-RT Neck Dissection in Patients with Cervical Metastatic Disease from Squamous Cell Carcinoma
80. American Society of Head and Neck Radiology Meeting, Cleveland OH, September 2002, Cervical Metastatic Disease Imaging.
81. American Society of Clinical Oncology, New Orleans, LA, June 4-8, 2004  
Invited speaker and panelist: "Emerging Approaches in Head and Neck Cancer Management."
82. American Academy of Orofacial Pain – Invited Speaker: Responsibility of Clinicians and Diagnostic Radiologists in the Effective Use of Imaging In Patients with Facial Pain- Las Vegas April 2006
83. American Society Of Head and Neck Radiology -Gold Medalist Oration- Invited Speaker-Avoiding False Negative CT and MR Interpretations: Proven Methods to Avoid Missing Critical, Subtle Findings on Imaging Studies of the Head and Neck Phoenix, AZ October 2006

## **SCIENTIFIC EXHIBITS**

- Mancuso AA, Hanafee WN, Ward P. Correlated CT anatomy and pathology of the larynx. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, 1978 (summa cum laude).
- Mancuso AA, Hanafee WN, Ward P. Correlated CT anatomy and pathology of the larynx. Annual Meeting of the American Roentgen Ray Society, Toronto, 1979 (special merit award).
- Mancuso AA, Bohman L, Hanafee WN, Ward P. CT of the nasopharynx: Normal variations of normal and pathological correlations. Annual Meeting of the American Roentgen Ray Society, Toronto, 1979 (special merit award).
- Mancuso AA, Bohman L, Hanafee WN, Ward P. CT of the nasopharynx: Normal variations of normal and pathological correlations. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Atlanta, Georgia, 1979.
- Hanafee WN, Mancuso AA, Winter J, Jenkins H, Bergstrom JF. Edge enhancement CT scanning in inflammatory lesions of the middle ear. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Atlanta, Georgia, 1979.
- Ward P, Mancuso AA, Hanafee WN, Berci G. Evaluation of computerized tomography, cinelaryngoscopy and laryngography in determining the extent of laryngeal disease. American Academy of Otorhinolaryngologists. Dallas, Texas, October 8-12, 1979.
- Hanafee WN, Mancuso AA, Bentson JR, Jenkins H, Winter J. Edge enhancement CT scanning of the temporal bone. American Society of Neuroradiology Meeting, Spring, 1980 (summa cum laude).
- Stone D, Mancuso AA, Rice D, Hanafee WN. CT parotid, sialography. Radiological Society of North America, Dallas, November 1980.
- Akins EW, Hill JA, Mancuso AA, et al. Assessment of left ventricular wall thickness in patients with chronic myocardial infarction by MRI. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, November 1986.
- Yancey JM, Kaude JV, Ackerman N, Googe RE, Mancuso AA, Love IL. Gd-DTPA enhancement of experimental kidney and soft tissue carcinoma. Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, 1986.
- Zedvinskis DP, Benson MT, Kerr HH, Cacciarelli AA, Madrazzo B, Mancuso AA. Congenital anomalies: The cervical lymphatic system - Embryologic and pathologic anatomy. Scientific Assembly and Annual Meeting of the Radiological Society of North America, December 1990.
- Dalen K, Benson MT, Kerr HH, Cacciarelli AA, Mancuso AA. Congenital anomalies of the branchial apparatus: Embryologic and pathologic anatomy. Scientific Assembly and Annual Meeting of the Radiological Society of North America, December 1990.
- Sims HM, de Vries EJ, Mancuso AA. Type IV second branchial cleft cysts. Presented at the 95th Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Kansas City, Missouri, September 22-26, 1991.
- Stiles WA, de Vries EJ, Mancuso AA. Castleman's disease in a retropharyngeal mass. Presented at the 95th Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Kansas City, Missouri, September 22-26, 1991.

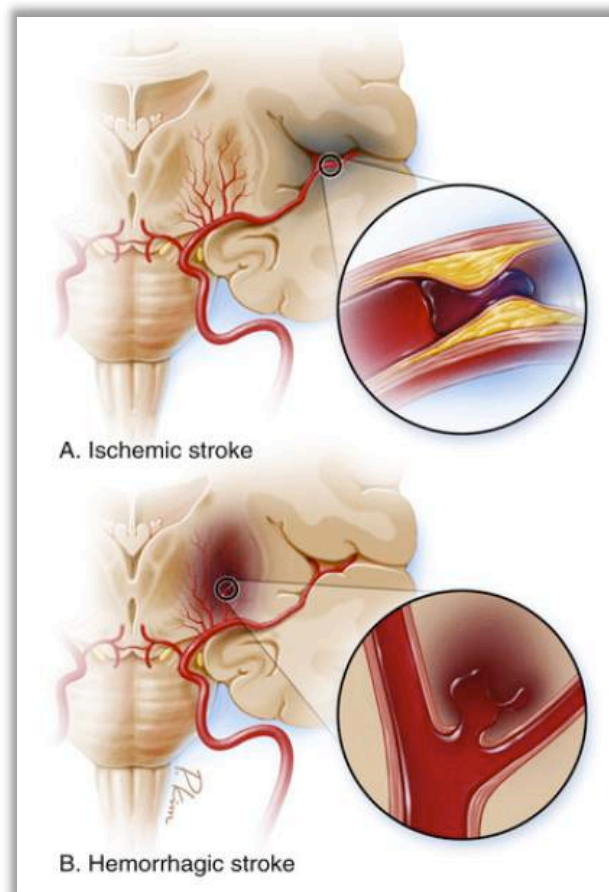
- de Vries EJ, Mancuso AA. Masticator space neurofibroma. Presented at the 95th Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Kansas City, Missouri, September 22-26, 1991.
- Trimas SJ, de Vries EJ, Mancuso AA, Cassisi NJ. Avascular carotid body tumor. Presented at the 95th Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Kansas City, Missouri, September 22-26, 1991.
- Slattery WH, de Vries EJ, Mancuso AA. Actinomycosis osteomyelitis of the skull base. Presented at the 95th Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Kansas City, Missouri, September 22-26, 1991.
- Tart RP, Mukherji S, Mancuso AA. Morphologic characteristics useful in guiding the work-up of infiltrative diseases of the head and neck. Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1991. (Certificate of merit)
- Tart RP, Mukherji SK, Stringer S, Mancuso AA. CT of normal and abnormal facial lymph nodes. Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1992. (Certificate of merit)
- Tart RP, Kotzur IM, Mancuso AA, et al. MRI of retropharyngeal lymph nodes: Variations of normal anatomy. Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1993.
- Tart RP, Kotzur IM, Mancuso AA, et al. CT of the buccal space: Normal anatomy and review of pathology presenting as buccal space masses. Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1993.
- Mukherji SK, Kotzur IM, Mancuso AA, et al. Radiographic appearance of the irradiated larynx and hypopharynx by CT: Expected changes versus recurrent tumor. Presented at the Scientific Assembly and Annual Meeting of the Radiological Society of North America, Chicago, Illinois, December 1993. (Cum Laude Certificate)
- Mukherji SK, Mancuso AA, et al. Can pretreatment CT predict local control in T2 glottic carcinoma treated with radiation therapy alone? International Congress of Head and Neck Radiology, Washington, DC, June 15-19, 1994. (Winner, Resident's Award)

# **Medical Principles**

## General Principles

### *Stroke*

1. Stroke is the sudden death of brain cells due to a lack of oxygen.
2. The lack of oxygen is caused by either a blockage of blood flow to the brain or by the rupture of an artery that supplies the brain.
3. When a stroke is caused by blocked blood flow, it is called an ischemic stroke.
4. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.



5. A stroke may result in permanent brain-damage, long-term disability, and even death.



6. Signs and symptoms<sup>1</sup> of stroke generally include:

- Sudden numbness or weakness in the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking, or difficulty understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance, or lack of coordination.
- Sudden severe headache with no known cause.

### *Stroke Causes: Ischemia*

7. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.

8. Ischemia occurs when a blood clot reduces or blocks blood flow, preventing the organ or tissue from receiving enough oxygen-rich blood.

9. If not treated promptly, the cells in the part of the organ or the tissue supplied by the blocked artery will be deprived of oxygen and, with time, may be damaged or infarct (die).

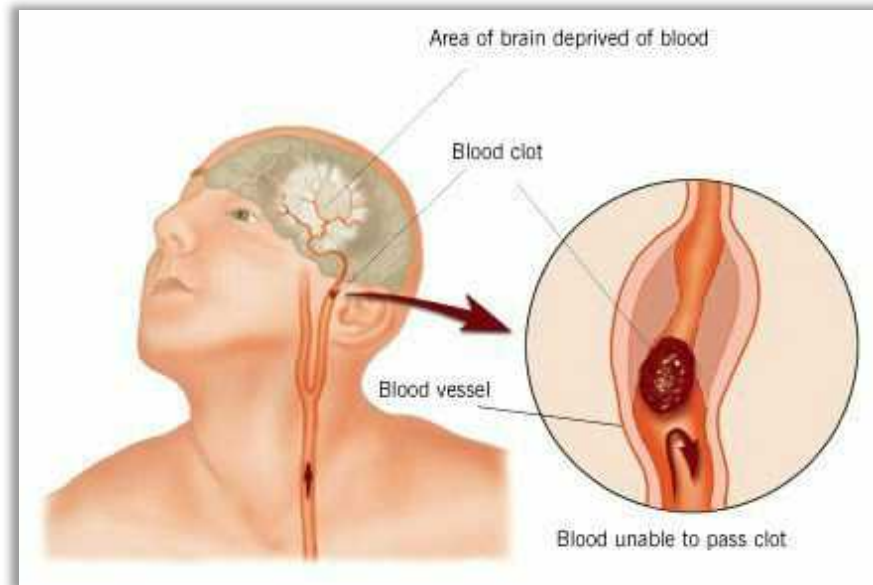
### *Ischemic stroke*

10. If something blocks blood flow to the brain, brain cells start to die because they cannot get oxygen. That is a stroke.

11. An ischemic stroke occurs when a blood clot interferes with blood flow through an artery that supplies the brain.

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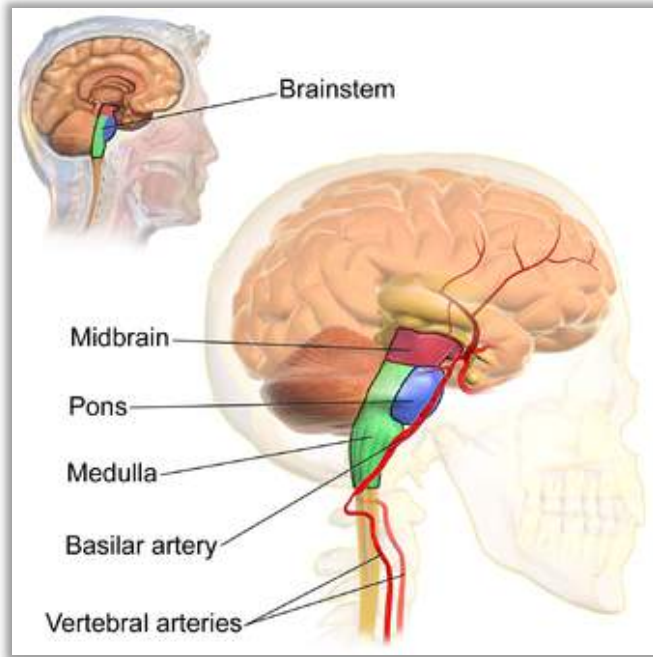
<sup>1</sup> A sign is a manifestation of medical condition that the physician perceives, objectively. In contrast, a symptom is a manifestation apparent to patient, subjectively.



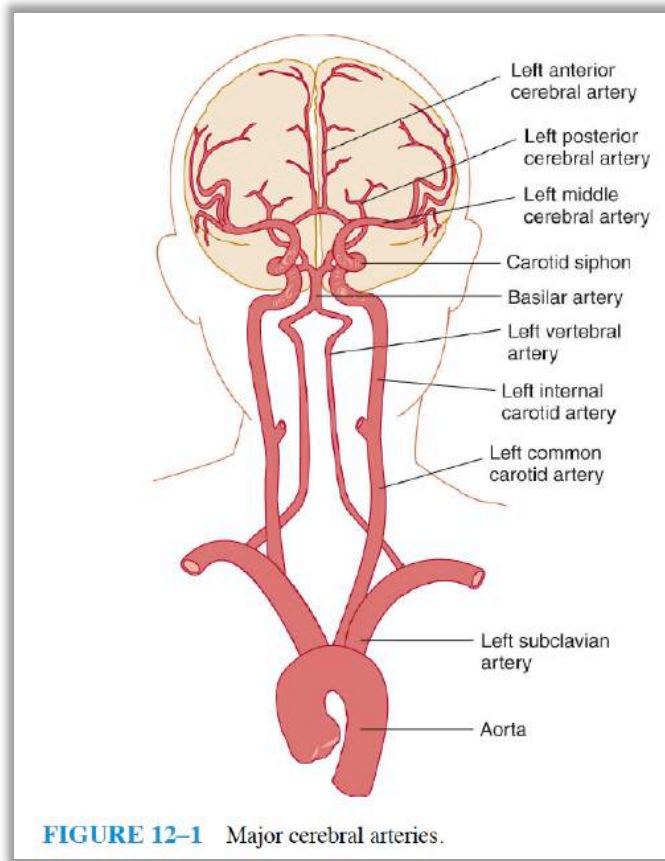
12. A thrombus is a blood clot that forms within a blood vessel.
13. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.
14. Arterial dissection—a tear inside an artery—often causes an embolus.
15. Trauma is a common cause of arterial dissection.

### *The Basilar Artery*

16. The basilar artery lies at the front of the brainstem in the midline.

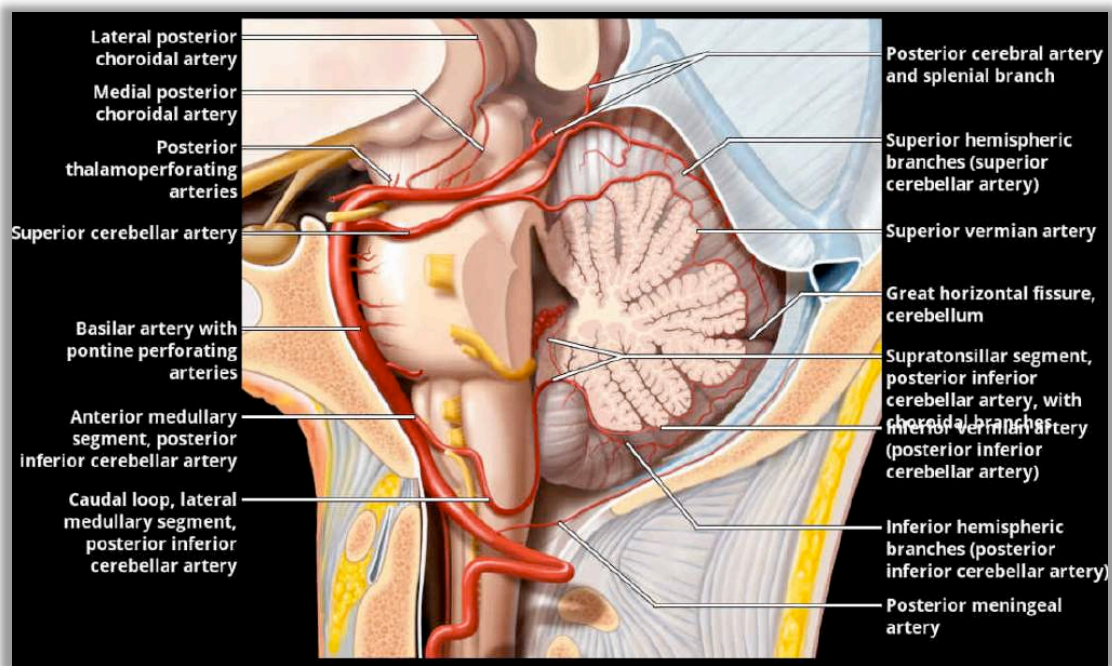
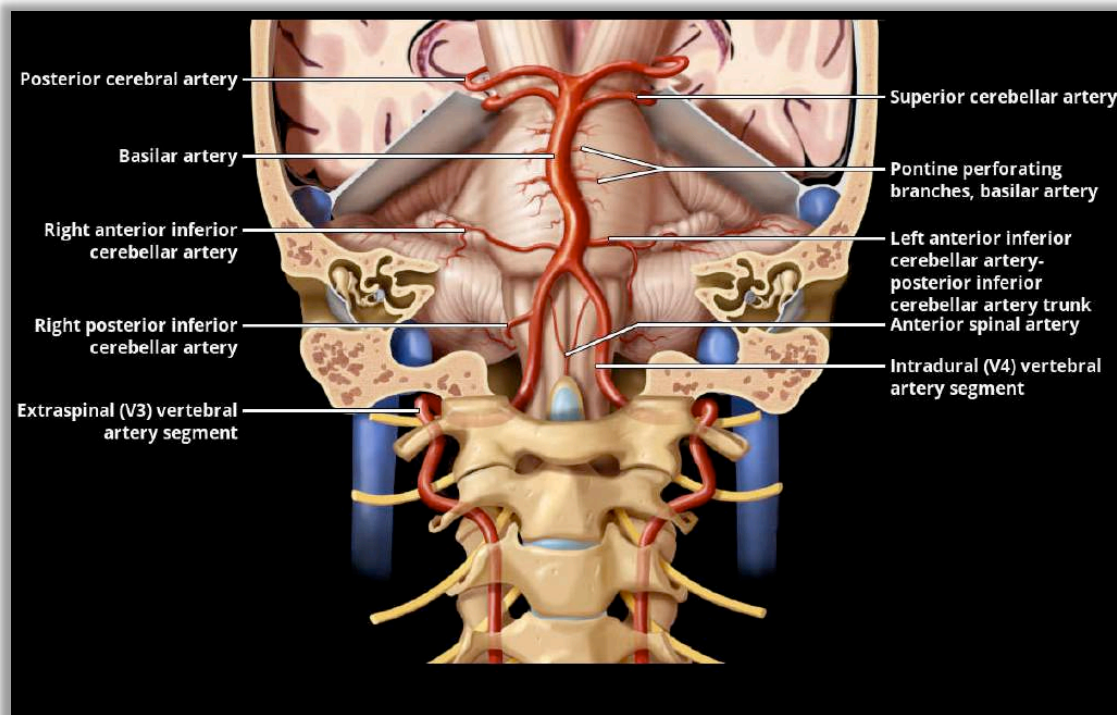


17. The basilar artery is formed by the union of the two vertebral arteries.



**FIGURE 12-1** Major cerebral arteries.

18. The basilar artery carries oxygenated blood up through the brainstem to the posterior (back) part of the brain.



## *Basilar Artery Occlusion (BAO)*

19. Basilar Artery Occlusion (BAO) is the name for an acute stroke originating in the basilar artery.
20. A BAO is a type of posterior-circulation stroke. It affects the circulation of blood in the back part of the brain.
21. A BAO occurs when a blood clot in the basilar artery impedes blood flow, resulting in ischemia in the posterior part of the brain.







22. If not treated quickly, a BAO can lead to severe brain damage, organ malfunction, catastrophic disability, and even death.
23. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

## *BAO Signs and Symptoms*

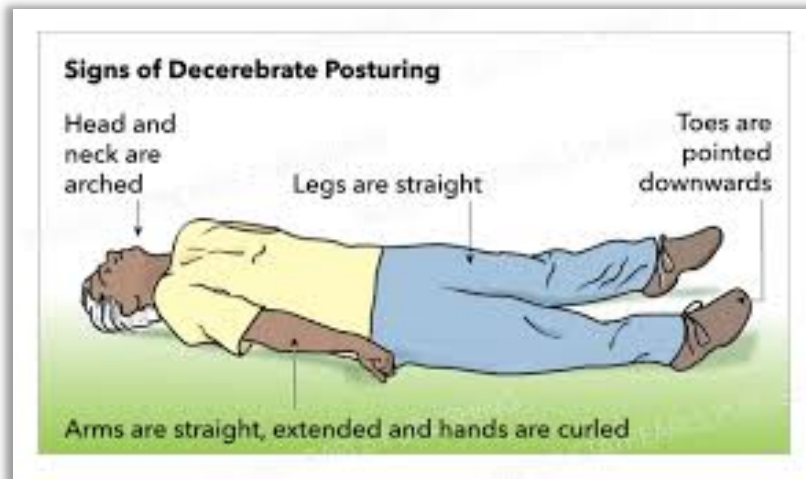
24. Because the cerebral vessels each tends to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion.
25. The signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
26. The hallmarks of a BAO include:

- Decreased or altered consciousness
- Quadriparesis (loss of voluntary movement in all four limbs)
- Various combinations of limb ataxia (impaired balance or coordination)
- Oculomotor (eye movement) abnormalities
- Pupillary abnormalities (pupils do not react normally to light)
- Dysarthria (inability to articulate speech)
- Dysphagia (inability to swallow)

Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

27. Such signs and symptom can present in various combinations.
28. Decerebrate posturing is a classic sign of BAO and other posterior strokes.
29. Decerebrate posturing is an abnormal posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.





30. Decerebrate posturing is also known as extensor posturing.
31. Other signs and symptoms of BAO include:
- Overactive or overresponsive reflexes (hyperreflexia).
  - Impaired balance or coordination (ataxia);
  - Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking.
  - Loss of the ability to speak (dysphonia).
  - Abnormalities of alertness and behavior, including hallucinations.
  - Dizziness, vomiting.
32. In rare BAO cases, patients suffer locked-in syndrome.
33. Patients with locked-in syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware and conscious of their “locked in” condition.

*Stroke diagnosis: history and presentation*

34. The most characteristic historical aspect of stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.
35. After the onset, stroke symptoms most often stay the same or improve over the few hours that follow.

36. The symptoms may also worsen in a smooth or stuttering course.
37. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
38. A second most characteristic historical aspect of stroke is that the patient's symptoms usually fit the distribution of a single vascular territory.
39. That is to say, patients with brain infarct will present with signs and symptoms in the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
40. The signs and symptoms thus provide an important clue as to the likely location of the possible stroke.
41. The most characteristic aspect of a stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.

*Stroke diagnosis: MEND exam*

42. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.
43. The MEND exam was developed to facilitate communication between healthcare providers throughout the continuum of care for stroke patients.
44. The MEND exam incorporates the posterior circulation elements missing in the Cincinnati Prehospital Stroke Scale (CPSS).
45. The MEND exam has all three elements of the CPSS, plus six elements from the NHISS (consciousness, orientation, commands, visual fields, gaze, leg motor, limb ataxia, and sensation).



<b>MEND EXAMINATION - PREHOSPITAL</b> Green Boxes Contain Basic Exam (CPSS)	
<b><u>MENTAL STATUS</u></b>	
●	Level of Consciousness (AVPU)
●	Speech: "You can't teach an old dog new tricks"
●	Questions (age, month)
●	Commands (close, open eyes)
<b><u>CRANIAL NERVES</u></b>	
●	Facial Droop (show teeth or smile)
●	Visual Fields (four quadrants)
●	Horizontal Gaze (side to side)
<b><u>LIMBS</u></b>	
●	Motor – Arm Drift (close eyes-hold out arms) Leg Drift (open eyes-lift each leg separately)
●	Sensory – Arm, Leg (close eyes & touch, pinch)
●	Coordination – Arm, Leg (finger-nose, heel-shin)

46. The MEND exam takes under two minutes to perform, and requires no tools, making it ideal as a screening tool.

*Stroke Diagnosis: Stroke Score*

47. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
48. The Scale (also known as Score) looks at 11 different elements that evaluate specific abilities in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

49. A patient's score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
50. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.
51. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
52. In fact, the initial severity of the stroke according the Score is the most important predictor of outcome.

### *Stroke diagnosis: CT scan and MRI*

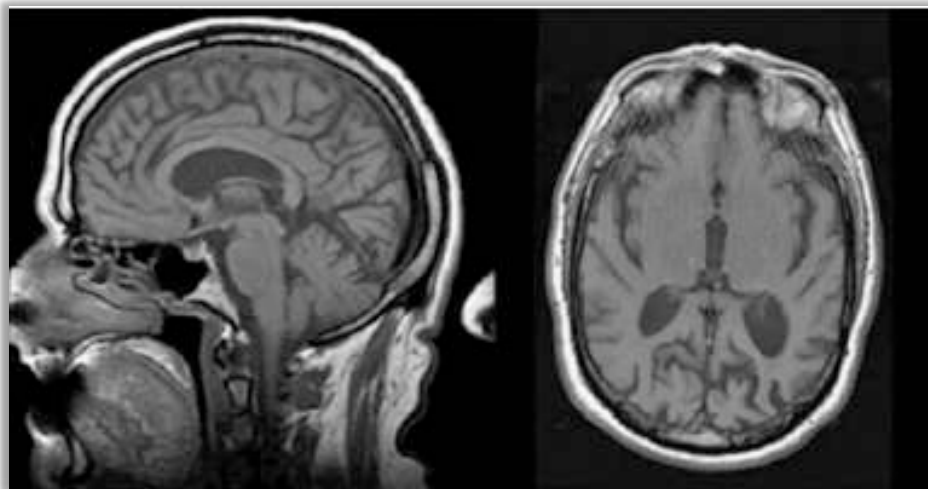
53. An CT scan and MRI are noninvasive diagnostic tests.
54. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.
55. A non-contrast CT of the head remains the standard procedure for the initial evaluation of stroke.

56. In the emergent initial evaluation of an acute stroke patient in the emergency department, a non-contrast CT of the head remains the imaging test utilized in most hospitals worldwide, with the exception of a few centers that have dedicated MRI capabilities for stroke.
57. A non-contrast CT scan has the advantages of being widely available, relatively inexpensive, and fast to perform.
58. A CT scan takes less than 1 minute.
59. A non-contrast CT should be performed within 20 minutes of the patient's arrival at the emergency department in order to speed up potential treatment with thrombectomy and/or TPA for ischemic-stroke patients.
60. All patients with a suspected acute ischemic stroke should undergo a non-contrast brain CT scan or brain MRI.



61. A CT scan is one of the vital first steps in the management of a stroke patient. It helps to exclude hemorrhagic stroke.
62. The CT scan will immediately rule out hemorrhage, as blood is bright on a CT.

63. A CT scan can quickly differentiate an ischemic stroke from intracranial hemorrhaging and other mass lesions— information crucial to the subsequent therapeutic decisions that will be rapidly made.
64. A CT scan generally must be performed within 30 minutes of the patient’s arrival at the hospital.
65. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. But, in contrast to a CT or CTA, an MRI requires that the patient be cooperative to hold still for several minutes.
66. A brain MRI can visualize ischemic infarcts earlier, and identify acute posterior circulation strokes more accurately, than a CT scan.
67. An MRI’s diffusion-weighted sequence (“DWI”) can show any restricted diffusion consistent with infarct.
68. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
69. An MRI’s DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury



70. Radiologists interpret CT and MRI images and communicates their findings to other doctors in radiology reports.

### *Stroke diagnosis: CTA and MRA*

71. A CTA and an MRA are vascular-imaging tests.
72. Vascular imaging specifically focuses on the blood vessels.
73. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.
74. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
75. Vascular imaging specifically helps doctors find blood clots.
76. Vascular imaging thus helps doctors diagnose and treat ischemic strokes, including BAO.
77. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
78. A CTA takes minutes to complete—a few minutes to inject the contrast dye and less a minute to run the scan.
79. A CTA can quickly provide a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.
80. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
81. Most patients with a suspected acute ischemic stroke (like a BAO) should undergo a CTA or MRA.
82. An MRA provides the same information as a CTA.
83. But, in contrast to a CT or CTA, an MRA requires that the patient be cooperative to hold still for several minutes.



84. A doctor must promptly order vascular imaging when there is reason to suspect that the patient has an occlusion in a major blood vessel.
85. This is particularly true if there is reason to suspect that the occlusion is in an artery supplying the brain, like the basilar artery.
86. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.

### *Radiology reports*

87. A radiologist interprets imaging studies (including a CT, CTA, MRI, MRA) and communicates his or her findings and conclusions to other doctors on written radiology reports.
88. A radiologist must interpret imaging studies reasonably, correctly, and accurately.
89. A radiologist must also provide prompt and accurate radiology reports.
90. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call “critical values”—that is, immediately call the attending physician to inform him or her of the findings.
91. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.

### *Stroke treatment: medical emergency*

92. Stroke is the most common neurological emergency.
93. During a stroke, every minute counts. Time lost is brain lost.
94. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
95. When a patient presents with signs or symptoms of stroke, a physician must act quickly to confirm or rule out stroke.
96. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
97. Acute therapies for an ischemic stroke (thrombectomy, TPA) are best implemented as fast as possible, so the steps needed to stabilize and assess the patient must be taken as quickly as possible.
98. In practice, to speed up the process, these steps are often taken simultaneously.
99. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke.
100. If the stroke is an ischemic stroke, medical providers must act quickly to clear the occlusion (blood clot) causing the stroke.
101. In some cases, medical providers must act quickly to order and perform a thrombectomy to remove the blood clot causing the stroke.
102. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.
103. Fast treatment can lessen the brain damage that stroke can cause.
104. The National Institute of Neurological Disorders recommends time-frames for completing the basic, widely-accepted procedures that hospitals follow to evaluate potential ischemic-stroke patients.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

\*By phone or in person.

105. Emergency-medicine physicians and neurologists must generally perform procedures within these time-frames.
106. With a focus on rapid recognition, evaluation, and treatment of stroke, many hospitals have streamlined care to meet recommended time-goals.
107. That has led to the development of stroke protocols, critical pathways, and acute interventional stroke teams that may be deployed in the field before the patient arrives at the emergency department.

*Stroke treatment: thrombectomy*

108. A blood clot causing a stroke can be removed through a medical procedure called a thrombectomy.
109. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery, which is located in the groin.
110. The catheter is guided through the blood system towards the blood clot.
111. Once the catheter reaches the blood clot, the surgeon can attempt to suction, dissolve, or retrieve the clot.
112. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
113. The main goal of these therapies is to get the artery open and re-establish blood flow.



114. Thus, a doctor should always ask whether he or she is doing everything possible to optimize blood flow to regions of cerebral ischemia.
115. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in probability of good outcome.
116. Every twenty minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
117. It is the responsibility of the practitioner initially evaluating the patient to facilitate the patient's transfer to a thrombectomy suite, whether located at the same or another hospital.

## Supporting Literature

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119. *Caplan's Stroke, A Clinical Approach* (5<sup>th</sup> Ed.), Louis R., Caplan (Ed.), Cambridge University Press, 2016.
120. *Clinical Neuroanatomy* (28<sup>th</sup> Ed.), Waxman, Stephen G., McGraw-Hill Education, 2017.
121. *Clinical Neurology and Neuroanatomy*, Berkowitz, Aaron L., McGraw-Hill Education, 2017.
122. *Imaging Anatomy: Brain and Spine*, Osborn, Anne G., Salzman, Karen L., et al., Elsevier, 2020.
123. *Nolte's The Human Brain, an Introduction to Its Functional Anatomy* (8<sup>th</sup> Ed.), Vanderah, Todd W., Gould, Douglas J., Elsevier, 2021.
124. *On Call Neurology* (4<sup>th</sup> Ed.), Mayer, Stephan A., Randolph, Marshall S., Elsevier 2021.
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# **Medical Chronology**

## Treatment of Michaela Smith

### *Prologue: Michaela Suffers a Kick to the Right Side of Her Head*

1. On or about June 21, 2019, Michaela was kicked on the right side of the head. HMC 30, HMC 71.
2. The accident occurred during physical training for her job as a detention officer for the sheriff's department. HMC 30, HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

3. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own shortly thereafter. HMC 30, HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216  
H&P  
Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

June 28, 2019 – Michaela's First Visit to Hamilton

### *Onset of Symptoms*

4. On June 28, 2019, Michaela again took part in training for her job. HMC 2, HMC 6, HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

5. The training involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

6. After the training, Michaela drove herself home and did “well for a couple of hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETELY OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

7. Between 20:30 and 21:30 that same evening, Michaela started experiencing a constellation of symptoms, including:

- throbbing headache
- shortness of breath
- swelling throat
- slurred speech
- bilateral facial and hand numbness
- near syncope
- vomiting
- facial pain
- rhinorrhea
- nausea
- dizziness
- difficulty talking, with thick speech
- inability to open her mouth completely or swallow freely

HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244

**H&P**

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

8. Michaela had no prior history of a similar problem. HMC 71.



Initial Provider Contact 6/28/2019 2338  
 HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.  
 no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton Emergency Department ("ED")*

9. At 21:43, Michaela arrived at the Hamilton emergency department. HMC 65.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #: _____	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	GA	30721	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>		Disposition: <u>Home</u>	
Dispo Summary Printed: <u>6/29/2019 0215</u>		Condition at Dispo: <u>Stable</u>	
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmplnt: <u>Poss Allergic Reaction</u>			

HMC 65.

10. Michaela's parents were with her.

Holsonback, Shaw n D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.



11. At 22:41, Michaela was admitted to the Hamilton ED, which identified headache, shortness of breath, and unspecified nausea with vomiting as the reasons for her visit. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT

Reason For Visit Diagnosis	
Code	Description
R51	Headache
R06.02	Shortness of breath
R11.2	Nausea with vomiting, unspecified

HMC 79.

12. Between 22:53 and 22:59, RN Kayla Rewis triaged Michaela. HMC 68.

13. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

14. At that time, these were Michaela’s complaints: “soreness/swelling to throat, headache, vomiting, and near syncopal [fainting] episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rewis, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259

**NURSING TRIAGE (Adult)**

**HPI:**

Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

15. At 23:38, Emergency Physician Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

16. At that time, Dr. Holsonback noted the prior kick to Michaela's head: "Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness headache w/o syncope at the time, sx resolved." HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

17. At that time, Michaela's neurological condition was: "motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside." HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.

**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.

**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.

18. Her mental status was: “speech clear, oriented X 3, normal affect, responds appropriately to questions.” HMC 72.

19. Michaela’s general appearance was “well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort.” HMC 71.

**PHYSICAL EXAM:**

GENERAL APPEARANCE: well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

20. As part of his examination, Dr. Holsonback obtained a National Institute of Health Stroke Scale (NIHSS) score for Michaela. HMC 72.

21. Michaela scored a 0 (that is, normal) on each of the 11 elements that make up the NIHSS. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.

22. Michaela’s total score was thus also 0 (normal), on a scale of 0 to 42. HMC 72.

23. The NIHSS is a common diagnostic method for quickly assessing the severity of a stroke.

24. The Scale (also known as a Score) looks at 11 different elements that evaluate specific ability in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
	CATEGORY	SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

25. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.

*Michaela Undergoes a Brain CT Scan*

26. Despite her NIHSS score, Dr. Holsonback moved quickly to get Michaela a CT scan. HMC 64.

27. At 23:47, Dr. Holsonback ordered a stat head CT scan, for “headache right side”—the same side where Michaela had received a kick during training at work a week earlier. HMC 64, HMC 30, HMC 71.

Order Type: Radiology  
Order Sub Type: CT

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47 06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.

Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

Holsonback, Shawn D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**


Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

28. The scan was administered by 23:54, within minutes of Dr. Holsonback's order.

HMC 61; Appendix.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
This interpretation is based upon the receipt of 32 images.			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.

29. The CT scan revealed that Michaela was having a brainstem or posterior-circulation stroke.

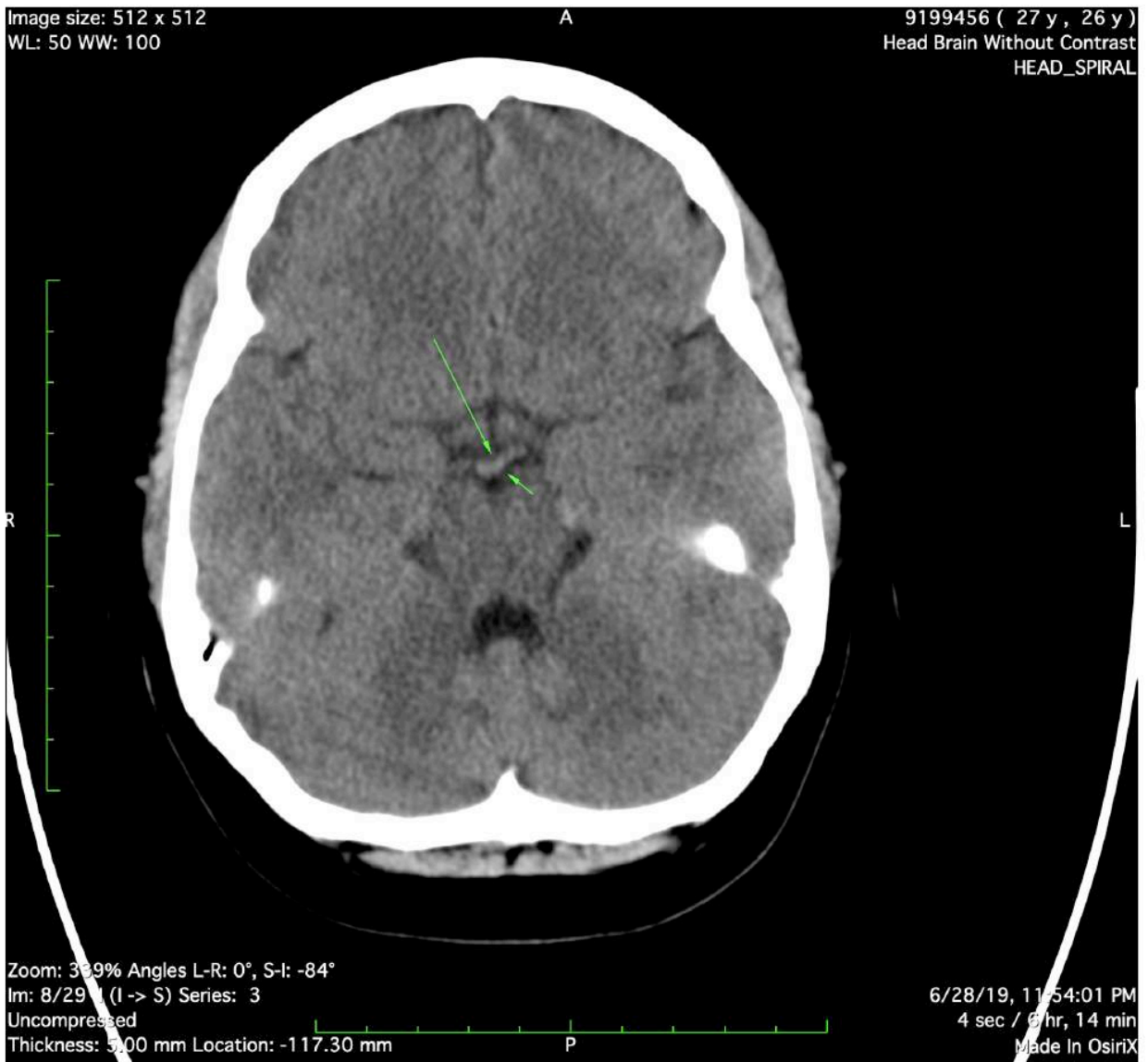
30. Image 7 of 29 of the CT scan, for example, showed a white hyperdense sign of a basilar-artery thrombosis:



See Appendix.




31. Image 8 of 29 of the CT scan revealed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:



See Appendix.

*Radiologist Cooney Fails to Identify the Signs of Stroke on the CT Scan*

32. At 00:18, acting as a vRad employee, Radiologist Michael Cooney read the 32 images associated with the study. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA		
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720		
<b>Study Type:</b>	CT HEAD WO		
<b>Ordered As:</b>	CT HEAD WO		
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Accession:</b>	3948616
<b>Date of Exam:</b>	28 Jun 2019 EDT	<b>Account Number:</b>	
<b>Patient ID:</b>	9199456	<b>Patient DOB:</b>	
<b>Patient Location:</b>	Unknown	<b>Caretaker:</b>	
<b>Account #:</b>		<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>This interpretation is based upon the receipt of 32 images.</b>			
<b>EXAM:</b> CT Head Without Contrast			
<b>EXAM DATE/TIME:</b> 6/28/2019 11:52 PM			

HMC 61.

33. Dr. Cooney found no evidence of hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.



34. Dr. Cooney's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. Dr. Cooney did not even mention the sign. HMC 61.

35. Dr. Cooney's findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. Dr. Cooney did not even mention the streak. HMC 61.

36. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded that the study showed "no acute intracranial abnormality." HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

37. At 00:28, Dr. Holsonback noted Dr. Cooney's reading of the CT scan as showing "no acute intracranial abnormality." HMC 72.

Holsonback, Shaw n D.O. Created: 6/29/2019 0027 Last Entry: 0028  
MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
without Informing Her She Has a BAO*

38. At 00:57, Dr. Holsonback rechecked Michaela. HMC 72.

39. She was "resting, feeling better," with a "headache still present" and "all numbness resolved." HMC 72.

40. At 02:15, Michaela continued to feel “better,” had “no focal neurological deficits,” and agreed to a discharge. HMC 2, HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

41. At 02:15, Michaela signed her disposition summary. HMC 65-66.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: **Smith, Michaela E**  
EDM Code: **ER0170**  
Med Rcrd: **9199456**


MD Electronic Sg Holsonback, Shawn D.O. 6/29/2019 0214

**MY SIGNATURE BELOW INDICATES:**  
> I have received and understood the oral instructions regarding my current medical problem.  
> I will arrange follow-up care as instructed above.  
> I acknowledge receipt of the written instructions as outlined on this and any previous page(s).  
I will read and review these instructions.  
> I understand that a copy of the medical record is available to the practitioner or medical organization providing follow-up care, treatment, and services.

x Michaela Smith x Ashlynn R. M. Smith  
Patient (or Legal Guardian) Signature Staff (Witness) Signature Driver

HMC 66.

42. The disposition summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” and her chief complaint as “Poss Allergic Reaction.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	101737552 05LB01 06/28/2019 OP
May return to work/school: <u>1-2 Days</u>	Smith, Michaela E EMR
Restrictions: <u>None</u>	Physician, On Duty
Critical Care Time: <u>none</u>	

HMC 65.

43. The summary instructed Michaela to follow up with Dalton Family Practice, and permitted her to return to work, in 1-2 days, without restrictions. HMC 65.

44. The summary also instructed her to return to “Return to the Emergency Department sooner if worse.” HMC 65.

45. Michaela “verbalized understanding and ability comply” with these instructions. There were no learning or communication “barriers” and she received no “medical driving restrictions.” HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

46. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.

47. Her pain was 0 of 10. HMC 70.

48. At 02:27, Michaela was discharged in “stable” condition and left for home. HMC 65, 70.

49. Neither any provider nor the discharge instructions informed Michaela or her parents of the occlusion in her basilar artery.

<b>Hamilton Medical Center - Emergency Department</b> 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary (for discharged patient; English)</b>			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
Rn Triage: <u>Kayla R. R.N.</u>		Rm (last): _____	
RN Eval: <u>Stacey S. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
PMD: <u>Duckett, Jennifer P.A.</u>		MLP: _____	
Chief Cmplnt: <u>Poss Allergic Reaction</u>		PMD Ph: <u>(706) 278-0138</u>	

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING/COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

50. Michaela was “comfortable going home.” HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

51. At home, she “went to bed about 03:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

## **June 29, 2019 – Michaela Returns to Hamilton by Ambulance**

### *Michaela Wakes with Global Alteration of Consciousness*

52. As demonstrated below, Michaela awoke with altered mental status and other classic signs and symptoms of stroke. These signs and symptoms amounted to a global alteration of consciousness, reflecting the onset of a neurological emergency some time after her discharge from Hamilton.



53. At about 07:15, Michaela's mother heard her moaning in her bedroom, went to check on her, and found her "with altered mental status and poor mobility." HMC 6, HMC 30.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

54. Michaela talked "through her gritted teeth" but could not "really open her mouth" and had "problems with moving and slurred speech." HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

55. Speaking “through her teeth,” Michaela told her mother that she was “unable to get out of bed” and thus “had wet on herself.” HMC 6, HMC 2.

56. When she awoke, Michaela was also “foaming at the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 08:14 Last Entry: 08:27

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

57. Thus, “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

58. The paramedics were then called. HMC 2, HMC 6.



The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2, 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

59. Upon arriving, the paramedics “were not able to get the patient up to walk” and Michaela had to be “brought into the emergency room by stretcher.” HMC 6.

60. After that Michaela did not speak again. HMC 6.

*Michaela Returns to Hamilton with Classic  
Signs of Stroke—a BAO*

61. By 08:19, the ambulance arrived at the Hamilton emergency department. HCM 24, HMC 25.

62. Michaela thus returned to Hamilton as a clinically different patient, whose neurological condition had deteriorated markedly overnight.

63. From the time of her arrival, Michaela demonstrated “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, MHC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

64. These symptoms alone were major signs of massive brain injury.

65. These symptoms alone made clear that Michaela was facing a neurological emergency that required an expedited and urgent diagnostic evaluation and possible intervention.

66. Extensor posturing, for example, is typically a result of severe brain injury.

67. What’s more, the presence of “extensor posturing” by itself made clear that the emergency likely involved injury to Michaela’s brainstem.

68. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was identified as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

69. Between 08:14 and 08:27, RN Megan Martin triaged Michaela.

70. During the assessment, Michaela “was squinting her eyes and looking around, while still shaking[.]” HMC 26.

71. Nurse Martin also gave Michaela a MEND exam. HMC 26.

72. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

■ **HPI:** Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

73. Michaela also mumbled that she could not talk. HMC 26.

74. Nurse Martin noted that Michaela’s last-known-well was about “10pm 6/28/19,” per the EMS. HMC 26.

75. By 08:29, Nurse Martin ordered an “electrocardiogram with physician review.” HMC 28.

Martin, Megan R.N. Created: 6/29/2019 0838 Last Entry: 0838  
Order(s) performed by "Nurse":  
- ELECTROCARDIOGRAM WITH PHYSICIAN REVIEW  
Order Notes:  
EKG completed - at 6/29/2019 0829 by Martin, Megan R.N. and given to Hawkins David F. M.D. for review at 6/29/2019 0834.

HMC 28.

76. The EKG was completed at 08:29 and “given to Hawkins, David F. M.D. for review at 6/29/2019 0834,” HMC 28.

*Dr. Hawkins Documents but Fails to Treat the Stroke*

77. Michaela returned to Hamilton with classic and obvious signs of stroke. HMC 30-31.

78. At some point between 09:12 and 12:44, Emergency Room Physician David F. Hawkins examined Michaela. HMC 30-31.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244  
H&P  
Initial Provider Contact 6/29/2019 0912  
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

79. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.

**H&P**

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

Initial Provider Contact 6/28/2019 2338

**HPI:** approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX

nothing worsens Sx.

nothing improves Sx.

no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

80. Michaela generally appeared “unresponsive, uncooperative,” with “no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2.” HMC 31.

81. Michaela’s neurological condition was this: “extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs . . . Will not follow commands.” HMC 31.



**GENERAL APPEARANCE:** somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2

**VITALS: SEE NN,**

**PULSE OXIMETRY:** 97% on RA.

**EARS:** canals clear bilat, TMs clear, no discharge from ears.

**EYES:** PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

**NOSE:** no nasal discharge.

**MOUTH:** (-)decreased moisture. + GAG

**THROAT:** no tonsillar inflammation, no airway obstruction.

**NECK:** supple, no neck tenderness, (-)thyromegally.

**BACK:** (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

**CHEST WALL:** no chest tenderness.

**LUNGS:** no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

**HEART:** normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

**ABDOMEN:** normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

**EXTREMITIES:** good pulses in all extremities, no swelling/tenderness in the extremities, no edema. FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTURING

**SKIN:** warm, dry, good color, no rash.

**NEURO:** EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE

**ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS**

**MENTAL STATUS:** unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

82. Michaela's extremities were "flaccid" with "occ spastic tone in arms and legs as in posturing." HMC 31.

83. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

84. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including alcohol abuse, depression, drug abuse, eating disorder, and schizophrenia. HMC 31.

**DIFFERENTIAL Dx:**

**PSYCHIATRIC Dx:** adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.

**NEURO Dx:** CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

85. Dr. Hawkins's differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA: "CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor." HMC 31.

**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

86. Although he identified stroke (“CVA” and “TIA”) as a differential diagnosis, Dr. Hawkins did not order vascular imaging to confirm or rule out a stroke, and did not take any other action to treat the stroke.<sup>1</sup>

87. In fact, despite his differential diagnosis of a stroke, and despite Michaela’s deteriorated clinical presentation, Dr. Hawkins failed to order even a new CT scan of Michaela’s brain (which would have taken minutes to complete) and failed to obtain a new stroke score for Michaela.

*Dr. Johnson Also Fails to Identify the Stroke in the CT Scan*

88. At 09:15, Radiologist Kevin Johnson interpreted and submitted a final report on the same CT scan taken overnight. HMC 30.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

HMC 60.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 9:15A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 60.

89. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus

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<sup>1</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.



disease, or mastoid or middle-ear effusions. He also found that the gray-white differentiation was within normal limits. HMC 60.

90. Dr. Johnson's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. Dr. Johnson did not even mention the sign. HMC 60.

91. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. Dr. Johnson did not even mention the streak. HMC 60.

92. Instead, contrary to the plain images, Dr. Johnson *affirmatively* concluded that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat Michaela's Stroke for Hours*

93. At 10:00, RN Lindsey Andrews called the Georgia Poison Center regarding Michaela's symptoms. HMC 28.

94. The Poison Center recommended a chest x-ray, and a CT scan of the head: "the physician may consider doing a CT of the head to rule out something unrelated to the pepper spray incident." HMC 28.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

95. At 10:08, Dr. Hawkins ordered a stat chest x-ray. HMC 15.

<b>Hamilton Medical Center</b> PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180 Radiology Services	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB:	<b>MR/RAD #:</b> 09199456/09199456 <b>ADMIT #:</b> 101737594 <b>HOSP/SVC:</b> EMR <b>ORDER DATE:</b> Jun 29 2019 10:08A <b>ROOM #:</b> ECD-RM2201 <b>REF #:</b> 3948717
<b>Ordering Dr:</b> DAVID MD HAWKINS <b>Attending Dr:</b> DAVID MD HAWKINS	

HMC 15.

96. But he did not order a CT scan.

97. At 10:31, Dr. Johnson read the chest x-ray recommended by the Poison Center and concluded it was a "normal exam." HMC 15, HMC 22.

**\*\*\*Final Report\*\*\***

**REASON FOR EXAM:** per GA Poison Center

**PROCEDURE:** DIA 1030 - CHEST SINGLE VIEW - Jun 29 2019 10:23AM

**RESULT:**  
Per Georgia Poison Center

**TECHNIQUE:** Single frontal view of the chest was obtained

**COMPARISON:** None

**FINDINGS:** The lungs are clear. The heart size is normal. The bones appear intact.

**IMPRESSION:**  
Normal exam.

KJ/dmc  
Job #12358370

HMC 15.

**INTERPRETED BY:** KEVIN JOHNSON MD on Jun 29 2019 10:31A  
**SIGNED BY:** KEVIN JOHNSON MD on Jun 29 2019 12:09P

HMC 15.

98. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter mental status after heavy physical activity.” HMC 23.

Order Type: Radiology				
Order Sub Type: MRI				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ? HEAT EXPOS Stat	Complete	
	06/29/19 11:22			06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

99. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

100. At 12:45, Dr. Hawkins discussed Michaela's case with Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1245 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

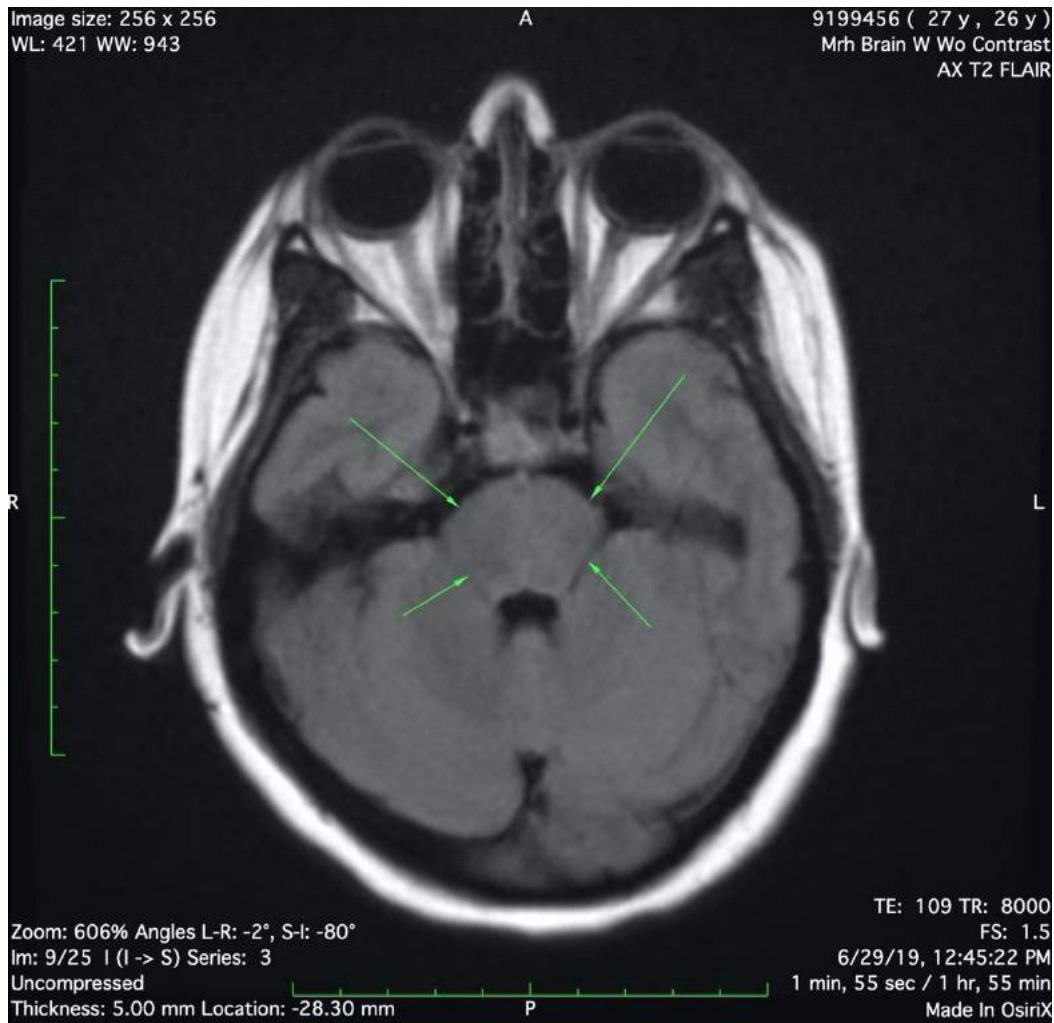
101. Dr. Glass agreed with administering the MRI, in order to distinguish "function from organ cause." HMC 32.

102. Dr. Glass also agreed to see Michaela in the ER for evaluation. HMC 32.

### *The MRI Confirms a Yet-Treatable Ischemic Stroke*

103. At 12:45, Michaela underwent the brain MRI, for "altered mental status after physical activity." HMC 16.

104. Although the MRI's DWI sequence showed that Michaela's brainstem was ischemic (thus confirming she was having a stroke), the MRI's FLAIR sequence remained normal—that is, Michaela's brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.



*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

105. At 12:54, Dr. Hawkins admitted Michaela to the hospital floor for observation. HMC 32.
106. At that time, Michaela continued to exhibit classic stroke signs and symptoms. See HMC 32.
107. Michaela, for example, had a decreased level of consciousness, had a bizarre affect with no interaction, showed general weakness, was not speaking, was tearful, was hyperventilating, had spasticity to her extremities, had no laterizing signs, and was urinating on herself. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEIZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

108. Despite her clinical presentation, Dr. Hawkins admitted Michaela for “observation,” noting that the CT scan of “last night” was negative. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEIZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

109. The reason for her admission was; “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

110. At 13:29, Dr. Johnson interpreted Michaela’s MRI. At 13:30, Dr. Johnson discussed his findings with Dr. Hawkins. HMC 16.

IMPRESSION:

NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P**

HMC 16.

111. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

112. The MRI also showed: “gray-white differential within normal limits” and “normal flow voids are maintained within the major intracranial vascular pedicles,” and “no sites of pathologic contrast enhancement.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.



113. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.

114. Dr. Johnson failed to include the brainstem ischemia visible in the DWI sequence. HMC 16. (In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.)

115. Instead, contrary to the DWI imaging, Dr. Johnson concluded that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

COMPARISON: CT head 6/28/2019; no prior MRI

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

IMPRESSION:

NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

No definitive acute abnormalities are identified on this motion-compromised examination.

HMC 16.

116. In addition, Dr. Johnson again reviewed Michaela’s CT scan, for “comparison” purposes. Dr. Johnson thus had a second opportunity to interpret the CT scan. HMC 16.

117. Dr. Johnson failed again to catch and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to catch and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a “normal exam.” See HMC 16, HMC 61.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat the Stroke for Additional Hours*

118. At 14:05, RN Gabe Herman performed a neuro check, including a Glasgow Common Scale (GCS) assessment. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534  
 Nurse Note:  
 NEURO CHECK - 6/29/2019 1405  
 EYE OPENING: eyes open to verbal stimuli 3  
 VERBAL RESPONSE: verbal incomprehensible sounds 2,  
 MOTOR RESPONSE: motor flexion withdrawal 4  
 GLASCOW COMA TOTAL 7

119. The GCS is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients.

120. The Scale assesses the patient according to three aspects of responsiveness: eye-opening, motor, and verbal responses.

TABLE 38-2		
Glasgow Coma Scale		
BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

121. At 14:18, Internist Ananka Myrie called Dr. Hawkins. Dr. Myrie informed him that she wanted neurology and psychiatry evaluations of Michaela before admitting her. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
 Results Reviewed by ED Physician:  
 MRH BRAIN W/WO CONTRAST  
 CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

122. Between 14:17 and 14:22, Dr. Hawkins called Dr. Glass again, to inform him of the negative MRI findings. HMC 32.

123. Dr. Hawkins and Dr. Glass discussed the facts that Michaela still appeared “stuporous,” interacted only “intermittently” and “primatively” with her parents, and may have suffered an “atypical seizure.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422

MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

124. Dr. Glass “did not suggest medication prior to his exam.” HMC 32.

125. At 14:51, Dr. Hawkins turned over Michaela’s care to Emergency Physician Jonathan Thompson. HMC 32.

126. At that time, the emergency department continued waiting for Dr. Glass’s evaluation. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451

Results Reviewed by ED Physician:

MRH BRAIN W/WO CONTRAST

LACTATE

MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Despite Examining Michaela, Dr. Glass Still  
Does Not Diagnose and Treat the Stroke*

127. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

128. At that time, Michaela continued to exhibit signs and symptoms of stroke:

- “Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—”
- “She can at times open her eyes and close them to command and does appear to look at me at times.”
- “At times she appears to have a deconjugate gaze but at other times not.”
- “At times she will have extensor posturing type movements of the upper extremities.”

- “She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently [sic].”
- “She has bilateral Babinski. She has bilateral Hoffmann’s in her hands.”

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann's in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

129. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” and despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with pepper spray” and then went to bed “doing fairly well,” Dr. Glass did not turn his attention to diagnosis of stroke, despite Michaela’s presentation. *See HMC 6-7.*

130. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass wondered if "a hypoxic event" or "unlikely" seizures might be the cause of her condition.

- "I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well . . ."
- "Her MRI scan did not show a structural abnormality to account for the symptoms."
- "I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here."
- "I will get an emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy."

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.



1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

131. As a result, despite Michaela's clinical presentation, Dr. Glass failed to review the CT scan or MRI for himself, failed to order a new CT scan or vascular imaging, and failed order or provide any treatment for Michaela's BAO.

132. Instead, Dr. Glass noted that the "CTA scan of the brain was normal," the "CT scan of the brain did not show any acute changes," and the "MRI scan of the brain with and without contrast showed significant motion artifact but was normal." HMC 3, HMC 6.

**Laboratories and Diagnostics:**

CT scan of the brain was normal.

MRI scan of the brain with and without contrast showed significant motion artifact but was normal.

HMC 3.

CT scan of the brain did not show any acute changes

MRI scan of the brain with and without contrast showed motion artifact but no significant abnormality

Ammonia, urine drug screen, TSH and EtOH were all okay

HMC 6.



*Dr. Glass Signs Off on Transfer to Erlanger for a  
Neuro Evaluation*

133. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time.” HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

134. Dr. Glass agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

135. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.

136. At 17:35, Michaela was transferred to Erlanger by EMS. The reason for the transfer was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.

**Appropriateness**

— Appropriate transport service equipment and personnel are requested to provide appropriate level of care  
 — Basic: \_\_\_ Advanced:  Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_  
 Agency: Hamilton EMS  
 — The receiving facility has available space for the patient.  
 — Transferring physician has discussed patient status with accepting physician — Auto accept thru transfer center  
 — the receiving facility has agreed to accept the patient and provided adequate treatment  
 Facility: Erlanger Time: \_\_\_\_\_  
 Name of Physician accepting patient: Ben Smith Phone: \_\_\_\_\_  
 Approved by: \_\_\_\_\_ Title: \_\_\_\_\_  
 — Reason for Transfer: altered mental status  
 — Risk of Transfer: transport, anxiety compromise  
 — Benefits to Transfer: neuro evaluation  
 — It is medically necessary to transport the patient by ambulance  
 Signature of transferring physician: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Transferring facility: Hamilton Fax: \_\_\_\_\_  
 Name of Patient's primary care physician: none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother  
 Refusal to transfer signature/relationship: \_\_\_\_\_  
 Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

— Report given to: Owens RN By: Debi Adams RN Time: 1702  
 — Police notified (if applicable). Agency: \_\_\_\_\_  
 — Family notified. Name: \_\_\_\_\_  
 — Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS \_\_\_ documented. Disposition of valuables: \_\_\_\_\_  
 Signature of RN: Debi Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

137. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp Financial Class		
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger After an MRA Reveals a Brainstem and Right-Side Stroke*

138. At 18:39, Michaela arrived at Erlanger emergency department by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

139. At 01:10 overnight, June 30, 2019, Michaela was transferred from the ER to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

140. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.

<b>CONSULTATION</b>	
<b>Patients Name:</b> SMITH, MICHAELA E	
<b>Hospital Number:</b> 000101737594	<b>Date of Birth:</b>
<b>Room Number:</b> ECD RM	<b>Patient Status:</b> O
<b>To Attending Physician:</b> David F. Hawkins, MD	<b>Consulting Physician:</b> Jeffrey Glass, MD
<b>Dictated by:</b> Jeffrey Glass, MD	
<b>Date dictated:</b> 06/30/2019 12:02 P	
<b>Date transcribed:</b> 06/30/2019 12:39 P jc2	
Signed by Glass M.D., Jeffrey on 01-Jul-2019 17:45:02 -04:00	

HMC 5.

141. Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.”

HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

142. At Erlanger, Michaela’s condition “progressively worsened.”

143. On July 1, 2019, Michaela was placed on a ventilator and a feeding tube.



Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

144. On the afternoon of July 2, 2019, a brain CT scan produced an “urgent critical result,” including “a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation.”

BEH 310.

CT brain without IV contrast		Resulted: 07/02/19 1616, Result status: Final result	
Ordering provider: William Albert Shelton, MD 07/02/19 1516	Order status: Completed	Filed by: Interface, Radiology/Cardiology Results In 07/02/19 1618	Accession number: E1142983
Resulted by: Andrew J Hill, MD			
Performed: 07/02/19 1527 - 07/02/19 1539			
Resulting lab: CARESTREAM PACS/PS360			
Narrative:			
<b>**URGENT CRITICAL RESULT **</b>			
This report was faxed to BEH NNICU at 1608 hours on 07/02/2019 -- H. Andrus/Editor.			
HISTORY: Altered mental status.			
TECHNIQUE: <b>Noncontrast brain CT.</b> Automated dose control used during this exam.			
FINDINGS			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
No evidence of acute intracranial hemorrhage or extra-axial collection. No midline shift.			
Mucous retention cyst left maxillary sinus. Orbits are intact. The skull is intact.			
Impression:			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
Findings given to Dr. Tom Devlin at 1612 on 07/02/2019 by Dr. Andrew Hill.			

BEH 310.

145. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

146. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

Performed: 07/02/19 1927 - 07/02/19 2050  
Resulting lab: CARESTREAM PACS/PS360  
Narrative:

Accession number: E1143287

**\*\*URGENT UNEXPECTED FINDING\*\***

This report was faxed to BEH NNICU at 2239 hours on 7/2/2019 and received by Liz Hughes, RN, at 2242 hours on 7/2/2019 -- G. VanOstrand/Editor.

HISTORY: Stroke, follow up

EXAMINATION: MRI BRAIN WITHOUT CONTRAST, MR ANGIOGRAM NECK WITH AND WITHOUT CONTRAST, MR ANGIOGRAM BRAIN WITHOUT CONTRAST

TECHNIQUE: Multiecho multisequence imaging of the head was performed without intravenous contrast administration.

3-D time-of-flight MRA of the head was performed without intravenous contrast. MIP reconstructions of the circle of Willis were generated.

MRA of the neck was performed without and with intravenous contrast. MIP reconstructions of neck vessels were generated. 20 cc of MultiHance was administered intravenously.

Where applicable, stenosis measurements are performed per NASCET criteria; with mild (<50%), moderate (50-70%), severe (70-99%).

COMPARISON: CT head, same day.

BEH 319.

147. The studies were tagged as an "urgent unexpected finding." BEH 319.

148. The findings of the head MRI included:

- A large acute infarct involving the right cerebellar hemisphere, and brain stem
- Diffuse cerebral edema.
- Absent ICA flow voids bilaterally
- Basilar-artery flow void
- A mass effect on the brainstem
- Cerebellar tonsillar herniation at least 2 cm below the foramen magnum
- Compression of the cervicomedullary junction

HMC 319.

MRI Head:

A large acute infarct is seen involving the right cerebellar hemisphere, and brainstem. Diffuse cerebral edema is present. There is subtle increased T2 signal involving the cerebral cortex bilaterally. Bilateral thalamic acute lacunar infarcts.

Absent ICA flow voids bilaterally. Basilar artery flow void is present.

There is mass effect on the brainstem. Cerebellar tonsillar herniation noted at least 2 cm below the foramen magnum. There is compression of the cervicomedullary junction. Subcentimeter pineal cyst noted.

HMC 319.

149. The findings of the head MRA included: “No evidence of flow-related enhancement noted in the intracranial vessels.” BEH 319.

150. The findings of the neck MRA included “diffuse attenuated caliber of vertebral arteries noted on both sides.” BEH 319.

MRA head: No evidence of flow-related enhancement noted in the intracranial vessels.

MRA NECK: No evidence of flow-limiting stenosis or occlusion of cervical carotid or vertebral arteries noted. No dissection identified. However, there is diffuse attenuated caliber of vertebral arteries noted on both sides.

HMC 319.

151. In summary, the findings of the three studies were: “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the



brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels

BEH 319.

152. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

153. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

154. Michaela Smith was 26 years old. HMC 67, HMC 44.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: Smith, Michaela E  
Pt Acct: 101737552

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ED RECORD

Patient: Smith, Michaela E Age/DOB: \_\_\_\_\_ Sex: F SS #: \_\_\_\_\_  
Age: 26yr Med Rcrd: 9199456

Mailing Address: 1452 Piedmont Dr Arrival (HIS): 6/28/2019 2243  
Mailing Other: \_\_\_\_\_ Dispo Summary Printed 6/29/2019 0215  
City: Dalton ED Record Printed: \_\_\_\_\_  
State: GA Zip: 30721 Initial Provider Contact: 6/28/2019 2327  
Mode of Arrival: Car

MD ED: Holsonback, Shawn D.O. RN Eval: Stacey S. R.N.  
MLP: \_\_\_\_\_ PMD: Duckett, Jennifer P.A.

HMC 67.

# APPENDIX

# CT Scan Imaging



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y, 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 339% Angles L-R: 0°, S-I: -84°

Im: 7/29 (I -> S) Series: 3

Uncompressed

Thickness: 5.00 mm Location: -122.30 mm

P

6/28/19, 11:54:01 PM

4 sec / 6 hr, 14 min

Made In OsiriX

Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



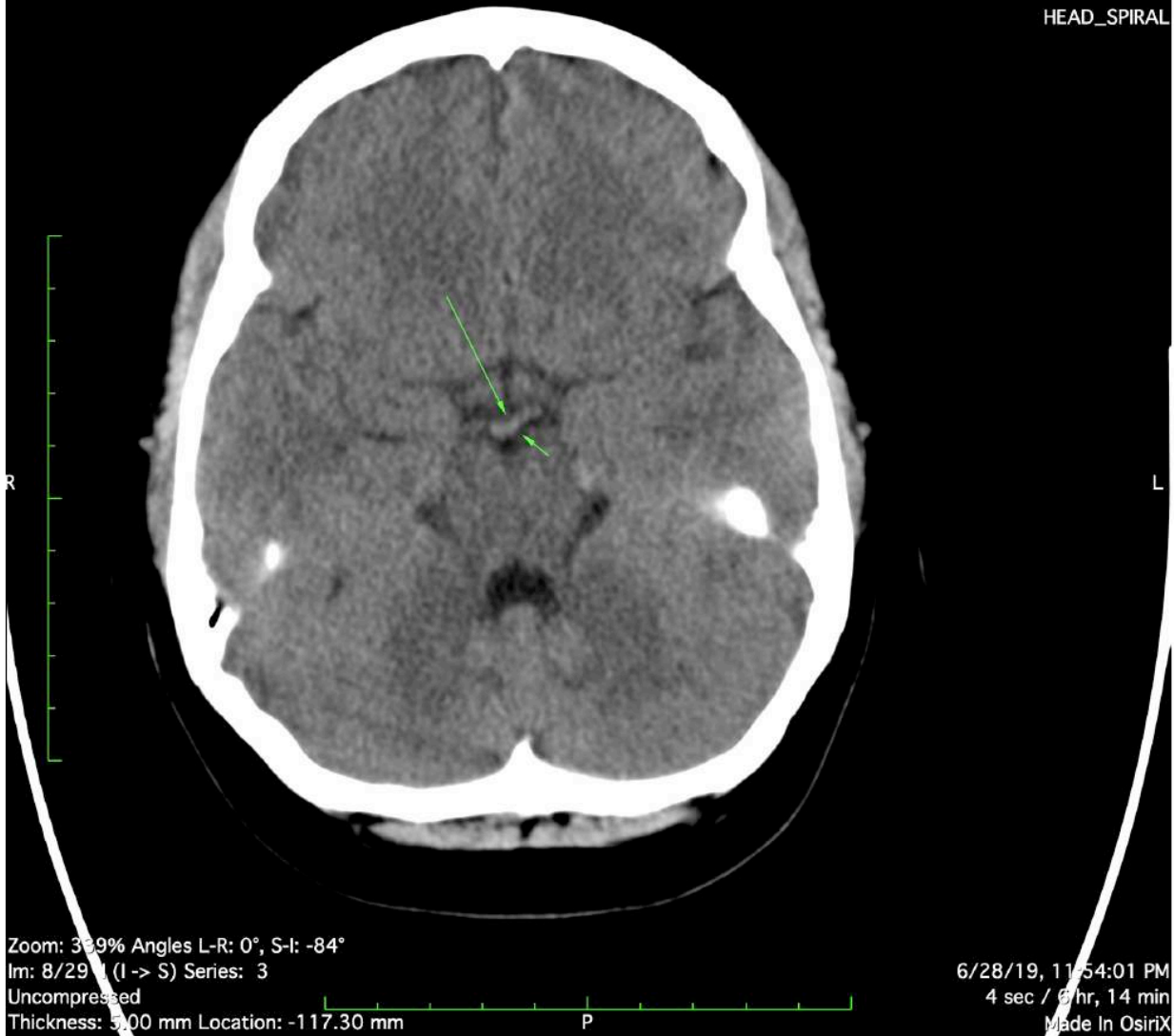
Zoom: 374% Angles L-R: 0°, S-I: -84°  
Im: 8/29 | (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 fr, 14 min  
Made In OsiriX

Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL

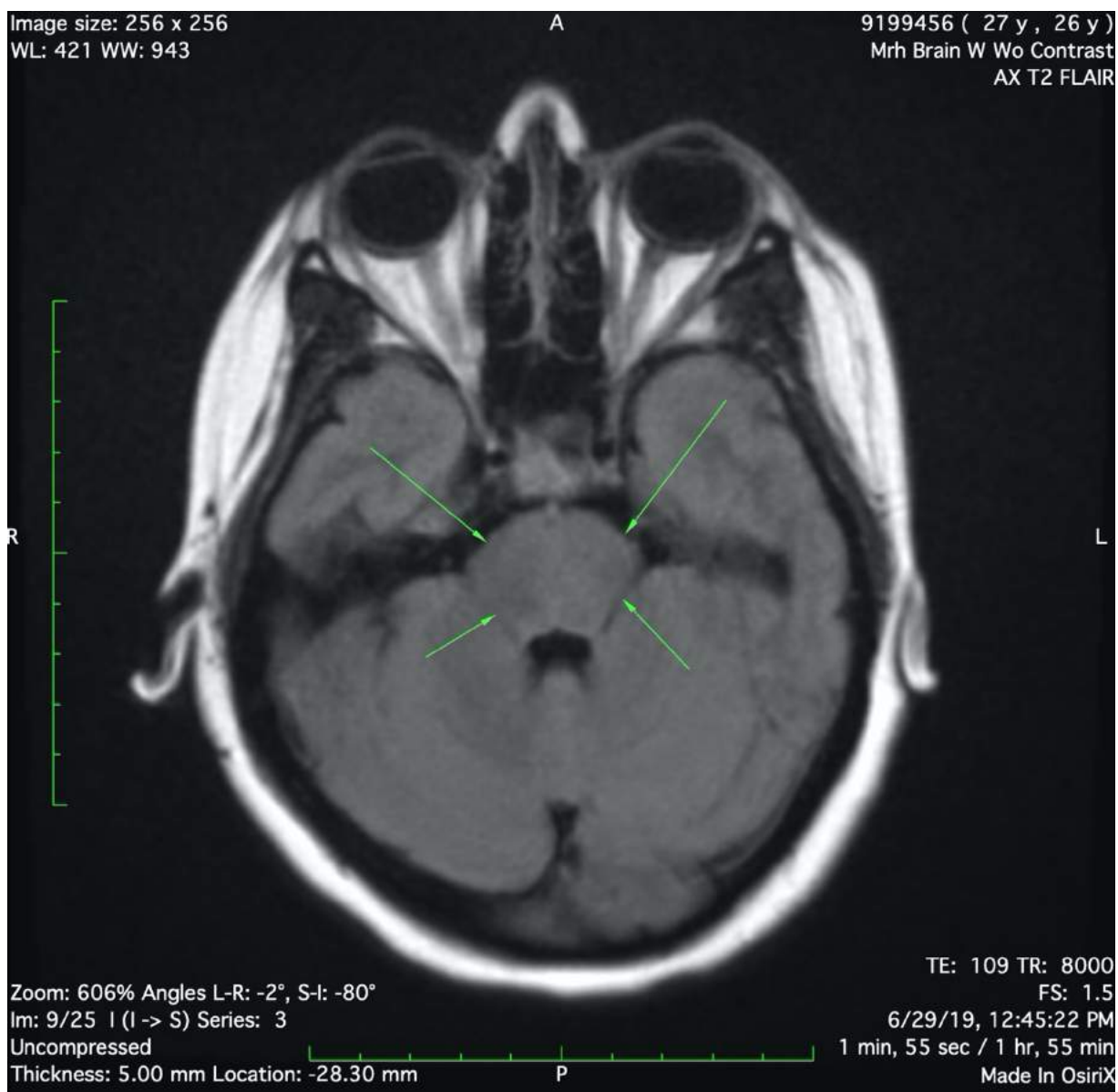


Zoom: 369% Angles L-R: 0°, S-I: -84°  
Im: 8/29 (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 hr, 14 min  
Made In OsiriX



# MRI Imaging



**AFFIDAVIT OF BRIAN STETTLER, M.D., REGARDING  
MICHAELA ELIZABETH SMITH**

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Brian Stettler, M.D., who after first being duly sworn, states as follows.

**Introduction**

1. This affidavit addresses medical negligence that occurred during Michaela Smith's visit to Hamilton Medical Center ("Hamilton") in Dalton, Georgia, on June 28 and 29, 2019.
2. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.
3. This affidavit addresses matters that Plaintiffs' counsel have asked me to address. I have not attempted to identify all standard-of-care violations. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues the Defense might raise or that otherwise might arise as the case unfolds.
4. I use the term "standard of care" to refer to that degree of care and skill ordinarily exercised by members of the medical profession generally under the same or similar circumstances and like surrounding conditions as pertained to the medical providers I discuss here.
5. Plaintiffs' counsel drafted this affidavit after consulting with me, and I reviewed the draft and edited it to make sure it correctly states my views.
6. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details.
7. I hold all the opinions expressed below to a reasonable degree of medical certainty — that is, more likely than not. If additional information becomes available later, my views may change.

8. I understand that Plaintiffs' counsel will provide this affidavit to the Defendants, and that their insurance company will hire lawyers and medical experts to review this case and to review this affidavit. If anyone on the Defense believes that I have not been given, or have overlooked or misconstrued, any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiffs' counsel. The Defense need not wait to take my deposition to communicate with me. I will consider any information the Defense wishes to bring to my attention, and, if appropriate, I will provide a supplemental affidavit.

### Evidence Considered

9. I have reviewed medical records from Hamilton pertaining to Michaela Smith's visits on June 28 and 29, 2019. I have also reviewed medical records from Baroness Erlanger Hospital, the facility where Michaela was hospitalized and died, after her discharge from Hamilton.

### Principal Opinions

10. My principal opinions are summarized here. In deposition or trial testimony, I may elaborate upon these principal opinions, and in doing so, I may offer related, subsidiary, or incidental opinions.

**i. Task & Requirement:** Diagnosing stroke.

*Standard of care requirement:* In treating a patient with the neurological deficits Michaela Smith exhibited when she returned to Hamilton on June 29, 2019, the standard of care requires an emergency-medicine physician to confirm or rule out a stroke.

*Violations:* Emergency-Medicine Physician David Hawkins violated this requirement by:

- (1) failing to recognize the clinical significance of Michaela's signs and symptoms when she returned to Hamilton on June 29, 2019,
- (2) failing to screen for stroke through a CT scan and stroke score, and
- (3) failing to order vascular imaging—a definitive diagnostic study capable of identifying the source of Michaela's deficits.



*Causation:* As a result of each of these violations, Dr. Hawkins failed to diagnose and treat Michaela's stroke, and Michaela suffered preventable injury and death. At 12:45 on June 29, 2019, an MRI demonstrated that Michaela's brainstem, although ischemic, had not yet suffered permanent stroke changes. But-for each of these violations, therefore, Michaela's stroke would have been diagnosed and treated.

*Damages:* Each violation thus caused Michaela pain and suffering, injury, and death.

**ii. Task & Requirement:** Providing emergent care to stroke patient.

*Standard of care requirement:* The standard of care requires an emergency-medicine physician to initiate a stroke protocol or otherwise provide emergent care to a patient with neurological deficits concerning for stroke.

*Violations:* Dr. Hawkins violated this requirement by failing to initiate a stroke protocol or otherwise provide emergent care when Michaela returned to Hamilton on June 29, 2019. Specifically, Dr. Hawkins failed to examine Michaela, screen for stroke, order vascular imaging, order a neurology consult, and otherwise investigate and treat her deficits, emergently.

*Causation:* These violations wasted valuable time, leading directly to unnecessary pain and suffering, brain injury, and ultimately death.

*Damages:* These violations thus caused Michaela pain and suffering, injury, and death.

**iii. Task & Requirement:** Obtaining an emergency thrombectomy or other effective treatment for stroke patient.

*Standard of care requirement:* In the case of a patient with a BAO, the standard of care requires an emergency-medicine physician to take the steps necessary for the patient to undergo an emergency thrombectomy or other acute therapy.

*Violation:* Dr. Hawkins violated this requirement by failing to take the steps required for Michaela to undergo a thrombectomy or other acute therapy.

*Causation:* As a result of this violation, Michaela's BAO remained untreated, and Michaela thereby suffered preventable pain and suffering, brain injury, and death.

*Damages:* This violation thus caused Michaela pain and suffering, injury, and death.

### Qualifications

11. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based on my own personal knowledge and belief.

12. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.

13. My Curriculum Vita, which is attached as Exhibit A, provides further detail about my qualifications. I incorporate and rely on that information here.

14. The events at issue here occurred in June 2019.

15. I am qualified to provide expert testimony pursuant to OCGA 24-7-702.

- a. In June 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of Ohio to practice as a physician. That is where I was practicing in June 2019.

- b. In June 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to — specifically, the tasks identified above on which I offer standard-of-care opinions.

I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to June 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am a physician specializing in emergency medicine in the settings of hospitals and other long-term care facilities, and for many



years I have had great familiarity with each of the tasks on which I offer standard-of-care opinions here.

### Attached Documents


16. The documents identified below are attached to this affidavit largely for the benefit of the insurance adjustors responsible for evaluating this case on behalf of the Defendants, and for the lawyers provided by the insurance company.

17. Attached to this affidavit is a document that recites medical principles that apply here. The Defendants themselves will not need that recitation of basic medical information. Plaintiff's counsel created the medical-principles document for the benefit of the Defense. I have reviewed the document, and the principles stated there are correctly stated and apply here.

18. Also attached to this affidavit is a chronology of facts pertaining to this case. In forming my substantive view of the case, I have relied on the medical records themselves, not the chronology. The chronology, however, provides a useful reference for relevant facts contained in the records in less-organized fashion. Plaintiff's counsel created the chronology. I have not edited it.

### Supporting Literature

19. The general points discussed above are elementary, are likely well known to the Defendants, and should not require a literature search. Insofar as any Defendant consulted or should have consulted reliable authorities on these points in treating Michaela Smith, the literature cited in the attached medical-principles document represents such authorities, which here may also prove helpful to adjustors and lawyers in their evaluation of this case.



Brian Stettler, M.D.

SWORN TO AND SUBSCRIBED before me

April 7, 2021



JENNA DENSON  
Notary Public, State of Ohio  
My Commission Expires 09-23-2023

*Jenna Denson*  
NOTARY PUBLIC

My Commission Expires: 9.23.2023



# Brian A. Stettler, MD

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3662 Shaw Ave  
Cincinnati, OH 45208  
Mobile: (513) 258-6135  
[BrianAStettler@gmail.com](mailto:BrianAStettler@gmail.com)

## Education and Training:

- Certification:** American Board of Emergency Medicine  
Certified 2005 & 2015, expires 12.31.2025
- Fellowship:** University of Cincinnati, Cincinnati, OH  
Department of Emergency Medicine  
Neurovascular Emergencies  
July 2004-June 2005
- Residency:** University of Cincinnati, Cincinnati, OH  
Department of Emergency Medicine  
July 2000- June 2004  
Chief Resident, 2003-2004  
Resident Teaching Award 2004
- Education:** Ohio State University College of Medicine, Columbus, Ohio  
August 1996- June 2000  
Degree: M.D.
- Ohio State University, Columbus, OH  
August 1991- June 1996  
Degree: B.S. Molecular Genetics

## Clinical Positions:

Attending Physician  
Qualified Emergency Specialists, Inc.  
Cincinnati, OH  
February 2019 - present

Attending Physician  
UC Health  
Cincinnati, OH  
July 2004 – February 2019

**Academic Appointments:**

Vice Chair of Faculty Development  
Department of Emergency Medicine  
University of Cincinnati College of Medicine, Cincinnati, OH  
June 2018 – February 2019

Director of Faculty Development  
Department of Emergency Medicine  
University of Cincinnati College of Medicine, Cincinnati, OH  
July 2016 – February 2019

Associate Professor  
Department of Emergency Medicine  
University of Cincinnati College of Medicine, Cincinnati, OH  
July 2015 – February 2019

Residency Program Director  
Department of Emergency Medicine  
University of Cincinnati College of Medicine, Cincinnati, OH  
May 2007 – July 2017

Associate Residency Director  
Department of Emergency Medicine  
University of Cincinnati Hospital, Cincinnati, OH  
September 2005 – May 2007

Assistant Professor  
Department of Emergency Medicine  
University of Cincinnati College of Medicine, Cincinnati, OH  
July 2004 – 2015

Faculty  
Greater Cincinnati/Northern Kentucky Stroke Team  
July 2004 - present

**Service:**

**National:**

Member, SAEM Faculty Development Committee (2016 – present)

Member, SAEM Fellowship Approval Committee (2014-present)

Member, SAEM GME Committee (2014-present)

Member, Stroke Task Force

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Emergency Cardiovascular Care Committee  
American Heart Association (2004-2005)

### **Institutional:**

Member, College of Medicine Faculty Wellness Committee  
University of Cincinnati College of Medicine, (2018 – February 2019)

- Chairman, subcommittee on wellness resources: Subcommittee is tasked with investigating available resources for faculty wellness and delivering a report to the College of Medicine and Department Chairs to act as resources for faculty

Member, ARPT Committee  
University of Cincinnati College of Medicine, (2017 – February 2019)

Member/Chairman, Medical Student Appeals Board  
University of Cincinnati College of Medicine, (2016 – February 2019)

Member, Faculty Development Council  
University of Cincinnati College of Medicine, (2014 – February 2019)

Member, Education and Assessment Committee  
Graduate Medical Education  
University Hospital (2008- February 2019)

Member, Duty Hours Committee  
Graduate Medical Education  
University Hospital (2007-2014)

Member, CPR committee  
University Hospital (2005-2007)

### **Departmental:**

Chairman, Faculty Development Committee  
Department of Emergency Medicine  
University of Cincinnati (2018)

- *Committee designed to discuss and capitalize on opportunities to improve the academic and personal development of UCEM faculty. Current projects include transparent model for scheduling UC/Community ED hours, Peer evaluations of faculty, and development of a comprehensive mentor training program for the Department*

Medical Student application review and invited interviewer  
University of Cincinnati Emergency Medicine Residency Program  
University of Cincinnati College of Medicine (2017 - February 2019)

Designer and Co-Facilitator  
UC Department of Emergency Medicine Faculty Schedule  
Greater Cincinnati Northern Kentucky Stroke Team Faculty Schedule

# Brian A. Stettler, MD

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University of Cincinnati (2013 – February 2019)

Chairman, Clinical Competencies Committee  
Department of Emergency Medicine  
University of Cincinnati (2013-2017)

Chairman, Leadership Curriculum Planning Committee  
Department of Emergency Medicine  
University of Cincinnati (2013- February 2019)

Chairman, Education Committee  
Department of Emergency Medicine  
University of Cincinnati (2009-2017)

Member, Leadership Council  
Department of Emergency Medicine  
University of Cincinnati, (2009- February 2019)

Member, Operations Committee  
UC Department of Emergency Medicine  
University of Cincinnati (2009- February 2019)

Member, Air Care Safety Committee (2001-2003)

## **Educational Experience**

### **Curriculum Design:**

Leadership Curriculum, Department of Emergency Medicine, 2013

Curriculum designed de novo and launched with the goal of providing formal training, discussion, and mentorship to allow junior faculty and resident learners to develop and realize their own potential as leaders in all aspects of their lives, both personally and professionally

Faculty Continuing Education Series (2009- February 2019)

Curriculum designed to refresh faculty clinical and procedural skills in an environment where residents perform vast majority of procedures, but still require knowledgeable supervision and oversight. Sessions have included Approach to the Difficult Airway and Bedside Ultrasound. All faculty who work clinically have participated in the curriculum.

### **Invited Presentations:**

#### **National:**

“Negotiating Solutions” Resident Academic Leadership Forum. SAEM National Meeting. Orlando, FL. May, 2017

“Bedside Teaching and Feedback in an Imperfect Environment.” Junior Faculty Forum. SAEM National Meeting. Orlando, FL. May, 2017

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“Resident Remediation.” Education Leadership Forum. SAEM National Meeting. New Orleans, LA. May, 2016

“Bedside Teaching and Feedback in an Imperfect Environment.” Junior Faculty Forum. SAEM National Meeting. New Orleans, LA. May, 2016

Stull MJ, McDonough E, Paulsen R, **Stettler BA**, Hill J. Development of a Behaviorally-Anchored Assessment Form for Bedside Teaching in the Emergency Department. Accepted for Oral Presentation at Society of Academic Emergency Medicine Annual Meeting – New Orleans, LA – May 2016.

Richardson C, Stull MJ, Miller CN, **Stettler BA**. Cultivating Leaders in Emergency Medicine: A Formal, but Flexible Curriculum. Oral Presentation. Society of Academic Emergency Medicine Annual Meeting – San Diego, CA – May 2015.

Hill JM, McDonough E, Paulsen R, **Stettler BA**, Stull MJ. Development of a Behaviorally Anchored Assessment Form for Resident Lectures in an Emergency Medicine Residency Training Program. Oral Presentation. Society for Academic Emergency Medicine Annual Meeting – San Diego, CA – May 2015.

“Bedside Teaching and Feedback in an Imperfect Environment.” Junior Faculty Forum. SAEM National Meeting. Dallas, TX. May, 2014

“Interdisciplinary Communication and Hand-offs.” Small Group Discussion Content Designer and Leader. Chief Resident Immersion Training. UC Health. May, 2014.

“Mechanisms for Feedback and Evaluation.” Junior Faculty Forum. SAEM National Meeting. Atlanta, GA. May, 2013

“Team Communication.” Small Group Discussion Content Designer and Leader. Chief Resident Immersion Training. UC Health. May, 2013.

**Stettler BA**, Lindsell C, Alwell K, Kleindorfer D, Flaherty M, Woo D, Moomaw C, Broderick JP, Kissela BM. Stroke Severity at Presentation to the Emergency Department Varies by Time of Day: Results of a Population-Based Study. Accepted for oral presentation, SAEM National Conference, May 2007.

### Local:

*Chemical Restraint and Sedation of the Agitated Patient – Special Case Scenarios*, August 2018  
Designed and led multidisciplinary session on treatment of the agitated patient in special circumstances

*Contracts and Negotiation, August 2017 and August 2018*  
Panel Participant, Department of Emergency Medicine Grand Rounds

*Teaching, mentorship, and feedback in the ED*, July 2018  
Panel Participant, Department of Emergency Medicine Grand Rounds

*Oral Boards/eOrals presentation*, May 2018  
Presentation to EM residents of Oral Board cases with feedback

*The Changing Face of Stroke Management*, February 2018

## Brian A. Stettler, MD

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Combined Department of Emergency Medicine/Department of Neurology Grand Rounds

*Finance and Leadership*, January 2018

Leadership Curriculum, Department of Emergency Medicine Grand Rounds

*eOrals Facilitator and Presenter*, November 2017

Department of Emergency Medicine Grand Rounds

*Giving and Receiving Mentorship*, October 2017

Leadership Curriculum, Department of Emergency Medicine Grand Rounds

*Opportunities in Leadership*, July 2017

Co-Presenter, Leadership Curriculum, Department of Emergency Medicine Grand Rounds

*Oral Boards Facilitator and Presenter*, July 2017

Department of Emergency Medicine Grand Rounds

### **Mentorship:**

**Current Resident Mentorship:** *(minimum quarterly meetings for discussion/development/planning)*

Dr. Chris Shaw

Dr. Adam Gottula

Dr. Michael Klasky

Dr. Michael Spigner

**Medical Student Mentorship:** *(minimum quarterly meetings for discussion/development/planning)*

Samantha Stringer, MS4, 2014 - 2018

### **Project mentorship:**

Project mentor for resident EBM discussion:

*STEMI*, Presented January, 2017

Department of Emergency Medicine Grand Rounds

Residents involved: Aaron Murphy-Crews and Matt Scanlon

Mentor for Department of Emergency Medicine Residency Program

Individualized Interactive Instruction quarterly sessions

August 2017 – February 2019

Project mentor for Junior Faculty Development quarterly sessions

Department of Emergency Medicine, Spring 2017 – February 2019

Faculty Involved: Dr. Robbie Paulsen

### **Research:**

## Brian A. Stettler, MD

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### Peer Reviewed Publications:

Jeffery Hill, MD, MEd, Matthew Stull, MD, **Brian Stettler, MD**, Robbie Paulsen, MD, Kimberly Hart, MA, and Erin McDonough, MD. Development and Validation of a Lecture Assessment Tool for Emergency Medicine Residents. *AEM Education and Training*. 2018;00:1–7

Opeolu Adeoye, MD, MS; Heidi Sucharew, PhD; Jane Khoury, PhD; Achala Vagal, MD, MS; Pamela A. Schmit, RN, BSN; Irene Ewing, RN, BSN; Steven R. Levine, MD; Stacie Demel, DO, PhD; Bryan Eckerle, MD; Brian Katz, MD; Dawn Kleindorfer, MD; **Brian Stettler, MD**; Daniel Woo, MD, MS; Pooja Khatri, MD, MSc; Joseph P. Broderick, MD; Arthur M. Pancioli, MD. Combined Approach to Lysis Utilizing Eptifibatid and Recombinant Tissue-Type Plasminogen Activator in Acute Ischemic Stroke-Full Dose Regimen Stroke Trial. *Stroke*. 2015; 46: 2529-2533.

Hill JM, **Stettler BA**, Stull MJ, Paulsen RP, McDonough E. Behaviorally-Anchored Assessment of Resident Lectures. MedEdPORTAL: <https://www.mededportal.org/publication/10254>. 2015.

Adeoye O, Haverbusch M, Woo D, Sekar P, Moomaw CJ, Kleindorfer D, **Stettler BA**, Kissela BM, Broderick JP, Flaherty ML. Is ED disposition associated with intracerebral hemorrhage mortality? *Am J Emerg Med*. 2010 Mar 24. [Epub ahead of print]

Flaherty ML, Tao H, Haverbusch M, Sekar P, Kleindorfer D, Kissela B, Khatri P, **Stettler B**, Adeoye O, Moomaw CJ, Broderick JP, Woo D. Warfarin use leads to larger intracerebral hematomas. *Neurology*. 2008 Sep 30;71(14):1084-9.

**Stettler BA**. Evidence-Based Guidelines for Intraarterial Management of Acute Ischemic Stroke. Presented at the International Consensus on Cardiopulmonary and Emergency Cardiovascular Care Science and Treatment Recommendations Conference, January 2005.

**Stettler BA**. Advances in Diagnosis and Treatment of Transient Ischemic Attack. *Advancing the Standard of Care: Cardiovascular and Neurovascular Emergencies*. Ed. Blomkalns AL and Gibler WB. EMCREG CME monograph. 2005.

**Stettler BA**, Jauch EC, Kissela B, Lindsell CJ. Neurologic Education in Emergency Medicine Training Programs. *Acad Emerg Med*. 2005; 12: 909-911.

Jauch EC, Kissela B, **Stettler BA**. Acute Stroke Management. *eMedicine Journal*. 2004, Volume 5, Number 8

**Stettler BA**. Latest Imaging for Acute Ischemic Stroke and Intracerebral Hemorrhage. *Advancing the Standard of Care: Cardiovascular and Neurovascular Emergencies*. Ed. Blomkalns AL and Gibler WB. EMCREG CME monograph. 2004. 63-70.

### Abstracts:

Hill J, Stull M, Paulsen R, **Stettler BA**, Hart K, McDonough E. Validation Of A Behaviorally Anchored Evaluation Form For Resident Lectures. Poster Presentation. [CORD Academic Assembly Advances in Education Research and Innovations Forum](#), April, 2017.



## Brian A. Stettler, MD

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**Stettler BA**, Lindsell C, Alwell K, Kleindorfer D, Flaherty M, Woo D, Moomaw C, Broderick JP, Kissela BM. Frequency of Abnormal Lab Values in Patients Presenting to the Emergency Department with Acute Ischemic Stroke. Accepted for poster presentation, SAEM National Conference, May 2007.

**Stettler BA**, Kleindorfer D, Alwell K, Miller R, Moomaw C, Broderick JP, Kissela BM. Mortality in Patients Diagnosed with Ischemic Stroke or Transient Ischemic Attack Presenting with Isolated Posterior Circulation Symptoms: A Population-based Study. Poster Presentation, International Stroke Meeting, February 2007.

**Stettler BA**, Khoury J, Alwell K, Kleindorfer D, Miller R, Moomaw C, Broderick JP, Kissela BM. Rt-PA Treatment of Acute Ischemic Stroke is Associated with Lower Mortality and Better Functional Outcome in a Biracial Population. Poster Presentation, International Stroke Meeting, February 2006.

**Stettler BA**, Jauch EC, Kissela B, Lindsell CJ. Neurologic Education in Emergency Medicine Training Programs. Poster presentation, American Academy of Neurology Annual Meeting, April 2005.

**Stettler BA**, Khoury J, Miller R, Kleindorfer DO, Jauch EC, Pancioli A. Temporal Trends in Emergency Department Management of Transient Ischemic Attack: A Population-Based Study. Poster presentation, International Stroke Meeting, February 2005.

Dawn Kleindorfer, Kathleen Alwell, Jane Khoury, Irene Ewing, Alexander Schneider, Matthew L. Flaherty, Charles J. Moomaw, Rosie Miller, Pooja Khatri, **Brian A. Stettler**, Joseph P. Broderick. Temporal Trends in Emergency Department Arrival Times for Acute Ischemic Stroke: A Population-Based Study. Poster presentation, International Stroke Meeting, February 2005.

### Other Publications:

Stettler BA. Brain and Cranial Nerve Disorders, *Rosen's Emergency Medicine*, 9<sup>th</sup> edition, 2016

Stettler BA, Jauch EC. Neurologic Procedures in Emergency Medicine. *Adams Emergency Medicine*. 1<sup>st</sup> Edition. 2008

PEPID, 2003, Ischemic Heart Disease - Diagnosis and Emergency Treatment

Rapid Diagnosis and Treatment Center, University of Cincinnati Hospital CEC, 2003, Pelvic Inflammatory Disease Treatment Protocol

### Awards:

Program Director Award, UCCOM GME, 2017

Golden Apple Faculty Teaching Award 2007

University of Cincinnati Resident Teaching Award re-named "Brian A. Stettler, MD Resident Teaching Award" June 2019

**Memberships in Professional Organizations:**

American Heart Association 2005-present

Society of Academic Emergency Medicine 2000-present

American College of Emergency Physicians 2004-present

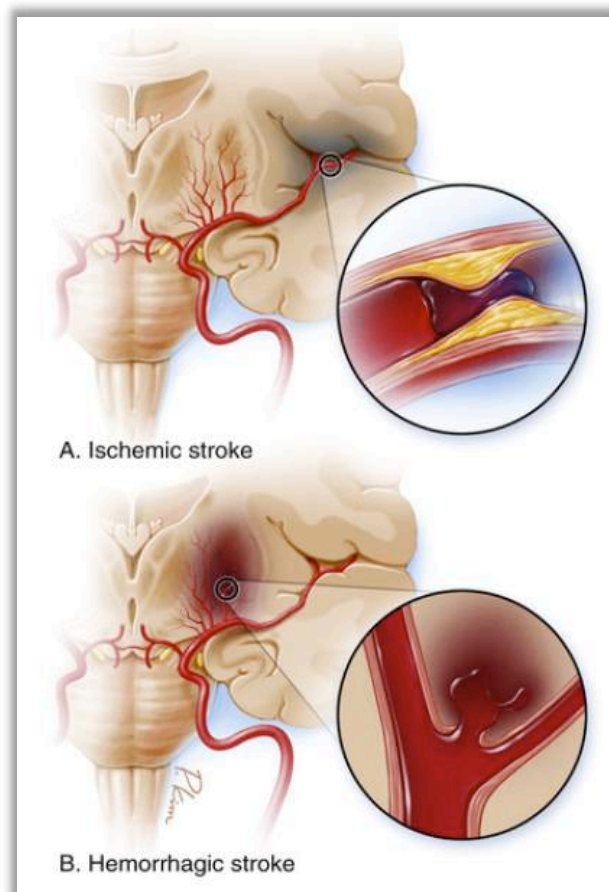
AQA, 1999-present

# **Medical Principles**

## General Principles

### *Stroke*

1. Stroke is the sudden death of brain cells due to a lack of oxygen.
2. The lack of oxygen is caused by either a blockage of blood flow to the brain or by the rupture of an artery that supplies the brain.
3. When a stroke is caused by blocked blood flow, it is called an ischemic stroke.
4. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.



5. A stroke may result in permanent brain-damage, long-term disability, and even death.

6. Signs and symptoms<sup>1</sup> of stroke generally include:

- Sudden numbness or weakness in the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking, or difficulty understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance, or lack of coordination.
- Sudden severe headache with no known cause.

### *Stroke Causes: Ischemia*

7. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.

8. Ischemia occurs when a blood clot reduces or blocks blood flow, preventing the organ or tissue from receiving enough oxygen-rich blood.

9. If not treated promptly, the cells in the part of the organ or the tissue supplied by the blocked artery will be deprived of oxygen and, with time, may be damaged or infarct (die).

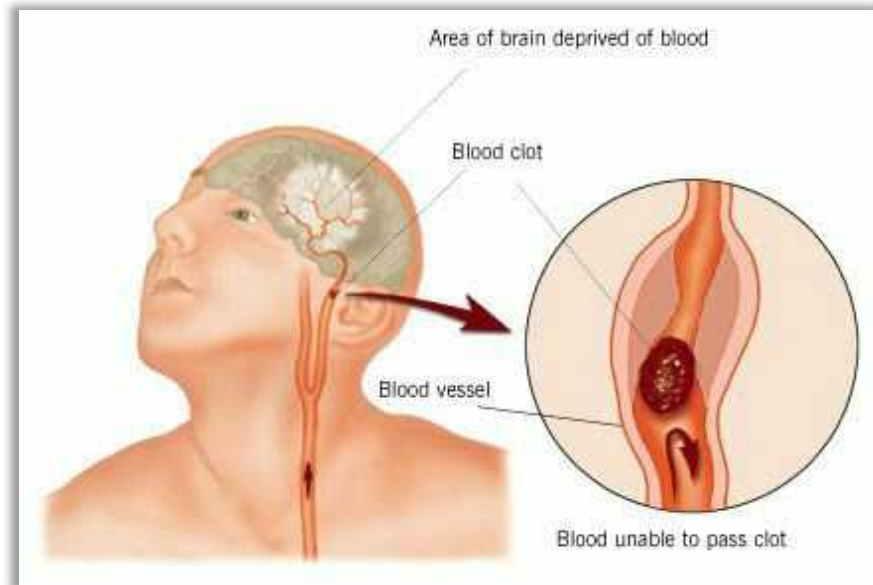
### *Ischemic stroke*

10. If something blocks blood flow to the brain, brain cells start to die because they cannot get oxygen. That is a stroke.

11. An ischemic stroke occurs when a blood clot interferes with blood flow through an artery that supplies the brain.

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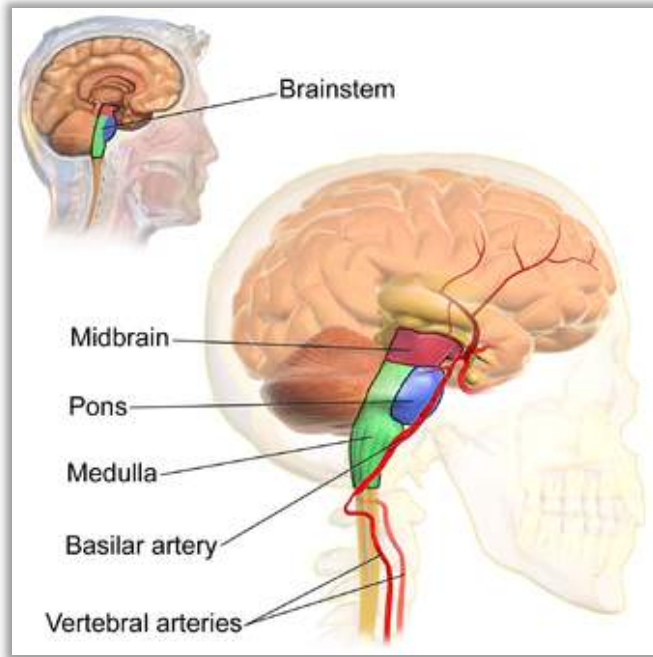
<sup>1</sup> A sign is a manifestation of medical condition that the physician perceives, objectively. In contrast, a symptom is a manifestation apparent to patient, subjectively.



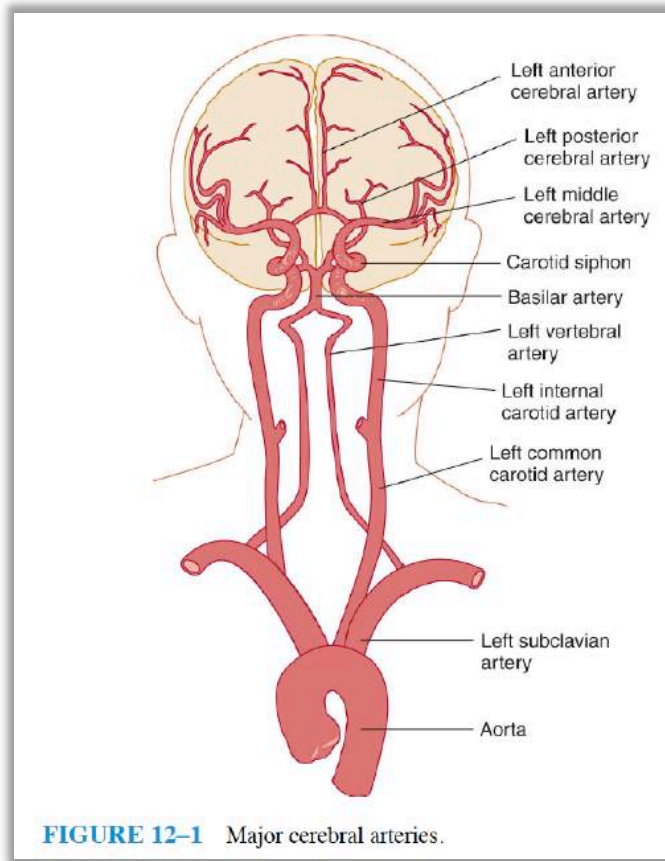
12. A thrombus is a blood clot that forms within a blood vessel.
13. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.
14. Arterial dissection—a tear inside an artery—often causes an embolus.
15. Trauma is a common cause of arterial dissection.

### *The Basilar Artery*

16. The basilar artery lies at the front of the brainstem in the midline.



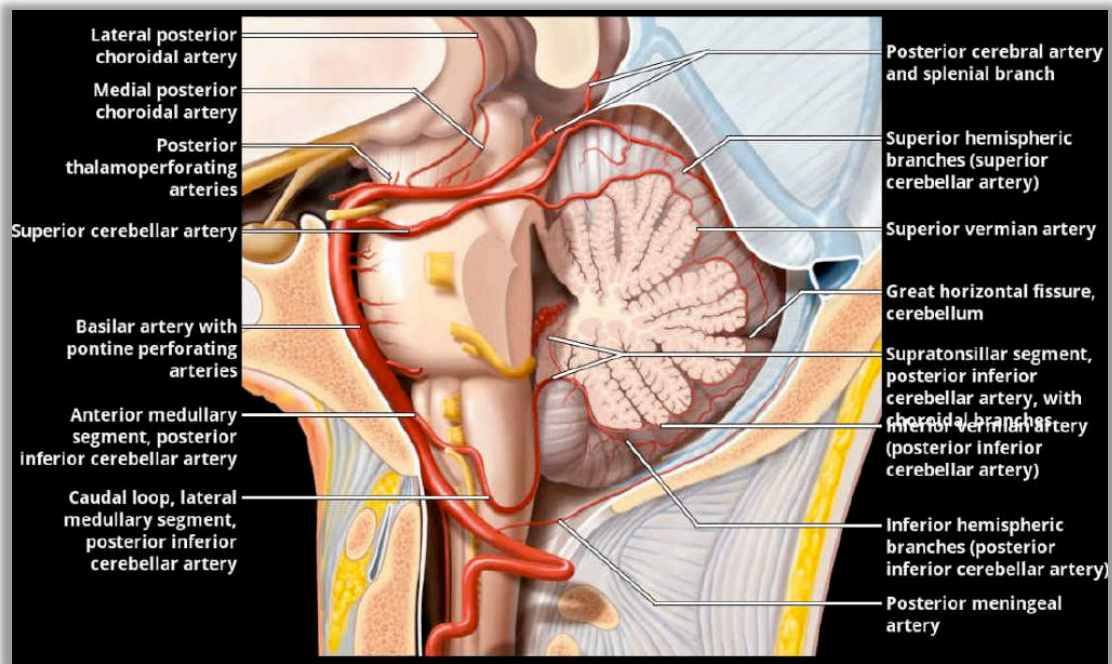
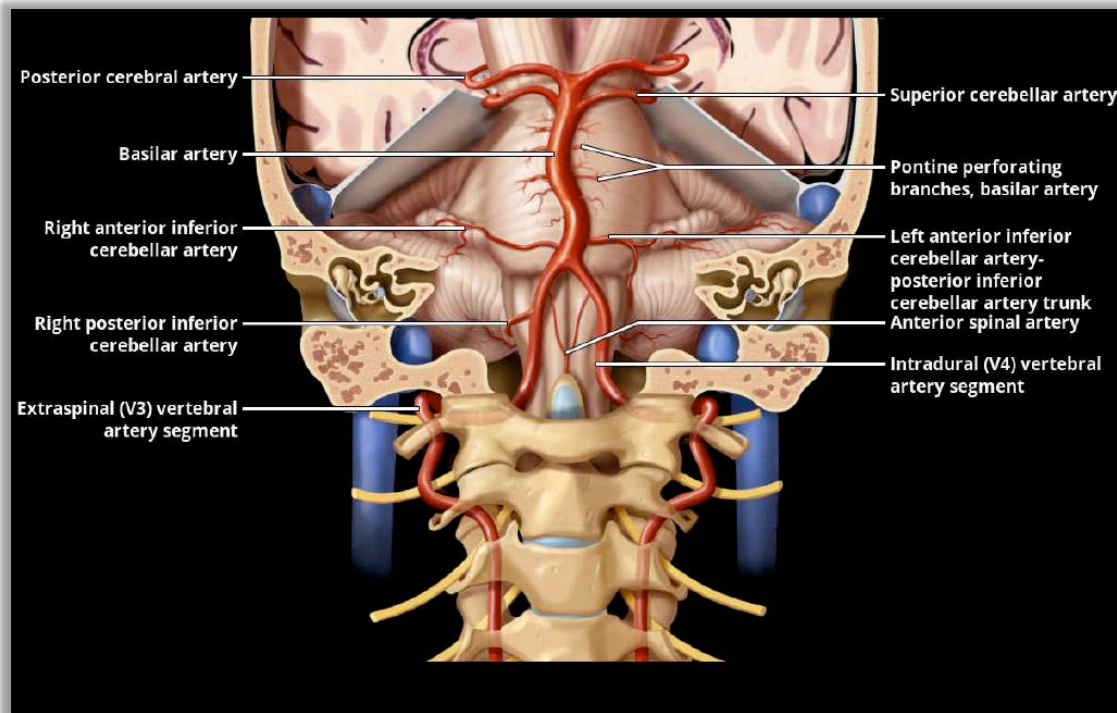
17. The basilar artery is formed by the union of the two vertebral arteries.



**FIGURE 12-1** Major cerebral arteries.



18. The basilar artery carries oxygenated blood up through the brainstem to the posterior (back) part of the brain.



## *Basilar Artery Occlusion (BAO)*

19. Basilar Artery Occlusion (BAO) is the name for an acute stroke originating in the basilar artery.
20. A BAO is a type of posterior-circulation stroke. It affects the circulation of blood in the back part of the brain.
21. A BAO occurs when a blood clot in the basilar artery impedes blood flow, resulting in ischemia in the posterior part of the brain.







22. If not treated quickly, a BAO can lead to severe brain damage, organ malfunction, catastrophic disability, and even death.
23. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

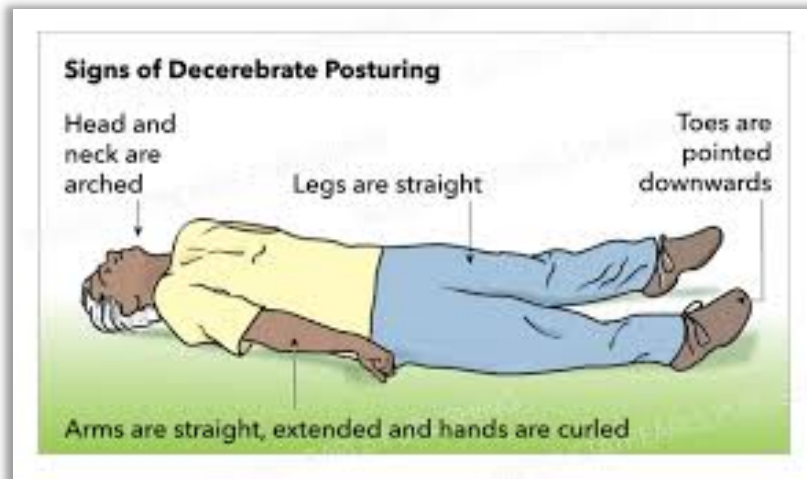
## *BAO Signs and Symptoms*

24. Because the cerebral vessels each tends to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion.
25. The signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
26. The hallmarks of a BAO include:

- Decreased or altered consciousness
- Quadriplegia (loss of voluntary movement in all four limbs)
- Various combinations of limb ataxia (impaired balance or coordination)
- Oculomotor (eye movement) abnormalities
- Pupillary abnormalities (pupils do not react normally to light)
- Dysarthria (inability to articulate speech)
- Dysphagia (inability to swallow)

Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

27. Such signs and symptom can present in various combinations.
28. Decerebrate posturing is a classic sign of BAO and other posterior strokes.
29. Decerebrate posturing is an abnormal posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.



30. Decerebrate posturing is also known as extensor posturing.
31. Other signs and symptoms of BAO include:
- Overactive or overresponsive reflexes (hyperreflexia).
  - Impaired balance or coordination (ataxia);
  - Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking.
  - Loss of the ability to speak (dysphonia).
  - Abnormalities of alertness and behavior, including hallucinations.
  - Dizziness, vomiting.
32. In rare BAO cases, patients suffer locked-in syndrome.
33. Patients with locked-in syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware and conscious of their “locked in” condition.

*Stroke diagnosis: history and presentation*

34. The most characteristic historical aspect of stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.
35. After the onset, stroke symptoms most often stay the same or improve over the few hours that follow.

36. The symptoms may also worsen in a smooth or stuttering course.
37. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
38. A second most characteristic historical aspect of stroke is that the patient's symptoms usually fit the distribution of a single vascular territory.
39. That is to say, patients with brain infarct will present with signs and symptoms in the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
40. The signs and symptoms thus provide an important clue as to the likely location of the possible stroke.
41. The most characteristic aspect of a stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.

*Stroke diagnosis: MEND exam*

42. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.
43. The MEND exam was developed to facilitate communication between healthcare providers throughout the continuum of care for stroke patients.
44. The MEND exam incorporates the posterior circulation elements missing in the Cincinnati Prehospital Stroke Scale (CPSS).
45. The MEND exam has all three elements of the CPSS, plus six elements from the NHISS (consciousness, orientation, commands, visual fields, gaze, leg motor, limb ataxia, and sensation).

<b>MEND EXAMINATION - PREHOSPITAL</b> Green Boxes Contain Basic Exam (CPSS)	
<b><u>MENTAL STATUS</u></b>	
●	Level of Consciousness (AVPU)
●	Speech: "You can't teach an old dog new tricks"
●	Questions (age, month)
●	Commands (close, open eyes)
<b><u>CRANIAL NERVES</u></b>	
●	Facial Droop (show teeth or smile)
●	Visual Fields (four quadrants)
●	Horizontal Gaze (side to side)
<b><u>LIMBS</u></b>	
●	Motor – Arm Drift (close eyes-hold out arms) Leg Drift (open eyes-lift each leg separately)
●	Sensory – Arm, Leg (close eyes & touch, pinch)
●	Coordination – Arm, Leg (finger-nose, heel-shin)

46. The MEND exam takes under two minutes to perform, and requires no tools, making it ideal as a screening tool.

### *Stroke Diagnosis: Stroke Score*

47. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
48. The Scale (also known as Score) looks at 11 different elements that evaluate specific abilities in the patient.



NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

49. A patient's score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
50. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.
51. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
52. In fact, the initial severity of the stroke according the Score is the most important predictor of outcome.

### *Stroke diagnosis: CT scan and MRI*

53. An CT scan and MRI are noninvasive diagnostic tests.
54. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.
55. A non-contrast CT of the head remains the standard procedure for the initial evaluation of stroke.

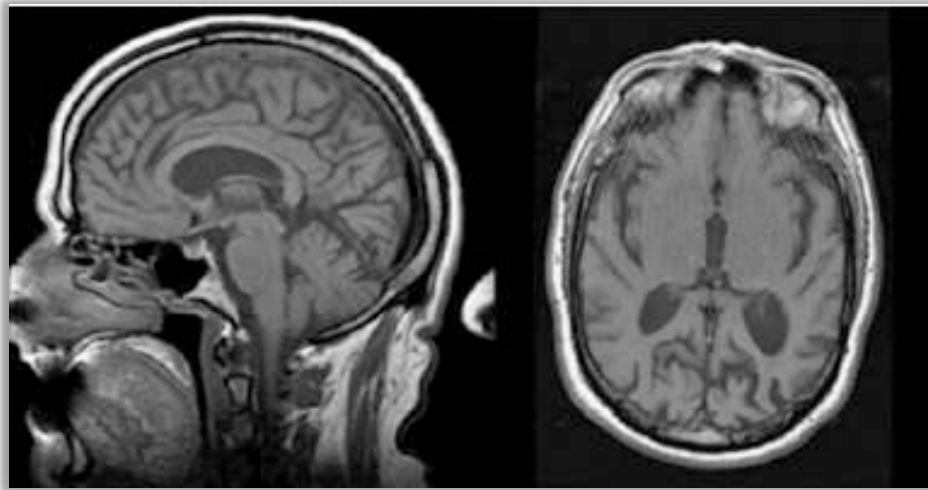


56. In the emergent initial evaluation of an acute stroke patient in the emergency department, a non-contrast CT of the head remains the imaging test utilized in most hospitals worldwide, with the exception of a few centers that have dedicated MRI capabilities for stroke.
57. A non-contrast CT scan has the advantages of being widely available, relatively inexpensive, and fast to perform.
58. A CT scan takes less than 1 minute.
59. A non-contrast CT should be performed within 20 minutes of the patient's arrival at the emergency department in order to speed up potential treatment with thrombectomy and/or TPA for ischemic-stroke patients.
60. All patients with a suspected acute ischemic stroke should undergo a non-contrast brain CT scan or brain MRI.



61. A CT scan is one of the vital first steps in the management of a stroke patient. It helps to exclude hemorrhagic stroke.
62. The CT scan will immediately rule out hemorrhage, as blood is bright on a CT.

63. A CT scan can quickly differentiate an ischemic stroke from intracranial hemorrhaging and other mass lesions— information crucial to the subsequent therapeutic decisions that will be rapidly made.
64. A CT scan generally must be performed within 30 minutes of the patient’s arrival at the hospital.
65. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. But, in contrast to a CT or CTA, an MRI requires that the patient be cooperative to hold still for several minutes.
66. A brain MRI can visualize ischemic infarcts earlier, and identify acute posterior circulation strokes more accurately, than a CT scan.
67. An MRI’s diffusion-weighted sequence (“DWI”) can show any restricted diffusion consistent with infarct.
68. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
69. An MRI’s DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury



70. Radiologists interpret CT and MRI images and communicates their findings to other doctors in radiology reports.

### *Stroke diagnosis: CTA and MRA*

71. A CTA and an MRA are vascular-imaging tests.
72. Vascular imaging specifically focuses on the blood vessels.
73. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.
74. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
75. Vascular imaging specifically helps doctors find blood clots.
76. Vascular imaging thus helps doctors diagnose and treat ischemic strokes, including BAO.
77. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
78. A CTA takes minutes to complete—a few minutes to inject the contrast dye and less a minute to run the scan.
79. A CTA can quickly provide a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.
80. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
81. Most patients with a suspected acute ischemic stroke (like a BAO) should undergo a CTA or MRA.
82. An MRA provides the same information as a CTA.
83. But, in contrast to a CT or CTA, an MRA requires that the patient be cooperative to hold still for several minutes.



84. A doctor must promptly order vascular imaging when there is reason to suspect that the patient has an occlusion in a major blood vessel.
85. This is particularly true if there is reason to suspect that the occlusion is in an artery supplying the brain, like the basilar artery.
86. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.

### *Radiology reports*

87. A radiologist interprets imaging studies (including a CT, CTA, MRI, MRA) and communicates his or her findings and conclusions to other doctors on written radiology reports.
88. A radiologist must interpret imaging studies reasonably, correctly, and accurately.
89. A radiologist must also provide prompt and accurate radiology reports.
90. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call “critical values”—that is, immediately call the attending physician to inform him or her of the findings.
91. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.

### *Stroke treatment: medical emergency*

92. Stroke is the most common neurological emergency.
93. During a stroke, every minute counts. Time lost is brain lost.
94. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
95. When a patient presents with signs or symptoms of stroke, a physician must act quickly to confirm or rule out stroke.
96. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
97. Acute therapies for an ischemic stroke (thrombectomy, TPA) are best implemented as fast as possible, so the steps needed to stabilize and assess the patient must be taken as quickly as possible.
98. In practice, to speed up the process, these steps are often taken simultaneously.
99. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke.
100. If the stroke is an ischemic stroke, medical providers must act quickly to clear the occlusion (blood clot) causing the stroke.
101. In some cases, medical providers must act quickly to order and perform a thrombectomy to remove the blood clot causing the stroke.
102. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.
103. Fast treatment can lessen the brain damage that stroke can cause.
104. The National Institute of Neurological Disorders recommends time-frames for completing the basic, widely-accepted procedures that hospitals follow to evaluate potential ischemic-stroke patients.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

\*By phone or in person.

105. Emergency-medicine physicians and neurologists must generally perform procedures within these time-frames.
106. With a focus on rapid recognition, evaluation, and treatment of stroke, many hospitals have streamlined care to meet recommended time-goals.
107. That has led to the development of stroke protocols, critical pathways, and acute interventional stroke teams that may be deployed in the field before the patient arrives at the emergency department.

*Stroke treatment: thrombectomy*

108. A blood clot causing a stroke can be removed through a medical procedure called a thrombectomy.
109. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery, which is located in the groin.
110. The catheter is guided through the blood system towards the blood clot.
111. Once the catheter reaches the blood clot, the surgeon can attempt to suction, dissolve, or retrieve the clot.
112. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
113. The main goal of these therapies is to get the artery open and re-establish blood flow.

114. Thus, a doctor should always ask whether he or she is doing everything possible to optimize blood flow to regions of cerebral ischemia.
115. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in probability of good outcome.
116. Every twenty minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
117. It is the responsibility of the practitioner initially evaluating the patient to facilitate the patient's transfer to a thrombectomy suite, whether located at the same or another hospital.



## Supporting Literature

118. *Acute Stroke Care* (3<sup>rd</sup> Ed.), Denny, Carter M., et al., Cambridge University Press, 2020.
119. *Caplan's Stroke, A Clinical Approach* (5<sup>th</sup> Ed.), Louis R., Caplan (Ed.), Cambridge University Press, 2016.
120. *Clinical Neuroanatomy* (28<sup>th</sup> Ed.), Waxman, Stephen G., McGraw-Hill Education, 2017.
121. *Clinical Neurology and Neuroanatomy*, Berkowitz, Aaron L., McGraw-Hill Education, 2017.
122. *Imaging Anatomy: Brain and Spine*, Osborn, Anne G., Salzman, Karen L., et al., Elsevier, 2020.
123. *Nolte's The Human Brain, an Introduction to Its Functional Anatomy* (8<sup>th</sup> Ed.), Vanderah, Todd W., Gould, Douglas J., Elsevier, 2021.
124. *On Call Neurology* (4<sup>th</sup> Ed.), Mayer, Stephan A., Randolph, Marshall S., Elsevier 2021.
125. *Rosen's Emergency Medicine: Concepts and Clinical Practice* (9<sup>th</sup> Ed.), Walls, Ron M. (Ed.), Elsevier 2018.

# Medical Chronology

## Treatment of Michaela Smith

### *Prologue: Michaela Suffers a Kick to the Right Side of Her Head*

1. On or about June 21, 2019, Michaela was kicked on the right side of the head. HMC 30, HMC 71.
2. The accident occurred during physical training for her job as a detention officer for the sheriff's department. HMC 30, HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

3. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own shortly thereafter. HMC 30, HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216  
H&P  
Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

June 28, 2019 – Michaela's First Visit to Hamilton

### *Onset of Symptoms*

4. On June 28, 2019, Michaela again took part in training for her job. HMC 2, HMC 6, HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

5. The training involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

6. After the training, Michaela drove herself home and did “well for a couple of hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETELY OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

7. Between 20:30 and 21:30 that same evening, Michaela started experiencing a constellation of symptoms, including:

- throbbing headache
- shortness of breath
- swelling throat
- slurred speech
- bilateral facial and hand numbness
- near syncope
- vomiting
- facial pain
- rhinorrhea
- nausea
- dizziness
- difficulty talking, with thick speech
- inability to open her mouth completely or swallow freely

HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244

**H&P**

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

8. Michaela had no prior history of a similar problem. HMC 71.

Initial Provider Contact 6/28/2019 2338  
 HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.  
 no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton Emergency Department ("ED")*

9. At 21:43, Michaela arrived at the Hamilton emergency department. HMC 65.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB:	
City: <u>Dalton</u>	GA	30721	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmplnt: <u>Poss Allergic Reaction</u>			

HMC 65.

10. Michaela's parents were with her.

Holsonback, Shaw n D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.



11. At 22:41, Michaela was admitted to the Hamilton ED, which identified headache, shortness of breath, and unspecified nausea with vomiting as the reasons for her visit. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT

Reason For Visit Diagnosis	
Code	Description
R51	Headache
R06.02	Shortness of breath
R11.2	Nausea with vomiting, unspecified

HMC 79.

12. Between 22:53 and 22:59, RN Kayla Rewis triaged Michaela. HMC 68.

13. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

14. At that time, these were Michaela’s complaints: “soreness/swelling to throat, headache, vomiting, and near syncopal [fainting] episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rewis, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259

**NURSING TRIAGE (Adult)**

**HPI:**

Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

15. At 23:38, Emergency Physician Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

16. At that time, Dr. Holsonback noted the prior kick to Michaela's head: "Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness headache w/o syncope at the time, sx resolved." HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

17. At that time, Michaela's neurological condition was: "motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside." HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.

**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.

**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.

18. Her mental status was: “speech clear, oriented X 3, normal affect, responds appropriately to questions.” HMC 72.

19. Michaela’s general appearance was “well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort.” HMC 71.

**PHYSICAL EXAM:**

GENERAL APPEARANCE: well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

20. As part of his examination, Dr. Holsonback obtained a National Institute of Health Stroke Scale (NIHSS) score for Michaela. HMC 72.

21. Michaela scored a 0 (that is, normal) on each of the 11 elements that make up the NIHSS. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.

22. Michaela’s total score was thus also 0 (normal), on a scale of 0 to 42. HMC 72.

23. The NIHSS is a common diagnostic method for quickly assessing the severity of a stroke.

24. The Scale (also known as a Score) looks at 11 different elements that evaluate specific ability in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

25. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.

*Michaela Undergoes a Brain CT Scan*

26. Despite her NIHSS score, Dr. Holsonback moved quickly to get Michaela a CT scan. HMC 64.

27. At 23:47, Dr. Holsonback ordered a stat head CT scan, for “headache right side”—the same side where Michaela had received a kick during training at work a week earlier. HMC 64, HMC 30, HMC 71.

Order Type: Radiology  
Order Sub Type: CT

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47 06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.

Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

Holsonback, Shawn D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**


Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

28. The scan was administered by 23:54, within minutes of Dr. Holsonback's order.

HMC 61; Appendix.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
This interpretation is based upon the receipt of 32 images.			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.

29. The CT scan revealed that Michaela was having a brainstem or posterior-circulation stroke.

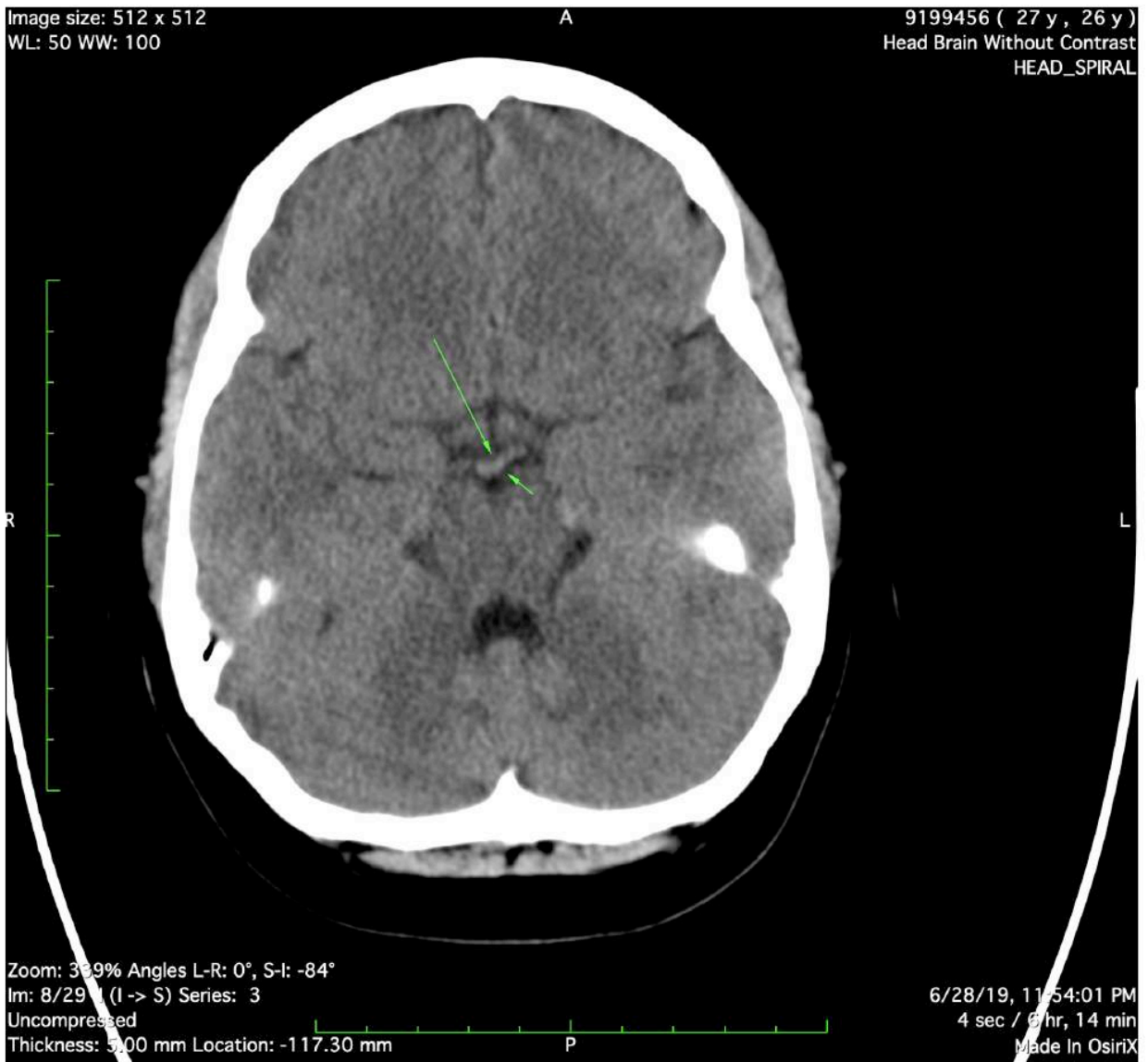
30. Image 7 of 29 of the CT scan, for example, showed a white hyperdense sign of a basilar-artery thrombosis:



See Appendix.



31. Image 8 of 29 of the CT scan revealed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:




See Appendix.



*Radiologist Cooney Fails to Identify the Signs of Stroke on the CT Scan*

32. At 00:18, acting as a vRad employee, Radiologist Michael Cooney read the 32 images associated with the study. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA		
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720		
<b>Study Type:</b>	CT HEAD WO		
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<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Accession:</b>	3948616
<b>Date of Exam:</b>	28 Jun 2019 EDT	<b>Account Number:</b>	
<b>Patient ID:</b>	9199456	<b>Patient DOB:</b>	
<b>Patient Location:</b>	Unknown	<b>Caretaker:</b>	
<b>Account #:</b>		<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>This interpretation is based upon the receipt of 32 images.</b>			
<b>EXAM:</b> CT Head Without Contrast			
<b>EXAM DATE/TIME:</b> 6/28/2019 11:52 PM			

HMC 61.

33. Dr. Cooney found no evidence of hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

34. Dr. Cooney's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. Dr. Cooney did not even mention the sign. HMC 61.

35. Dr. Cooney's findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. Dr. Cooney did not even mention the streak. HMC 61.

36. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded that the study showed "no acute intracranial abnormality." HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

37. At 00:28, Dr. Holsonback noted Dr. Cooney's reading of the CT scan as showing "no acute intracranial abnormality." HMC 72.

Holsonback, Shaw n D.O. Created: 6/29/2019 0027 Last Entry: 0028  
MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
without Informing Her She Has a BAO*

38. At 00:57, Dr. Holsonback rechecked Michaela. HMC 72.

39. She was "resting, feeling better," with a "headache still present" and "all numbness resolved." HMC 72.

40. At 02:15, Michaela continued to feel “better,” had “no focal neurological deficits,” and agreed to a discharge. HMC 2, HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

41. At 02:15, Michaela signed her disposition summary. HMC 65-66.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: **Smith, Michaela E**  
EDM Code: **ER0170**  
Med Rcrd: **9199456**

---

MD Electronic Sg Holsonback, Shawn D.O. 6/29/2019 0214


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**MY SIGNATURE BELOW INDICATES:**  
> I have received and understood the oral instructions regarding my current medical problem.  
> I will arrange follow-up care as instructed above.  
> I acknowledge receipt of the written instructions as outlined on this and any previous page(s).  
I will read and review these instructions.  
> I understand that a copy of the medical record is available to the practitioner or medical organization providing follow-up care, treatment, and services.

x Michaela Smith x Ashlynn R. M. Smith  
Patient (or Legal Guardian) Signature Staff (Witness) Signature Driver

HMC 66.

42. The disposition summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” and her chief complaint as “Poss Allergic Reaction.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	101737552 05LB01 06/28/2019 OP
May return to work/school: <u>1-2 Days</u>	Smith, Michaela E EMR
Restrictions: <u>None</u>	Physician, On Duty
Critical Care Time: <u>none</u>	

HMC 65.

43. The summary instructed Michaela to follow up with Dalton Family Practice, and permitted her to return to work, in 1-2 days, without restrictions. HMC 65.

44. The summary also instructed her to return to “Return to the Emergency Department sooner if worse.” HMC 65.

45. Michaela “verbalized understanding and ability comply” with these instructions. There were no learning or communication “barriers” and she received no “medical driving restrictions.” HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

46. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.

47. Her pain was 0 of 10. HMC 70.

48. At 02:27, Michaela was discharged in “stable” condition and left for home. HMC 65, 70.

49. Neither any provider nor the discharge instructions informed Michaela or her parents of the occlusion in her basilar artery.

<b>Hamilton Medical Center - Emergency Department</b> 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary (for discharged patient; English)</b>			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
Rm (last): _____		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Triage: <u>Kayla R. R.N.</u>	MLP: _____		
RN Eval: <u>Stacey S. R.N.</u>	PMD Ph: <u>(706) 278-0138</u>		
PMD: <u>Duckett, Jennifer P.A.</u>	Chief Cmplnt: <u>Poss Allergic Reaction</u>		

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING\COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

50. Michaela was “comfortable going home.” HMC 6.



The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

51. At home, she “went to bed about 03:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

## **June 29, 2019 – Michaela Returns to Hamilton by Ambulance**

### *Michaela Wakes with Global Alteration of Consciousness*

52. As demonstrated below, Michaela awoke with altered mental status and other classic signs and symptoms of stroke. These signs and symptoms amounted to a global alteration of consciousness, reflecting the onset of a neurological emergency some time after her discharge from Hamilton.

53. At about 07:15, Michaela's mother heard her moaning in her bedroom, went to check on her, and found her "with altered mental status and poor mobility." HMC 6, HMC 30.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

54. Michaela talked "through her gritted teeth" but could not "really open her mouth" and had "problems with moving and slurred speech." HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.



55. Speaking “through her teeth,” Michaela told her mother that she was “unable to get out of bed” and thus “had wet on herself.” HMC 6, HMC 2.

56. When she awoke, Michaela was also “foaming at the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 08:14 Last Entry: 08:27

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

57. Thus, “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

58. The paramedics were then called. HMC 2, HMC 6.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2, 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

59. Upon arriving, the paramedics “were not able to get the patient up to walk” and Michaela had to be “brought into the emergency room by stretcher.” HMC 6.

60. After that Michaela did not speak again. HMC 6.

*Michaela Returns to Hamilton with Classic  
Signs of Stroke—a BAO*

61. By 08:19, the ambulance arrived at the Hamilton emergency department. HCM 24, HMC 25.

62. Michaela thus returned to Hamilton as a clinically different patient, whose neurological condition had deteriorated markedly overnight.

63. From the time of her arrival, Michaela demonstrated “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, MHC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

64. These symptoms alone were major signs of massive brain injury.

65. These symptoms alone made clear that Michaela was facing a neurological emergency that required an expedited and urgent diagnostic evaluation and possible intervention.

66. Extensor posturing, for example, is typically a result of severe brain injury.

67. What’s more, the presence of “extensor posturing” by itself made clear that the emergency likely involved injury to Michaela’s brainstem.

68. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was identified as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

69. Between 08:14 and 08:27, RN Megan Martin triaged Michaela.

70. During the assessment, Michaela “was squinting her eyes and looking around, while still shaking[.]” HMC 26.

71. Nurse Martin also gave Michaela a MEND exam. HMC 26.

72. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

■ **HPI:** Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

73. Michaela also mumbled that she could not talk. HMC 26.

74. Nurse Martin noted that Michaela’s last-known-well was about “10pm 6/28/19,” per the EMS. HMC 26.

75. By 08:29, Nurse Martin ordered an “electrocardiogram with physician review.” HMC 28.

Martin, Megan R.N. Created: 6/29/2019 0838 Last Entry: 0838  
Order(s) performed by "Nurse":  
- ELECTROCARDIOGRAM WITH PHYSICIAN REVIEW  
Order Notes:  
EKG completed - at 6/29/2019 0829 by Martin, Megan R.N. and given to Hawkins David F. M.D. for review at 6/29/2019 0834.

HMC 28.

76. The EKG was completed at 08:29 and “given to Hawkins, David F. M.D. for review at 6/29/2019 0834,” HMC 28.

*Dr. Hawkins Documents but Fails to Treat the Stroke*

77. Michaela returned to Hamilton with classic and obvious signs of stroke. HMC 30-31.

78. At some point between 09:12 and 12:44, Emergency Room Physician David F. Hawkins examined Michaela. HMC 30-31.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244  
H&P  
Initial Provider Contact 6/29/2019 0912  
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

79. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.



H&P

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

Initial Provider Contact 6/28/2019 2338

HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX

nothing worsens Sx.

nothing improves Sx.

no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

80. Michaela generally appeared “unresponsive, uncooperative,” with “no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2.” HMC 31.

81. Michaela’s neurological condition was this: “extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs . . . Will not follow commands.” HMC 31.

**GENERAL APPEARANCE:** somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. **MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2**

**VITALS: SEE NN,**

**PULSE OXIMETRY:** 97% on RA.

**EARS:** canals clear bilat, TMs clear, no discharge from ears.

**EYES:** PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

**NOSE:** no nasal discharge.

**MOUTH:** (-)decreased moisture. + GAG

**THROAT:** no tonsillar inflammation, no airway obstruction.

**NECK:** supple, no neck tenderness, (-)thyromegally.

**BACK:** (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

**CHEST WALL:** no chest tenderness.

**LUNGS:** no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

**HEART:** normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

**ABDOMEN:** normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

**EXTREMITIES:** good pulses in all extremities, no swelling/tenderness in the extremities, no edema. **FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTURING**

**SKIN:** warm, dry, good color, no rash.

**NEURO:** **EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE**

**ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS**

**MENTAL STATUS:** unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

82. Michaela's extremities were "flaccid" with "occ spastic tone in arms and legs as in posturing." HMC 31.

83. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

84. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including alcohol abuse, depression, drug abuse, eating disorder, and schizophrenia. HMC 31.

**DIFFERENTIAL Dx:**

**PSYCHIATRIC Dx:** adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.

**NEURO Dx:** CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

85. Dr. Hawkins's differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA: "CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor." HMC 31.



**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

86. Although he identified stroke (“CVA” and “TIA”) as a differential diagnosis, Dr. Hawkins did not order vascular imaging to confirm or rule out a stroke, and did not take any other action to treat the stroke.<sup>1</sup>

87. In fact, despite his differential diagnosis of a stroke, and despite Michaela’s deteriorated clinical presentation, Dr. Hawkins failed to order even a new CT scan of Michaela’s brain (which would have taken minutes to complete) and failed to obtain a new stroke score for Michaela.

*Dr. Johnson Also Fails to Identify the Stroke in the CT Scan*

88. At 09:15, Radiologist Kevin Johnson interpreted and submitted a final report on the same CT scan taken overnight. HMC 30.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

HMC 60.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 9:15A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 60.

89. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus

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<sup>1</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.

disease, or mastoid or middle-ear effusions. He also found that the gray-white differentiation was within normal limits. HMC 60.

90. Dr. Johnson's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. Dr. Johnson did not even mention the sign. HMC 60.

91. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. Dr. Johnson did not even mention the streak. HMC 60.

92. Instead, contrary to the plain images, Dr. Johnson *affirmatively* concluded that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat Michaela's Stroke for Hours*

93. At 10:00, RN Lindsey Andrews called the Georgia Poison Center regarding Michaela's symptoms. HMC 28.

94. The Poison Center recommended a chest x-ray, and a CT scan of the head: "the physician may consider doing a CT of the head to rule out something unrelated to the pepper spray incident." HMC 28.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

95. At 10:08, Dr. Hawkins ordered a stat chest x-ray. HMC 15.

<b>Hamilton Medical Center</b> PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180 Radiology Services	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB: <input type="text"/>	<b>MR/RAD #:</b> 09199456/09199456 <b>ADMIT #:</b> 101737594 <b>HOSP/SVC:</b> EMR <b>ORDER DATE:</b> Jun 29 2019 10:08A <b>ROOM #:</b> ECD-RM2201 <b>REF #:</b> 3948717
<b>Ordering Dr:</b> DAVID MD HAWKINS <b>Attending Dr:</b> DAVID MD HAWKINS	

HMC 15.

96. But he did not order a CT scan.

97. At 10:31, Dr. Johnson read the chest x-ray recommended by the Poison Center and concluded it was a "normal exam." HMC 15, HMC 22.

**\*\*\*Final Report\*\*\***

**REASON FOR EXAM:** per GA Poison Center

**PROCEDURE:** DIA 1030 - **CHEST SINGLE VIEW** - Jun 29 2019 10:23AM

**RESULT:**  
Per Georgia Poison Center

**TECHNIQUE:** Single frontal view of the chest was obtained

**COMPARISON:** None

**FINDINGS:** The lungs are clear. The heart size is normal. The bones appear intact.

**IMPRESSION:**  
**Normal exam.**

KJ/dmc  
Job #12358370

HMC 15.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 10:31A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 15.

98. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter mental status after heavy physical activity.” HMC 23.

Order Type: Radiology				
Order Sub Type: MRI				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ?	Complete	
	06/29/19 11:22	HEAT EXPOS Stat		06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

99. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

100. At 12:45, Dr. Hawkins discussed Michaela's case with Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1245 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

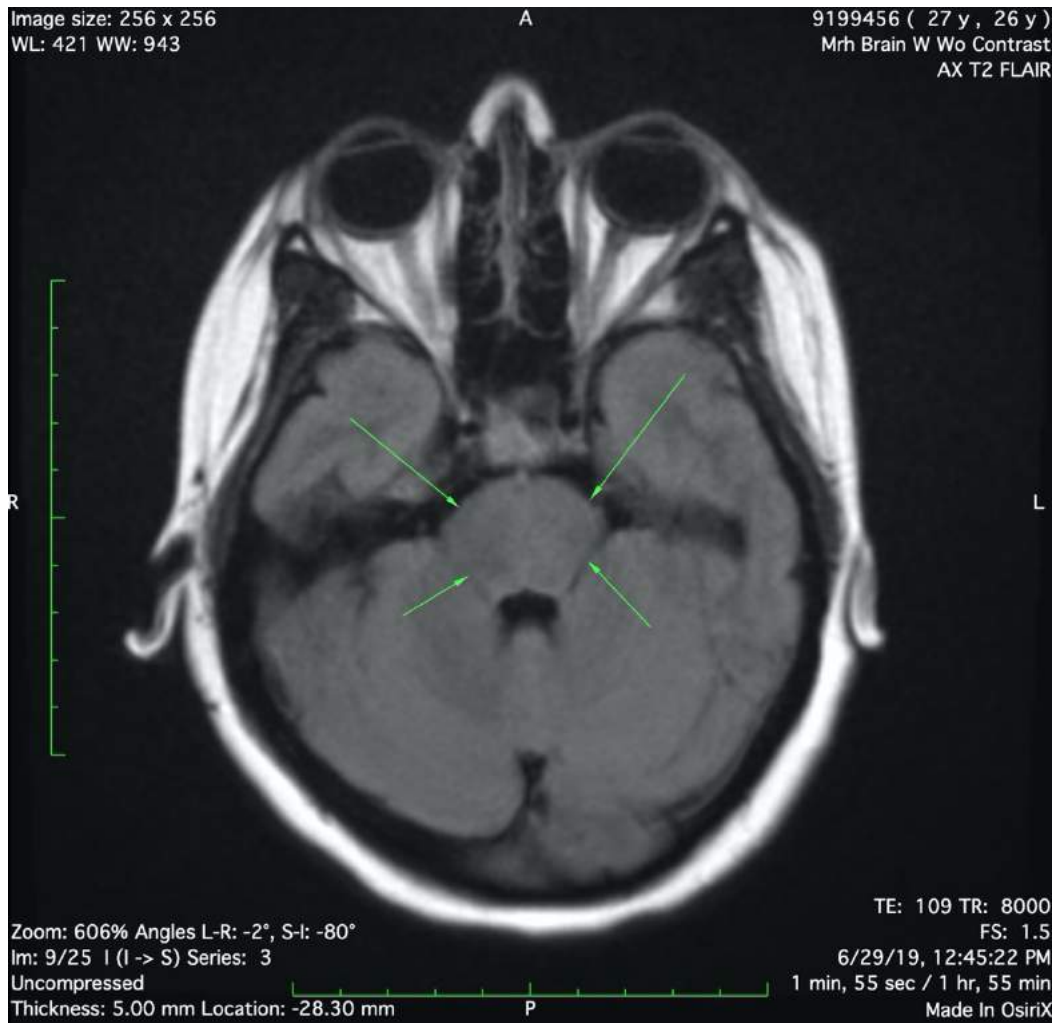
101. Dr. Glass agreed with administering the MRI, in order to distinguish "function from organ cause." HMC 32.

102. Dr. Glass also agreed to see Michaela in the ER for evaluation. HMC 32.

### *The MRI Confirms a Yet-Treatable Ischemic Stroke*

103. At 12:45, Michaela underwent the brain MRI, for "altered mental status after physical activity." HMC 16.

104. Although the MRI's DWI sequence showed that Michaela's brainstem was ischemic (thus confirming she was having a stroke), the MRI's FLAIR sequence remained normal—that is, Michaela's brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.



*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

105. At 12:54, Dr. Hawkins admitted Michaela to the hospital floor for observation. HMC 32.
106. At that time, Michaela continued to exhibit classic stroke signs and symptoms. See HMC 32.
107. Michaela, for example, had a decreased level of consciousness, had a bizarre affect with no interaction, showed general weakness, was not speaking, was tearful, was hyperventilating, had spasticity to her extremities, had no laterizing signs, and was urinating on herself. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

108. Despite her clinical presentation, Dr. Hawkins admitted Michaela for “observation,” noting that the CT scan of “last night” was negative. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

109. The reason for her admission was; “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

110. At 13:29, Dr. Johnson interpreted Michaela’s MRI. At 13:30, Dr. Johnson discussed his findings with Dr. Hawkins. HMC 16.



IMPRESSION:  
NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.  
No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

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**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P**

HMC 16.

111. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

112. The MRI also showed: “gray-white differential within normal limits” and “normal flow voids are maintained within the major intracranial vascular pedicles,” and “no sites of pathologic contrast enhancement.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

113. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.

114. Dr. Johnson failed to include the brainstem ischemia visible in the DWI sequence. HMC 16. (In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.)

115. Instead, contrary to the DWI imaging, Dr. Johnson concluded that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

**COMPARISON: CT head 6/28/2019; no prior MRI**

**FINDINGS:** The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

**IMPRESSION:**

**NOTE:** Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

**No definitive acute abnormalities are identified on this motion-compromised examination.**

HMC 16.

116. In addition, Dr. Johnson again reviewed Michaela’s CT scan, for “comparison” purposes. Dr. Johnson thus had a second opportunity to interpret the CT scan. HMC 16.

117. Dr. Johnson failed again to catch and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to catch and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a “normal exam.” See HMC 16, HMC 61.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat the Stroke for Additional Hours*

118. At 14:05, RN Gabe Herman performed a neuro check, including a Glasgow Common Scale (GCS) assessment. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534  
 Nurse Note:  
 NEURO CHECK - 6/29/2019 1405  
 EYE OPENING: eyes open to verbal stimuli 3  
 VERBAL RESPONSE: verbal incomprehensible sounds 2,  
 MOTOR RESPONSE: motor flexion withdrawal 4  
 GLASCOW COMA TOTAL 7

119. The GCS is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients.

120. The Scale assesses the patient according to three aspects of responsiveness: eye-opening, motor, and verbal responses.

**TABLE 38-2**  
**Glasgow Coma Scale**

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

121. At 14:18, Internist Ananka Myrie called Dr. Hawkins. Dr. Myrie informed him that she wanted neurology and psychiatry evaluations of Michaela before admitting her. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
 Results Reviewed by ED Physician:  
 MRH BRAIN W/WO CONTRAST  
 CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

122. Between 14:17 and 14:22, Dr. Hawkins called Dr. Glass again, to inform him of the negative MRI findings. HMC 32.

123. Dr. Hawkins and Dr. Glass discussed the facts that Michaela still appeared “stuporous,” interacted only “intermittently” and “primatively” with her parents, and may have suffered an “atypical seizure.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422

MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

124. Dr. Glass “did not suggest medication prior to his exam.” HMC 32.

125. At 14:51, Dr. Hawkins turned over Michaela’s care to Emergency Physician Jonathan Thompson. HMC 32.

126. At that time, the emergency department continued waiting for Dr. Glass’s evaluation. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451

Results Reviewed by ED Physician:

MRH BRAIN W/WO CONTRAST

LACTATE

MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Despite Examining Michaela, Dr. Glass Still  
Does Not Diagnose and Treat the Stroke*

127. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

128. At that time, Michaela continued to exhibit signs and symptoms of stroke:

- “Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—”
- “She can at times open her eyes and close them to command and does appear to look at me at times.”
- “At times she appears to have a deconjugate gaze but at other times not.”
- “At times she will have extensor posturing type movements of the upper extremities.”

- “She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently [sic].”
- “She has bilateral Babinski. She has bilateral Hoffmann’s in her hands.”

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann's in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

129. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” and despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with pepper spray” and then went to bed “doing fairly well,” Dr. Glass did not turn his attention to diagnosis of stroke, despite Michaela’s presentation. *See HMC 6-7.*



130. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass wondered if "a hypoxic event" or "unlikely" seizures might be the cause of her condition.

- "I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well . . ."
- "Her MRI scan did not show a structural abnormality to account for the symptoms."
- "I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here."
- "I will get an emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy."

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.



1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

131. As a result, despite Michaela's clinical presentation, Dr. Glass failed to review the CT scan or MRI for himself, failed to order a new CT scan or vascular imaging, and failed order or provide any treatment for Michaela's BAO.

132. Instead, Dr. Glass noted that the "CTA scan of the brain was normal," the "CT scan of the brain did not show any acute changes," and the "MRI scan of the brain with and without contrast showed significant motion artifact but was normal." HMC 3, HMC 6.

**Laboratories and Diagnostics:**

CT scan of the brain was normal.

MRI scan of the brain with and without contrast showed significant motion artifact but was normal.

HMC 3.

CT scan of the brain did not show any acute changes

MRI scan of the brain with and without contrast showed motion artifact but no significant abnormality

Ammonia, urine drug screen, TSH and EtOH were all okay

HMC 6.

*Dr. Glass Signs Off on Transfer to Erlanger for a  
Neuro Evaluation*

133. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time.” HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

134. Dr. Glass agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

135. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.

136. At 17:35, Michaela was transferred to Erlanger by EMS. The reason for the transfer was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.

**Appropriateness**

— Appropriate transport service equipment and personnel are requested to provide appropriate level of care  
 — Basic: \_\_\_ Advanced:  Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_  
 Agency: Hamilton EMS  
 — The receiving facility has available space for the patient.  
 — Transferring physician has discussed patient status with accepting physician — Auto accept thru transfer center  
 — the receiving facility has agreed to accept the patient and provided adequate treatment  
 Facility: Erlanger Time: \_\_\_\_\_  
 Name of Physician accepting patient: Ben Smith Phone: \_\_\_\_\_  
 Approved by: \_\_\_\_\_ Title: \_\_\_\_\_  
 — Reason for Transfer: altered mental status  
 — Risk of Transfer: transport, anxiety compromise  
 — Benefits to Transfer: Neuro evaluation  
 — It is medically necessary to transport the patient by ambulance  
 Signature of transferring physician: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Transferring facility: Hamilton Fax: \_\_\_\_\_  
 Name of Patient's primary care physician: none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother  
 Refusal to transfer signature/relationship: \_\_\_\_\_  
 Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

— Report given to: OWENS RN By: Debi Adams RN Time: 1702  
 — Police notified (if applicable). Agency: \_\_\_\_\_  
 — Family notified. Name: \_\_\_\_\_  
 — Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS \_\_\_ documented. Disposition of valuables: \_\_\_\_\_  
 Signature of RN: Debi Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

137. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp Financial Class		
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger After an MRA Reveals a Brainstem and Right-Side Stroke*

138. At 18:39, Michaela arrived at Erlanger emergency department by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

139. At 01:10 overnight, June 30, 2019, Michaela was transferred from the ER to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

140. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.

<b>CONSULTATION</b>	
<b>Patients Name:</b> SMITH, MICHAELA E	
<b>Hospital Number:</b> 000101737594	<b>Date of Birth:</b>
<b>Room Number:</b> ECD RM	<b>Patient Status:</b> O
<b>To Attending Physician:</b> David F. Hawkins, MD	<b>Consulting Physician:</b> Jeffrey Glass, MD
<b>Dictated by:</b> Jeffrey Glass, MD	
<b>Date dictated:</b> 06/30/2019 12:02 P	
<b>Date transcribed:</b> 06/30/2019 12:39 P jc2	
Signed by Glass M.D., Jeffrey on 01-Jul-2019 17:45:02 -04:00	

HMC 5.

141. Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.”

HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

142. At Erlanger, Michaela’s condition “progressively worsened.”

143. On July 1, 2019, Michaela was placed on a ventilator and a feeding tube.



Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

144. On the afternoon of July 2, 2019, a brain CT scan produced an “urgent critical result,” including “a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation.”

BEH 310.

CT brain without IV contrast		Resulted: 07/02/19 1616, Result status: Final result	
Ordering provider: William Albert Shelton, MD 07/02/19 1516	Order status: Completed	Filed by: Interface, Radiology/Cardiology Results In 07/02/19 1618	
Resulted by: Andrew J Hill, MD		Accession number: E1142983	
Performed: 07/02/19 1527 - 07/02/19 1539			
Resulting lab: CARESTREAM PACS/PS360			
Narrative:			
<b>**URGENT CRITICAL RESULT **</b>			
This report was faxed to BEH NNICU at 1608 hours on 07/02/2019 -- H. Andrus/Editor.			
HISTORY: Altered mental status.			
TECHNIQUE: <b>Noncontrast brain CT.</b> Automated dose control used during this exam.			
FINDINGS			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
No evidence of acute intracranial hemorrhage or extra-axial collection. No midline shift.			
Mucous retention cyst left maxillary sinus. Orbits are intact. The skull is intact.			
Impression:			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
Findings given to Dr. Tom Devlin at 1612 on 07/02/2019 by Dr. Andrew Hill.			

BEH 310.

145. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

146. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

Performed: 07/02/19 1927 - 07/02/19 2050  
Resulting lab: CARESTREAM PACS/PS360  
Narrative:

Accession number: E1143287

**\*\*URGENT UNEXPECTED FINDING\*\***

This report was faxed to BEH NNICU at 2239 hours on 7/2/2019 and received by Liz Hughes, RN, at 2242 hours on 7/2/2019 -- G. VanOstrand/Editor.

HISTORY: Stroke, follow up

EXAMINATION: MRI BRAIN WITHOUT CONTRAST, MR ANGIOGRAM NECK WITH AND WITHOUT CONTRAST, MR ANGIOGRAM BRAIN WITHOUT CONTRAST

TECHNIQUE: Multiecho multisequence imaging of the head was performed without intravenous contrast administration.

3-D time-of-flight MRA of the head was performed without intravenous contrast. MIP reconstructions of the circle of Willis were generated.

MRA of the neck was performed without and with intravenous contrast. MIP reconstructions of neck vessels were generated. 20 cc of MultiHance was administered intravenously.

Where applicable, stenosis measurements are performed per NASCET criteria; with mild (<50%), moderate (50-70%), severe (70-99%).

COMPARISON: CT head, same day.

BEH 319.

147. The studies were tagged as an "urgent unexpected finding." BEH 319.

148. The findings of the head MRI included:



- A large acute infarct involving the right cerebellar hemisphere, and brain stem
- Diffuse cerebral edema.
- Absent ICA flow voids bilaterally
- Basilar-artery flow void
- A mass effect on the brainstem
- Cerebellar tonsillar herniation at least 2 cm below the foramen magnum
- Compression of the cervicomedullary junction

HMC 319.

MRI Head:

A large acute infarct is seen involving the right cerebellar hemisphere, and brainstem. Diffuse cerebral edema is present. There is subtle increased T2 signal involving the cerebral cortex bilaterally. Bilateral thalamic acute lacunar infarcts.

Absent ICA flow voids bilaterally. Basilar artery flow void is present.

There is mass effect on the brainstem. Cerebellar tonsillar herniation noted at least 2 cm below the foramen magnum. There is compression of the cervicomedullary junction. Subcentimeter pineal cyst noted.

HMC 319.

149. The findings of the head MRA included: “No evidence of flow-related enhancement noted in the intracranial vessels.” BEH 319.

150. The findings of the neck MRA included “diffuse attenuated caliber of vertebral arteries noted on both sides.” BEH 319.

MRA head: No evidence of flow-related enhancement noted in the intracranial vessels.

MRA NECK: No evidence of flow-limiting stenosis or occlusion of cervical carotid or vertebral arteries noted. No dissection identified. However, there is diffuse attenuated caliber of vertebral arteries noted on both sides.

HMC 319.

151. In summary, the findings of the three studies were: “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the

brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels

BEH 319.

152. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

153. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

154. Michaela Smith was 26 years old. HMC 67, HMC 44.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: Smith, Michaela E  
Pt Acct: 101737552

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ED RECORD

Patient: Smith, Michaela E Age/DOB: \_\_\_\_\_ Sex: F SS #: \_\_\_\_\_  
Age: 26yr Med Rcrd: 9199456

Mailing Address: 1452 Piedmont Dr Arrival (HIS): 6/28/2019 2243  
Mailing Other: \_\_\_\_\_ Dispo Summary Printed 6/29/2019 0215  
City: Dalton ED Record Printed: \_\_\_\_\_  
State: GA Zip: 30721 Initial Provider Contact: 6/28/2019 2327  
Mode of Arrival: Car

MD ED: Holsonback, Shawn D.O. RN Eval: Stacey S. R.N.  
MLP: \_\_\_\_\_ PMD: Duckett, Jennifer P.A.

HMC 67.

# APPENDIX

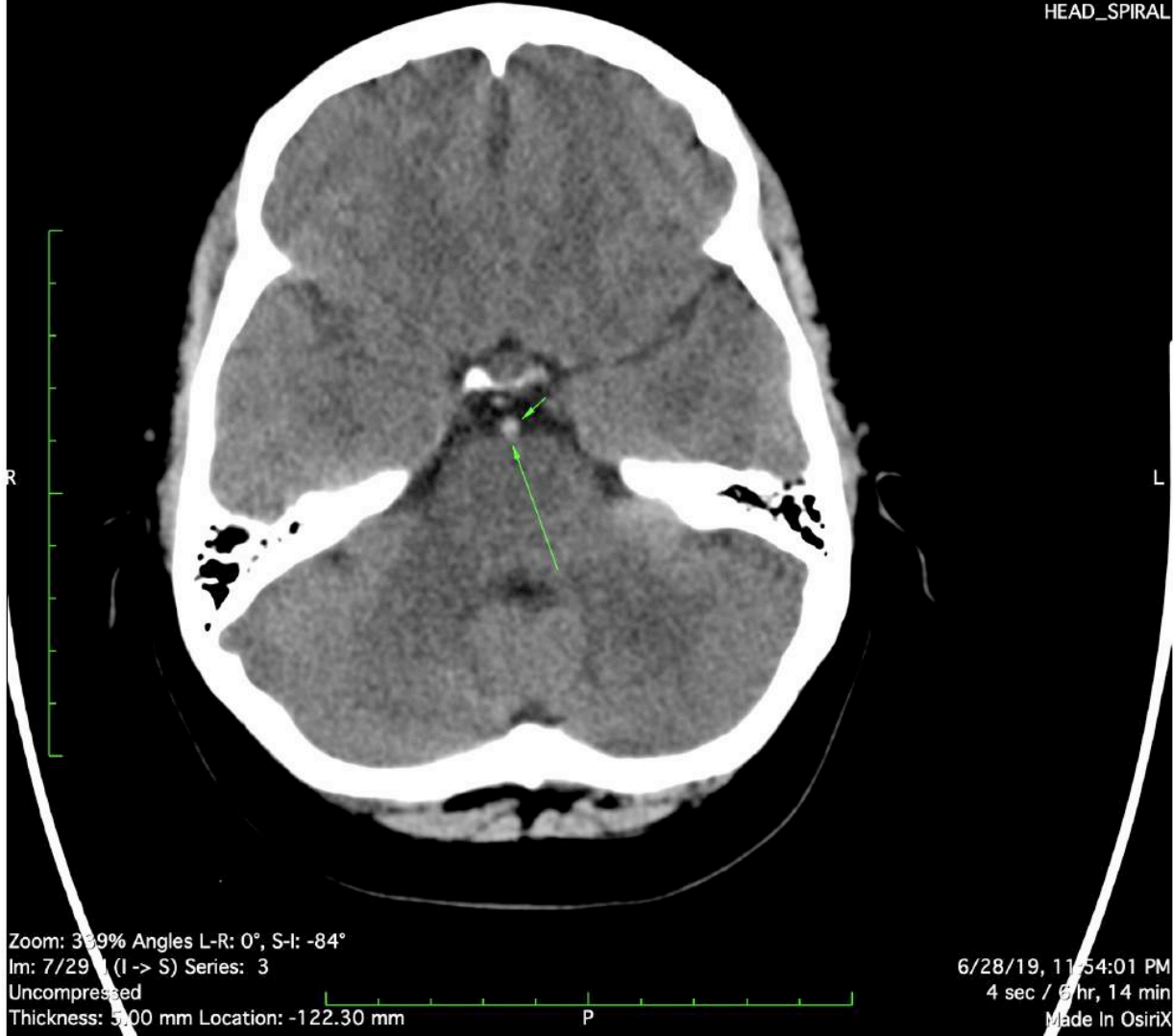
# CT Scan Imaging



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y, 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 339% Angles L-R: 0°, S-I: -84°  
Im: 7/29 (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -122.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 hr, 14 min  
Made In OsiriX

Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 374% Angles L-R: 0°, S-I: -84°  
Im: 8/29 | (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

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4 sec / 6 fr, 14 min  
Made In OsiriX



Image size: 512 x 512  
WL: 50 WW: 100

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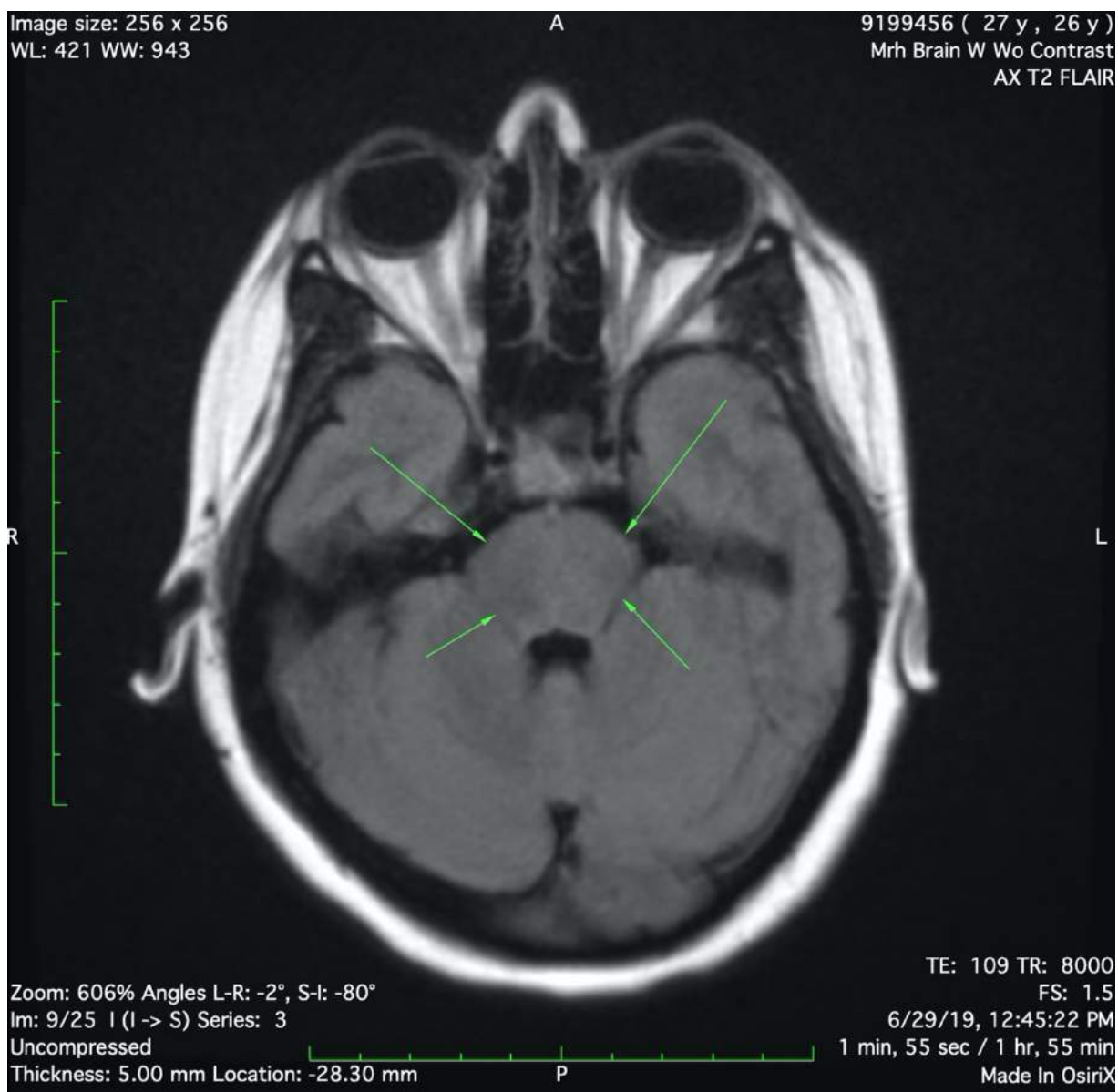
9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 369% Angles L-R: 0°, S-I: -84°  
Im: 8/29 (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 hr, 14 min  
Made In OsiriX

# MRI Imaging



**AFFIDAVIT OF ALEXANDER MERKLER, M.D., M.S., REGARDING  
MICHAELA ELIZABETH SMITH**

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Alexander Merkler, M.D., who after first being duly sworn, states as follows.

**Introduction**

1. This affidavit addresses medical negligence that occurred during Michaela Smith's visit to Hamilton Medical Center ("Hamilton") in Dalton, Georgia, on June 28 and 29, 2019.
2. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.
3. This affidavit addresses matters that Plaintiffs' counsel have asked me to address. I have not attempted to identify all standard-of-care violations. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues the Defense might raise or that otherwise might arise as the case unfolds.
4. I use the term "standard of care" to refer to that degree of care and skill ordinarily exercised by members of the medical profession generally under the same or similar circumstances and like surrounding conditions as pertained to the medical providers I discuss here.
5. Plaintiffs' counsel drafted this affidavit after consulting with me, and I reviewed the draft and edited it to make sure it correctly states my views.
6. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details.
7. I hold all the opinions expressed below to a reasonable degree of medical certainty — that is, more likely than not. If additional information becomes available later, my views may change.

8. I understand that Plaintiffs' counsel will provide this affidavit to the Defendants, and that their insurance company will hire lawyers and medical experts to review this case and to review this affidavit. If anyone on the Defense believes that I have not been given, or have overlooked or misconstrued, any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiffs' counsel. The Defense need not wait to take my deposition to communicate with me. I will consider any information the Defense wishes to bring to my attention, and, if appropriate, I will provide a supplemental affidavit.

### Evidence Considered

9. I have reviewed medical records from Hamilton pertaining to Michaela Smith's visits on June 28 and 29, 2019. I have also reviewed medical records from Baroness Erlanger Hospital, the facility where Michaela was hospitalized and died, after her discharge from Hamilton.

### Principal Opinions

10. My principal opinions are summarized here. In deposition or trial testimony, I may elaborate upon these principal opinions, and in doing so, I may offer related, subsidiary, or incidental opinions.

**i. Task & Requirement: Diagnosing stroke.**

*Standard of care requirement:* In treating a patient with the neurological deficits Michaela exhibited when she returned to Hamilton on June 29, 2019, the standard of care requires a neurologist to confirm or rule out a stroke.

*Violations:* Neurologist Jeffrey Glass violated this requirement by:

- (1) failing to recognize the clinical significance of Michaela's signs and symptoms when she returned to Hamilton on June 29, 2019, and
- (2) failing to order urgent or emergent vascular imaging—a definitive diagnostic study capable of identifying the source of Michaela's deficits.

*Causation:* As a result of each of these violations, Dr. Glass failed to diagnose and treat Michaela's stroke, and Michaela thereby suffered preventable injury and death. At 12:45 on June 29, 2019, an MRI demonstrated that Michaela's brainstem, although ischemic, had not yet suffered permanent

stroke changes. But-for each of these violations, therefore, Michaela's stroke would have been diagnosed and treated.

*Damages:* Each of these violations thus caused Michaela pain and suffering, injury, and death.

**ii. Task & Requirement:** Providing emergent care to stroke patient.

*Standard of care requirement:* The standard of care requires a neurologist to provide emergent care to a patient with neurological deficits concerning for stroke.

*Violations:* Dr. Glass violated this requirement by failing to provide Michaela emergent care on June 29, 2019. Specifically, Dr. Glass failed to screen for stroke, order vascular imaging, and otherwise investigate and treat her deficits, emergently.

*Causation:* These violations wasted valuable time, leading directly to unnecessary pain and suffering, brain injury, and death.

*Damages:* These violations thus caused Michaela pain and suffering, injury, and death.

**iii. Task & Requirement:** Obtaining an emergency thrombectomy or other effective treatment for stroke patient.

*Standard of care requirement:* In a patient with a BAO, the standard of care requires a neurologist to take the steps necessary for the patient to undergo an emergency thrombectomy or other acute therapy.

*Violation:* Dr. Glass violated this requirement by failing to take the steps required for Michaela to undergo a thrombectomy or other acute therapy.

*Causation:* As a result of this violation, Michaela's BAO remained untreated, and Michaela thereby suffered preventable brain injury and death.

*Damages:* This violation thus caused Michaela pain and suffering, injury, and death.

## Qualifications

11. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based on my own personal knowledge and belief.

12. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.

13. My Curriculum Vita, which is attached as Exhibit A, provides further detail about my qualifications. I incorporate and rely on that information here.

14. The events at issue here occurred in June 2019.

15. I am qualified to provide expert testimony pursuant to OCGA 24-7-702.

- a. In June 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of New York to practice as a physician. That is where I was practicing in June 2019.

- b. In June 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to — specifically, the tasks identified above on which I offer standard-of-care opinions.

I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to June 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am a physician specializing neurology, neurocritical care, stroke, and acute brain and spine injury, in the settings of hospitals and other long-term care facilities, and for many years I have had great familiarity with each of the tasks on which I offer standard-of-care opinions here.

### **Attached Documents**

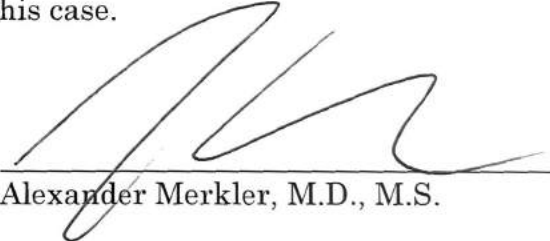
16. The documents identified below are attached to this affidavit largely for the benefit of the insurance adjustors responsible for evaluating this case on behalf of the Defendants, and for the lawyers provided by the insurance company.

17. Attached to this affidavit is a document that recites medical principles that apply here. The Defendants themselves will not need that recitation of basic medical information. Plaintiff's counsel created the medical-principles document for the benefit of the Defense. I have reviewed the document, and the principles stated there are correctly stated and apply here.

18. Also attached to this affidavit is a chronology of facts pertaining to this case. In forming my substantive view of the case, I have relied on the medical records themselves, not the chronology. The chronology, however, provides a useful reference for relevant facts contained in the records in less-organized fashion. Plaintiff's counsel created the chronology. I have not edited it.

### Supporting Literature

19. The general points discussed above are elementary, are likely well known to the Defendants, and should not require a literature search. Insofar as any Defendant consulted or should have consulted reliable authorities on these points in treating Michaela Smith, the literature cited in the attached medical-principles document represents such authorities, which here may also prove helpful to adjustors and lawyers in their evaluation of this case.

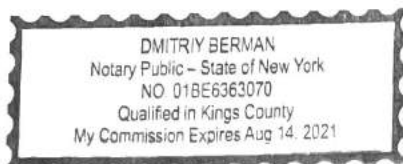
  
Alexander Merkler, M.D., M.S.

SWORN TO AND SUBSCRIBED before me

April 23, 2021

  
NOTARY PUBLIC

My Commission Expires: 08/14/2021





## **CURRICULUM VITAE**

Date of preparation: January 20, 2021

Signature: 

### **A. GENERAL INFORMATION**

Name	Alexander Eliot Merkler
Office address	525 East 68 <sup>th</sup> Street. F610 New York, NY 10065
Office telephone	212-746-0382
Home address	1735 York Avenue Apt 15B. New York, NY 10128
Cell phone	917-373-8523
Work email	<a href="mailto:alm9097@med.cornell.edu">alm9097@med.cornell.edu</a>
Personal Email	<a href="mailto:amerkler@gmail.com">amerkler@gmail.com</a>
Citizenship	USA

### **B. EDUCATIONAL BACKGROUND**

#### 1. Academic Degrees:

Degree	Institution	Dates	Awarded
BS	Brown University, Providence, RI	9/02-5/06	2006
MD	New York University School of Medicine, New York, NY	8/06-5/10	2010
MS	CTSC - Weill Cornell Medical College	9/17-12/20	2020

#### 2. Post-doctoral training:

Title	Institution	Dates
Intern, Internal Medicine	New York Presbyterian Hospital- Weill Cornell Medicine	6/10-6/11
Resident, Neurology	Weill Cornell Medicine New York Presbyterian Hospital-	6/11-6/13
Chief Resident, Neurology	New York Presbyterian Hospital-	6/13-6/14

	Weill Cornell Medicine	
Fellow, Neurocritical Care	New York Presbyterian Hospital - Columbia University / Weill Cornell Medicine	7/14-6/16

3. Other training:

Degree	Institution	Dates
MS	CTSC – Weill Cornell Medical College	9/17-12/20

**C. LICENSURE, BOARD CERTIFICATION, MALPRACTICE**

1. Licensure

State	Number	Date of First Issue	Date of Expiration
New York	273685	2/14	12/21

DEA	Date of Expiration: 1/23
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2. Board Certification

Full Name of Board	Certificate Number	Dates of Certification
American Board of Psychiatry and Neurology	58905	9/14-9/24
United Council for Neurologic Subspecialties, Neurocritical Care	NCC1506-17	12/17-12/27

3. Malpractice Insurance

Do you have Malpractice Insurance?	Yes
Name of Provider: Weill Cornell Medicine	
Premiums paid by: Weill Cornell Department of Neurology	

**D. PROFESSIONAL POSITIONS AND EMPLOYMENT**

1. Academic positions

Title	Institution	Dates
Assistant Professor of Neurology	Department of Neurology, Weill Cornell Medicine	7/16- current
Assistant Professor of Neuroscience	Feil Family Brain and Mind Research Institute, Weill Cornell Medicine	2/18- current

2. Hospital positions

Title	Institution	Dates
Assistant Attending	NewYork-Presbyterian Hospital/ Weill Cornell Medical Center	7/16- current
Attending	NewYork-Presbyterian Hospital/Gracie Square Hospital	2/17- current

E. **EMPLOYMENT STATUS (current or anticipated)**

Full-time salaried by Weill Cornell Medicine
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F. **INSTITUTIONAL/HOSPITAL AFFILIATION**

Primary Hospital Affiliation:	NewYork-Presbyterian Hospital/Weill Cornell Medical Center
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**INSTITUTIONAL RESPONSIBILITIES**

1. Teaching

<b>Didactic Teaching</b>	
Small Group Leader, Brain and Mind Medical Student Course	7/17- current
Yearly Lectures for neurology residents: 1) Neurological Emergencies 2) Management of Acute Ischemic Stroke 3) Management of Large Hemispheric Infarction 4) Subarachnoid Hemorrhage 5) Status Epilepticus	7/16- current
<b>Mentorship</b>	

<p>Fellow mentor:</p> <ol style="list-style-type: none"> <li>1) Pirouz Piran, Weill Cornell Medicine Stroke Fellow 7/18-6/19; Topic: Relationship between visceral infarction and functional outcomes among patients with acute ischemic stroke.</li> <li>2) Yahyah Atalay, Weill Cornell Medicine Stroke Fellow 7/18-6/19; Topic: Incidence and prevalence of cervical artery dissection across age groups.</li> <li>3) Jessica Lin, Weill Cornell Medicine Neurocritical Care Fellow 7/18-6/20; Topic: Blood pressure variation between ICH etiologies.</li> <li>4) Billy Roth, Weill Cornell Medicine Neurocritical Care Fellow 7/18-6/20; Topic: Relationship between GI disorders and stroke.</li> <li>5) Ayham Alkhachroum, Weill Cornell Medicine Neurocritical Care Fellow 7/17-6/19; Topic: Trends in Endotracheal intubation in patients with Neurocritical care diseases.</li> </ol> <p>Neurology resident mentor:</p> <ol style="list-style-type: none"> <li>1) Mais Al-Kawaz, Weill Cornell Medicine 7/16-6/19; Topic: Relationship between aortic aneurysm and subarachnoid hemorrhage.</li> <li>2) Darya Khazanova, Weill Cornell Medicine 7/16-6/19; Topic: Risk of recurrent status epilepticus.</li> <li>3) Sally Wang, Weill Cornell Medicine 7/19-present; Topic: Trends in Moya-Moya disease.</li> </ol> <p>Medical student mentor:</p> <ol style="list-style-type: none"> <li>1) Shobana Ramasamy, Weill Cornell Medicine 9/17-6/19; Topic: Relationship between ventricular disease and stroke.</li> </ol> <p>Undergraduate student mentor:</p> <ol style="list-style-type: none"> <li>1) Mary McKnight, Cornell University 7/19-8/19; Topic: Stroke research</li> </ol>	<p>7/16-current</p>
<p><b>Clinical Teaching</b></p>	
<p>Clinical supervision and teaching of fellows, residents, and medical students rotating in the neuroscience intensive care unit and inpatient stroke unit (12 weeks per year)</p>	<p>7/16-current</p>
<p>Instructor for Neurology Physical Diagnosis, part of the Brain and Behavior Course for 2<sup>nd</sup> Year Medical Students at Weill Cornell Medical College</p>	<p>7/19-current</p>
<p><b>Administrative Teaching Leadership Roles</b></p>	
<p>Site Director, Neurocritical Care Fellowship, Weill Cornell Medicine/Columbia University</p>	<p>7/17-current</p>
<p>Course Director, Multi-Disciplinary Critical Care Conference</p>	<p>9/19-current</p>
<p>Course Director, Neurocritical Care/Vascular Fellows Teaching Seminar</p>	<p>1/20-current</p>
<p>Course Director, Neurocritical Care Medical Student Elective</p>	<p>07/20-current</p>

2. Clinical care

<b>Clinical Activity</b>	
Attending Physician, Neuroscience Intensive Care Unit (12 weeks per year)	7/16-current
Attending Physician, Inpatient Stroke Service (2 weeks per year)	7/11-current
Attending Physician, Outpatient Neurology Clinic	7/16-current

3. Research

<b>Research Activity</b>
<p>I became committed to a career in health-oriented research during my neurology residency training at New York-Presbyterian Hospital/Weill Cornell (NYPH/Cornell). Through my clinical work, I became interested in improving our limited ability to accurately identify the mechanism of stroke. This knowledge gap meant that the etiology of ischemic stroke in many patients was unknown and, as a consequence, the appropriate treatment for secondary stroke prevention was uncertain. During residency and fellowship, I published studies evaluating the risk of ischemic stroke in relationship to clinically occult mechanisms such as subacute bacterial endocarditis and cancer. Since my appointment as a faculty member at NYPH/Cornell in 2016, I have remained dedicated to evaluating the relationship between occult cardiovascular disease and cryptogenic stroke because of the paucity of data on this important clinical topic. My preliminary data, gathered with support from grant funding, have led me to hypothesize that silent myocardial infarction may be a novel stroke risk factor. To further pursue this hypothesis, I have established collaborations with investigators in cardiology, vascular neurology, and neurobiology. Thus far, I received extramural funding from the American Heart Association and a KL2 career development award from the NIH, and the Leon Levy Foundation which are allowing me to obtain further training in research methodology.</p>
<b>Key Contributions</b>
Please see attached NIH-format biosketch for description of key contributions to science

4. Administrative Activities

<b>Departmental</b>	
Neurocritical Care Fellowship Site Director	7/17-current

Committee Member ACGME Neurology Residency Review Committee	7/18-current
Committee Member, Quality and Patient Safety	7/18-current
Director, Medical Student Rotation in the Neurosciences Intensive Care Unit	08/20-current

**G. RESEARCH SUPPORT**

**Past Research Support (past 3 years only)**

PI, NIH KL2-TR-002385, CTSC Weill Cornell Medicine, 9/17-6/18 PI, Leon Levy Fellowship in Neuroscience Grant, 02/18-02/19
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**Current Research Support**

Source	American Heart Association Career Development Award
Amount	\$77,000
Duration	07/01/2018-06/30/2021
Principal Investigator	Alexander Merkler
Your Role in Project	PI
% Effort	25%

Source	R01 HL109282-04 Devereux (PI)
Amount	\$5,000
Duration	07/01/2016-present
Principal Investigator	Alexander Merkler
Your Role in Project	Co-PI
% Effort	2%

Source	Covid-19 Research Grant
Amount	\$96,000

Duration	07/01/2020-present
Principal Investigator	Alexander Merkler & Babak Navi
Your Role in Project	Co-PI
% Effort	5%

Source	R01 DECIPHER Kamel (PI)
Amount	\$18,396
Duration	10/1/2020-present
Principal Investigator	Alexander Merkler
Your Role in Project	Co-PI
% Effort	10%

#### H. EXTRAMURAL PROFESSIONAL RESPONSIBILITIES

<b>Editorial Boards:</b>	
<i>Neurohospitalist (Associate Editor)</i>	2018-current
American Academic of Neurology NeuroBytes Editor	2018-current
<b>Professional Society Committees:</b>	
Member, Medical Advisory Committee, American Heart Association Young Professionals Group of NYC	2016-current
Brown University Alumni Interviewer	2007-current
<b>Invited Grant Reviewer:</b>	
Dutch Heart Foundation	2018-current
Grant Evaluator for the Masters Program at the Clinical and Translational Science Center	2018-current



The Netherlands Organisation for Health Research and Development	2019-current
PSI Foundation	2020-current
<b>Invited Journal Reviewer:</b>	
<i>Journal of the American College of Cardiology</i> (15 papers) <i>Circulation</i> (2 papers) <i>JAMA Neurology</i> (14 papers) <i>Journal of Neurology, Neurosurgery, and Psychiatry</i> (13 papers) <i>Hypertension</i> (18 papers) <i>Neurology</i> (2 papers) <i>Stroke</i> (7 papers) <i>Neurohospitalist</i> (20 papers) <i>European Journal of Neurology</i> (3 papers) <i>Neurocritical Care</i> (1 paper) <i>Expert Review of Cardiovascular Therapy</i> (1 paper) <i>Circulation Research</i> (1 paper) <i>Cerebrovascular Diseases</i> (2 papers) <i>PLoS ONE</i> (5 papers) <i>Neurological Research</i> (1 paper) <i>American Journal of Respiratory and Critical Care Medicine</i> (1 paper)	2011-current
<b>Conference Abstract Reviewer:</b>	
Annual Meeting, Neurocritical Care Society	2018-current
<b>Poster Professor Moderator</b>	
Annual Meeting, Neurocritical Care Society	2019-current
<b>Invited Presentations:</b>	
Recurrent Thromboembolic Events After Ischemic Stroke in Patients with Cancer. Department of Neurology Grand Rounds, Weill Cornell Medical	2013
Intracranial Hemorrhage. Neuroscience Nursing Education Series 2015, NewYork-Presbyterian Hospital	2015
Intracranial Hemorrhage. Neuroscience Nursing Education Series 2016, NewYork-Presbyterian Hospital	2016
Invited lecture, Weill Cornell Medicine, Department of Neurology Resident Bootcamp Lecture Series; "Treatment of Acute Neurological Emergencies."	2016

Grand Rounds, Columbia University Medical Center; Division of Critical Care Medicine; "Infectious Disease and the Central Nervous System"	2016
Invited lecture, Weill Cornell Medicine, Department of Neurology Resident Bootcamp Lecture Series; "Treatment of Acute Neurological Emergencies."	2017
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Treatment of Acute Ischemic Stroke"	2017
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Management of Large Hemispheric Infarction"	2017
Grand Rounds, Department of Neurology, New York Methodist Hospital Department of Neurology; "Infective Endocarditis and Stroke"	2017
Grand Rounds, Weill Cornell Medicine, Department of Neurology; "Myocardial Infarction and the Risk of Stroke"	2017
Grand Rounds, Weill Cornell Medicine, Department of Medicine; "Update in Neurology"	2017
Invited lecture, Weill Cornell Medicine, Department of Medicine; "Coma"	2017
Grand Rounds, Robert Wood Johnson Medical School, Department of Neurology; "Myocardial Infarction and the Risk of Stroke"	2017
Grand Rounds, Rutgers New Jersey Medical School, Department of Neurology; "Myocardial Infarction and the Risk of Stroke"	2017
Invited lecture, Weill Cornell Medicine, Department of Neurology Resident Bootcamp Lecture Series; "Treatment of Acute Neurological Emergencies."	2018
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Treatment of Acute Ischemic Stroke"	2018
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Management of Large Hemispheric Infarction"	2018
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Management of Status Epilepticus"	2018
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Management of Subarachnoid Hemorrhage"	2018
Invited Lecture, Weill Cornell Medicine, Department of Neurology; "The Focused Neurological Examination"	2018
Invited lecture, Weill Cornell Medicine, Department of Medicine; "Coma"	2018

Invited Lecture, New York Brain Attack Conference: “Angiographically Negative Subarachnoid Hemorrhage”	2018
Invited Speaker Symposium 2018: Stroke Rehabilitation – Focus on Clinical Management, Weill Cornell Medicine, Department of Rehabilitation; “A Primer on Secondary Stroke Prevention”	2018
Invited Lecture, Stroke and Neurocritical Care Conference, NewYork-Presbyterian Hospital Queens; “Neurocritical Care Management of the Non-Stroke Patient”	2018
Invited lecture, Weill Cornell Medicine, Department of Neurology Resident Bootcamp Lecture Series; “Treatment of Acute Neurological Emergencies.”	2019
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; “Treatment of Acute Ischemic Stroke”	2019
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; “Management of Large Hemispheric Infarction”	2019
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; “Management of Status Epilepticus”	2019
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; “Management of Subarachnoid Hemorrhage”	2019
Grand Rounds, Weill Cornell Medicine Nursing; “Update in the Management of Status Epilepticus”	2019
Invited Lecture, Weill Cornell Medicine Multidisciplinary Critical Care Fellows Lecture Series: “Management of Status Epilepticus”	2019
Invited Lecture, American Academy of Neurology Annual Meeting; “Vascular Neurology”	2019
Grand Rounds, NYU School of Medicine, Winthrop Hospital; “Myocardial Infarction and the Risk of Stroke.”	2019
Invited Lecture, Yale Neuro ICU / Stroke Monthly Research Seminar, Yale University School of Medicine; “Myocardial Infarction and the Risk of Stroke.”	2020
Invited Lecture, Weill Cornell Medical Center Neuropsychology Didactics series; “The Neurological Exam.”	2020
Invited lecture, Weill Cornell Medicine, Department of Neurology Resident Bootcamp Lecture Series; “Treatment of Acute Neurological Emergencies.”	2020
Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; “Treatment of Acute Ischemic Stroke”	2020

Invited Lecture, Weill Cornell Medicine, Department of Neurology; Resident Lecture Series; "Management of Large Hemispheric Infarction"	2020
Grand Rounds, Weill Cornell Medicine, Department of Neurology; "Interactive Review of Stroke."	2020
Invited Lecture, Weill Cornell Medical College Second Year Medical School Course; "Neurological Manifestations of Covid-19."	2020
Invited Lecture, New York Brain Attack Conference: "Treatment of Cerebral Vein Thrombosis: Pro: Direct Oral Anticoagulation"	2020
Invited Lecture, Weill Cornell Medicine Multidisciplinary Critical Care Fellows Lecture Series: "Treatment of Acute Ischemic Stroke"	2020
Invited Lecture, Lower Manhattan Community Affairs Education Series: "How to Identify & Treat Stroke"	2020
Invited Lecture, Swiss Neurology Webinars CME, Kantonsspital Aarau, Aarau, Switzerland: "Coviid-19 and Stroke"	2020
Invited Lecture, Fall 2020 Health and Wellness Seminar Series: Strokes and Covid-19; NewYork Presbyterian Hospital: "Coviid-19 and Stroke"	2020
Invited Lecture, Weill Cornell Medicine Multidisciplinary Physician Assistant Curriculum: "Treatment of Acute Ischemic Stroke"	2020
Invited Lecture, Stroke and Neurocritical Care Conference 2020; NewYork Presbyterian Hospital Queens: "Cerebrovascular Manifestations of Covid-19."	2020
Invited Lecture, Brain and Mind Research Institute at Weill Cornell Medicine; Bench-to-Bedside Lecture Series: "Neurological Manifestations of Covid-19."	2020
Invited Lecture, Weill Cornell Seminar in Neurology 2020, Salzburg Stiftung der American Austrian Foundation, Vienna, Austria: "Neurological Manifestations of Covid-19."	2020
Invited Lecture, Neurology Grand Rounds, Brown University: "Myocardial Injury and the Risk of Ischemic Stroke."	2020
Invited Lecture, Covid-19 Summit, Cornell University, Ithaca, New York: "Neurological Manifestations of Covid-19."	2020
Invited Lecture, 75 <sup>th</sup> Brazilian Congress of Cardiology, Brazil: "Silent Myocardial Infarction and the Risk of Stroke."	2020
Invited Lecture, Weill Cornell Research Symposium, Weill Cornell Medicine, New York, New York: "Covid-19 and the Risk of Stroke."	2020

**I. PROFESSIONAL MEMBERSHIPS**

Role	Organization	Dates
Member	American Academy of Neurology	2011-current
Member	American Heart Association	2012-current
Member	Neurocritical Care Society	2014-current
Member	American Neurological Association	2018-current

**J. HONORS AND AWARDS**

Honor/Award	Organization	Date
Phi Beta Kappa	Brown University	2006
Bachelor of Science, <i>magna cum laude</i>	Brown University	2006
Sigma Xi	Brown University	2006
Rosenbluth Foundation Travel Grant	NYU School of Medicine	2010
Chief Resident	Weill Cornell Medicine	2014
Resident Teaching Award	Weill Cornell Medicine	2014
American Academy of Neurology Annual Meeting Resident Scholarship Award	AAN	2014
American Academy of Neurology Annual Meeting Resident Scholarship Award	AAN	2015
International Stroke Conference Stroke Rehabilitation and Recovery Travel Award	International Stroke Conference	2016
International Stroke Conference New Investigator Award	International Stroke Conference	2016
Plum and Posner Annual Award for Best Neurology Faculty Teacher at Weill Cornell Medicine	Weill Cornell Medicine	2017
National Institute of Health KL2 Career Training Award given by the Weill Cornell Medical College Clinical & Translational Science Center	NIH and Weill Cornell Medicine CTSC	2017

Leon Levy Fellowship in Neuroscience Scholarship	Leon Levy Fellowship in Neuroscience	2018
American Neurological Association Travel Award	ANA	2018
Career Development Award	American Heart Association	2018
Weill Cornell Medicine Covid-19 Research Grant	Weill Cornell Medicine	2020
Robert G. Siekert New Investigator Award	International Stroke Conference	2021

## K. BIBLIOGRAPHY

Complete list of published work in MyBibliography:

<https://www.ncbi.nlm.nih.gov/pubmed/?term=alexander+merkler>

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2. **Merkler AE**, Marcus JR, Gupta A, Kishore SA, Leifer A, Patsalides A, DeAngelis LM, Navi, BB. Endovascular Therapy for Acute Stroke in Patients with Cancer. *Neurohospitalist* 2014;4:133-135.
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2. **Merkler AE**, Dunn LE, Lerario MP et al. The long term risk of seizures after stroke. Presented as an oral abstract at the 2016 International Stroke Conference, Los Angeles, CA.
3. **Merkler AE**, Chatterjee A, Gialdini G, et al. Trends and Characteristics of Tuberculous Meningitis in the United States, 1993-2013. Presented as a platform presentation at the 2017 American Academy of Neurology Annual Meeting, Boston, MA.
4. **Merkler AE**, Gialdini G, Yaghi S et al. Long-term Risk of Complications after Percutaneous Transcatheter Closure of Patent Foramen Ovale Presented as an platform presentation at the 2017 American Academy of Neurology Annual Meeting, Boston, MA.
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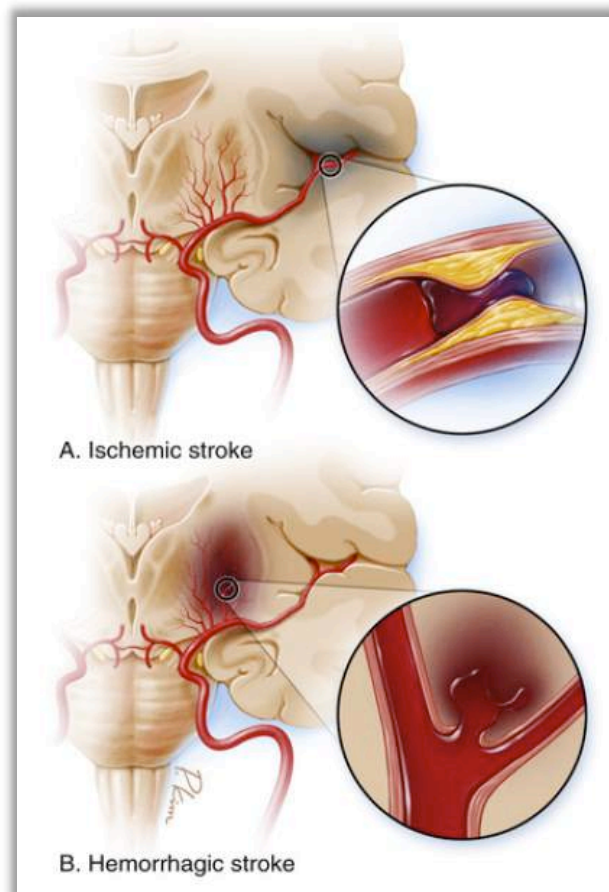


# **Medical Principles**

## General Principles

### *Stroke*

1. Stroke is the sudden death of brain cells due to a lack of oxygen.
2. The lack of oxygen is caused by either a blockage of blood flow to the brain or by the rupture of an artery that supplies the brain.
3. When a stroke is caused by blocked blood flow, it is called an ischemic stroke.
4. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.



5. A stroke may result in permanent brain-damage, long-term disability, and even death.

6. Signs and symptoms<sup>1</sup> of stroke generally include:

- Sudden numbness or weakness in the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking, or difficulty understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance, or lack of coordination.
- Sudden severe headache with no known cause.

### *Stroke Causes: Ischemia*

7. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.

8. Ischemia occurs when a blood clot reduces or blocks blood flow, preventing the organ or tissue from receiving enough oxygen-rich blood.

9. If not treated promptly, the cells in the part of the organ or the tissue supplied by the blocked artery will be deprived of oxygen and, with time, may be damaged or infarct (die).

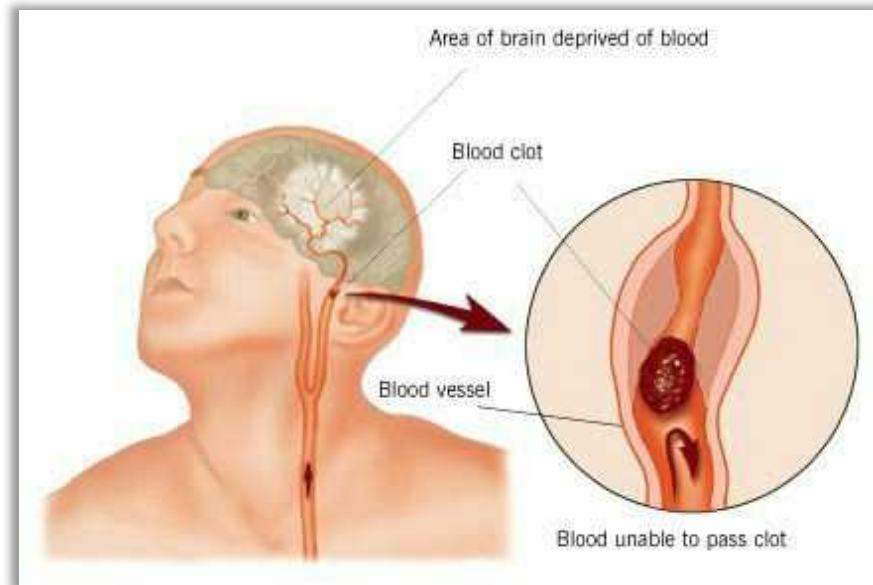
### *Ischemic stroke*

10. If something blocks blood flow to the brain, brain cells start to die because they cannot get oxygen. That is a stroke.

11. An ischemic stroke occurs when a blood clot interferes with blood flow through an artery that supplies the brain.

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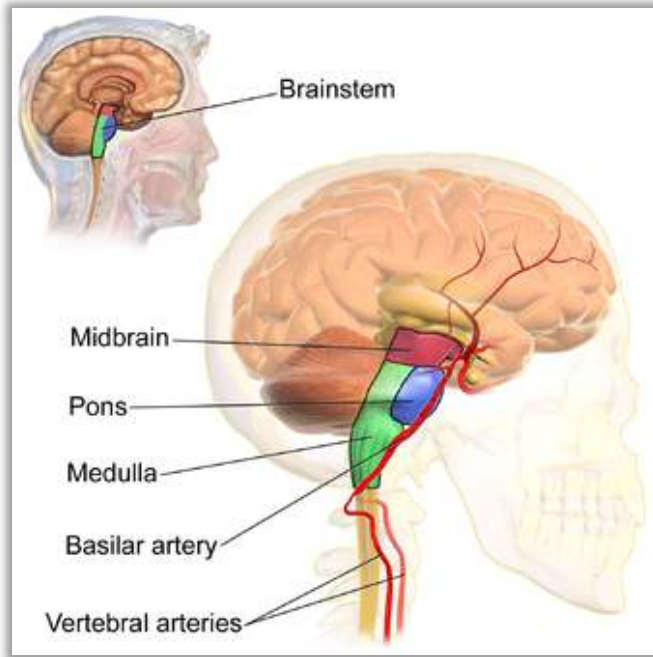
<sup>1</sup> A sign is a manifestation of medical condition that the physician perceives, objectively. In contrast, a symptom is a manifestation apparent to patient, subjectively.



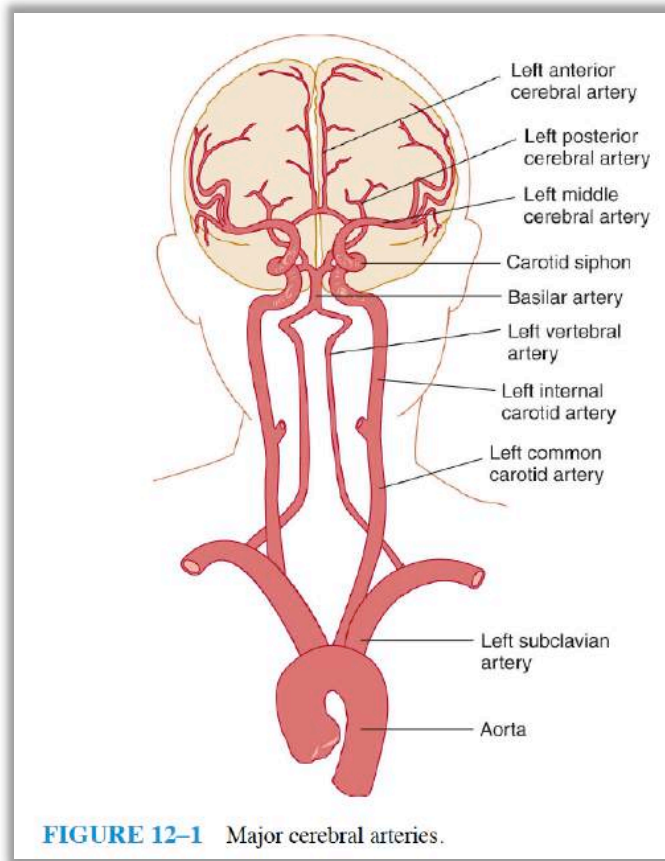
12. A thrombus is a blood clot that forms within a blood vessel.
13. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.
14. Arterial dissection—a tear inside an artery—often causes an embolus.
15. Trauma is a common cause of arterial dissection.

### *The Basilar Artery*

16. The basilar artery lies at the front of the brainstem in the midline.

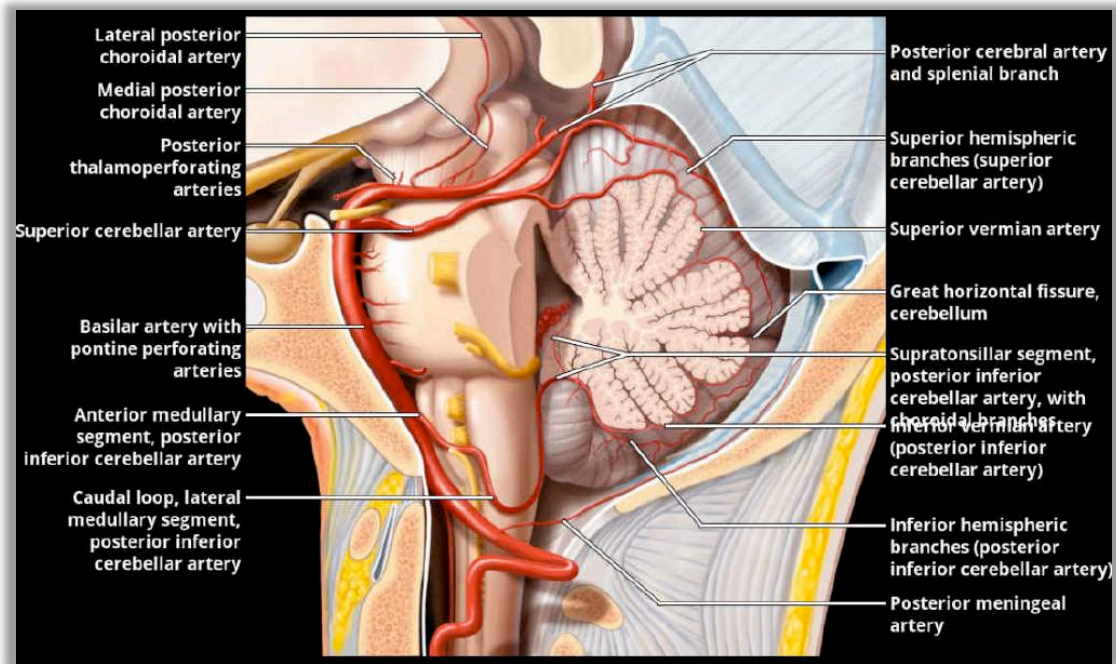
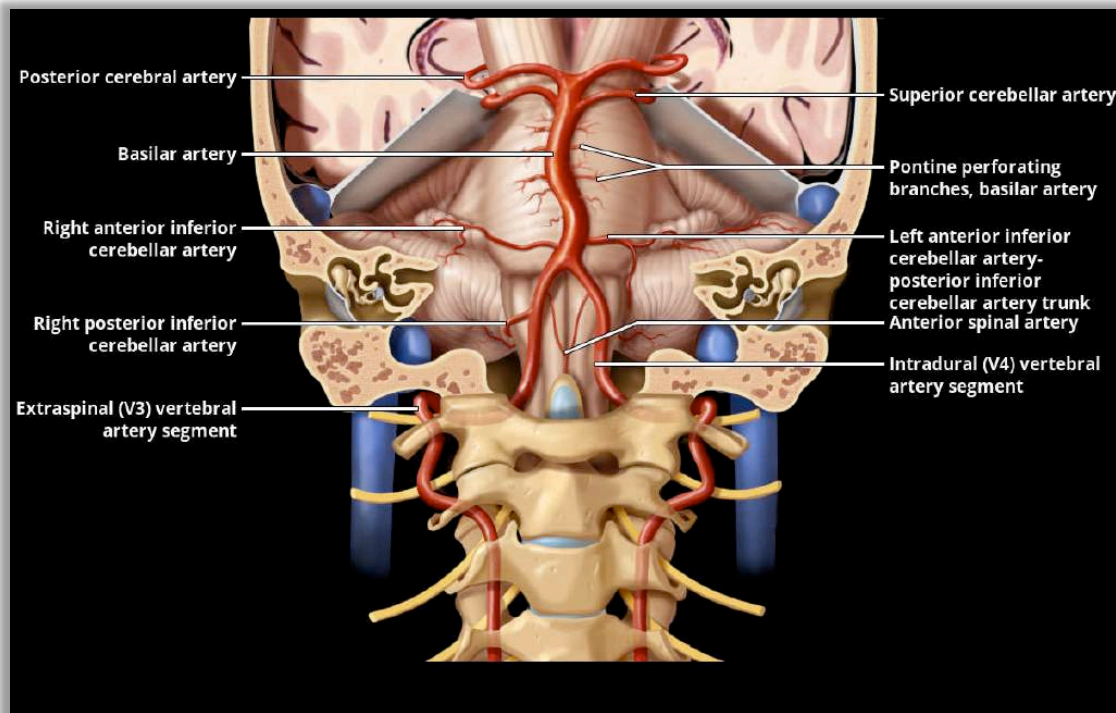


17. The basilar artery is formed by the union of the two vertebral arteries.



**FIGURE 12-1** Major cerebral arteries.

18. The basilar artery carries oxygenated blood up through the brainstem to the posterior (back) part of the brain.



## *Basilar Artery Occlusion (BAO)*

19. Basilar Artery Occlusion (BAO) is the name for an acute stroke originating in the basilar artery.
20. A BAO is a type of posterior-circulation stroke. It affects the circulation of blood in the back part of the brain.
21. A BAO occurs when a blood clot in the basilar artery impedes blood flow, resulting in ischemia in the posterior part of the brain.







22. If not treated quickly, a BAO can lead to severe brain damage, organ malfunction, catastrophic disability, and even death.
23. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

## *BAO Signs and Symptoms*

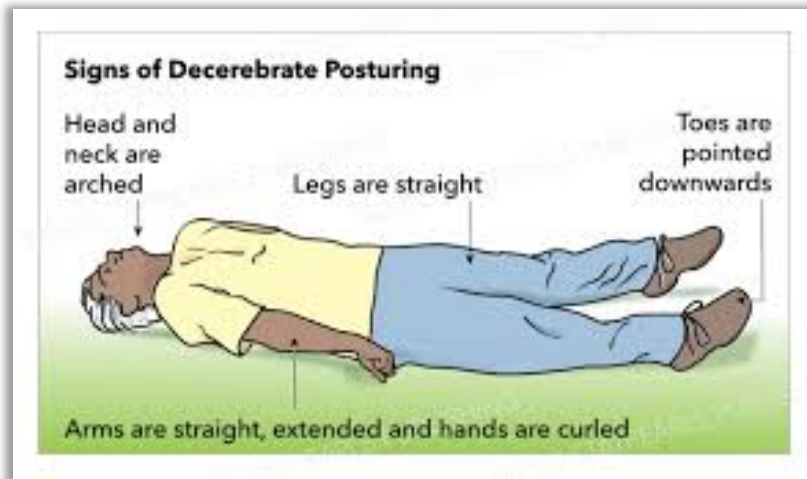
24. Because the cerebral vessels each tends to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion.
25. The signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
26. The hallmarks of a BAO include:



- Decreased or altered consciousness
- Quadriplegia (loss of voluntary movement in all four limbs)
- Various combinations of limb ataxia (impaired balance or coordination)
- Oculomotor (eye movement) abnormalities
- Pupillary abnormalities (pupils do not react normally to light)
- Dysarthria (inability to articulate speech)
- Dysphagia (inability to swallow)

Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

27. Such signs and symptom can present in various combinations.
28. Decerebrate posturing is a classic sign of BAO and other posterior strokes.
29. Decerebrate posturing is an abnormal posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.



30. Decerebrate posturing is also known as extensor posturing.
31. Other signs and symptoms of BAO include:
- Overactive or overresponsive reflexes (hyperreflexia).
  - Impaired balance or coordination (ataxia);
  - Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking.
  - Loss of the ability to speak (dysphonia).
  - Abnormalities of alertness and behavior, including hallucinations.
  - Dizziness, vomiting.
32. In rare BAO cases, patients suffer locked-in syndrome.
33. Patients with locked-in syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware and conscious of their “locked in” condition.

*Stroke diagnosis: history and presentation*

34. The most characteristic historical aspect of stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.
35. After the onset, stroke symptoms most often stay the same or improve over the few hours that follow.

36. The symptoms may also worsen in a smooth or stuttering course.
37. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
38. A second most characteristic historical aspect of stroke is that the patient's symptoms usually fit the distribution of a single vascular territory.
39. That is to say, patients with brain infarct will present with signs and symptoms in the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
40. The signs and symptoms thus provide an important clue as to the likely location of the possible stroke.
41. The most characteristic aspect of a stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.

*Stroke diagnosis: MEND exam*

42. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.
43. The MEND exam was developed to facilitate communication between healthcare providers throughout the continuum of care for stroke patients.
44. The MEND exam incorporates the posterior circulation elements missing in the Cincinnati Prehospital Stroke Scale (CPSS).
45. The MEND exam has all three elements of the CPSS, plus six elements from the NHISS (consciousness, orientation, commands, visual fields, gaze, leg motor, limb ataxia, and sensation).

<b>MEND EXAMINATION - PREHOSPITAL</b> Green Boxes Contain Basic Exam (CPSS)	
<b><u>MENTAL STATUS</u></b>	
●	Level of Consciousness (AVPU)
●	Speech: "You can't teach an old dog new tricks"
●	Questions (age, month)
●	Commands (close, open eyes)
<b><u>CRANIAL NERVES</u></b>	
●	Facial Droop (show teeth or smile)
●	Visual Fields (four quadrants)
●	Horizontal Gaze (side to side)
<b><u>LIMBS</u></b>	
●	Motor – Arm Drift (close eyes-hold out arms) Leg Drift (open eyes-lift each leg separately)
●	Sensory – Arm, Leg (close eyes & touch, pinch)
●	Coordination – Arm, Leg (finger-nose, heel-shin)

46. The MEND exam takes under two minutes to perform, and requires no tools, making it ideal as a screening tool.

### *Stroke Diagnosis: Stroke Score*

47. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
48. The Scale (also known as Score) looks at 11 different elements that evaluate specific abilities in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
	CATEGORY	SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

49. A patient's score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
50. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.
51. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
52. In fact, the initial severity of the stroke according the Score is the most important predictor of outcome.

### *Stroke diagnosis: CT scan and MRI*

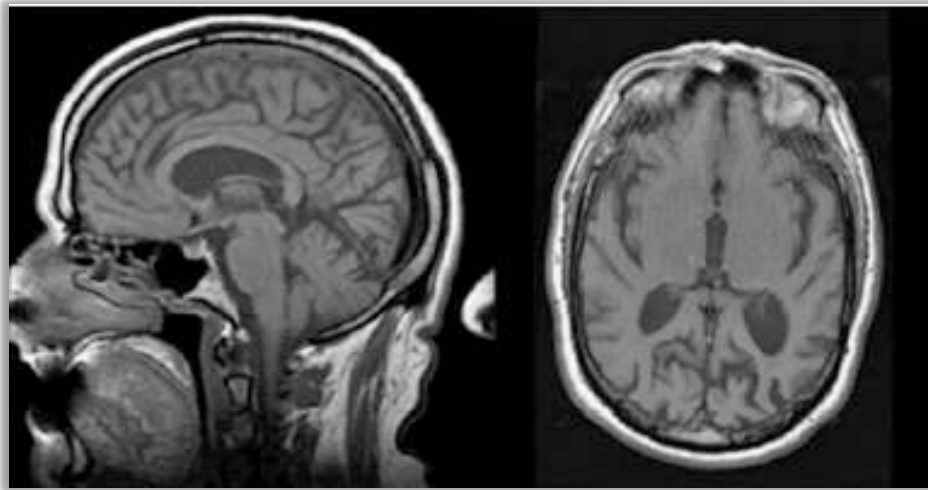
53. An CT scan and MRI are noninvasive diagnostic tests.
54. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.
55. A non-contrast CT of the head remains the standard procedure for the initial evaluation of stroke.

56. In the emergent initial evaluation of an acute stroke patient in the emergency department, a non-contrast CT of the head remains the imaging test utilized in most hospitals worldwide, with the exception of a few centers that have dedicated MRI capabilities for stroke.
57. A non-contrast CT scan has the advantages of being widely available, relatively inexpensive, and fast to perform.
58. A CT scan takes less than 1 minute.
59. A non-contrast CT should be performed within 20 minutes of the patient's arrival at the emergency department in order to speed up potential treatment with thrombectomy and/or TPA for ischemic-stroke patients.
60. All patients with a suspected acute ischemic stroke should undergo a non-contrast brain CT scan or brain MRI.



61. A CT scan is one of the vital first steps in the management of a stroke patient. It helps to exclude hemorrhagic stroke.
62. The CT scan will immediately rule out hemorrhage, as blood is bright on a CT.

63. A CT scan can quickly differentiate an ischemic stroke from intracranial hemorrhaging and other mass lesions— information crucial to the subsequent therapeutic decisions that will be rapidly made.
64. A CT scan generally must be performed within 30 minutes of the patient’s arrival at the hospital.
65. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. But, in contrast to a CT or CTA, an MRI requires that the patient be cooperative to hold still for several minutes.
66. A brain MRI can visualize ischemic infarcts earlier, and identify acute posterior circulation strokes more accurately, than a CT scan.
67. An MRI’s diffusion-weighted sequence (“DWI”) can show any restricted diffusion consistent with infarct.
68. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
69. An MRI’s DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury



70. Radiologists interpret CT and MRI images and communicates their findings to other doctors in radiology reports.



### *Stroke diagnosis: CTA and MRA*

71. A CTA and an MRA are vascular-imaging tests.
72. Vascular imaging specifically focuses on the blood vessels.
73. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.
74. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
75. Vascular imaging specifically helps doctors find blood clots.
76. Vascular imaging thus helps doctors diagnose and treat ischemic strokes, including BAO.
77. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
78. A CTA takes minutes to complete—a few minutes to inject the contrast dye and less a minute to run the scan.
79. A CTA can quickly provide a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.
80. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
81. Most patients with a suspected acute ischemic stroke (like a BAO) should undergo a CTA or MRA.
82. An MRA provides the same information as a CTA.
83. But, in contrast to a CT or CTA, an MRA requires that the patient be cooperative to hold still for several minutes.



84. A doctor must promptly order vascular imaging when there is reason to suspect that the patient has an occlusion in a major blood vessel.
85. This is particularly true if there is reason to suspect that the occlusion is in an artery supplying the brain, like the basilar artery.
86. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.

### *Radiology reports*

87. A radiologist interprets imaging studies (including a CT, CTA, MRI, MRA) and communicates his or her findings and conclusions to other doctors on written radiology reports.
88. A radiologist must interpret imaging studies reasonably, correctly, and accurately.
89. A radiologist must also provide prompt and accurate radiology reports.
90. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call “critical values”—that is, immediately call the attending physician to inform him or her of the findings.
91. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.

### *Stroke treatment: medical emergency*

92. Stroke is the most common neurological emergency.
93. During a stroke, every minute counts. Time lost is brain lost.
94. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
95. When a patient presents with signs or symptoms of stroke, a physician must act quickly to confirm or rule out stroke.
96. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
97. Acute therapies for an ischemic stroke (thrombectomy, TPA) are best implemented as fast as possible, so the steps needed to stabilize and assess the patient must be taken as quickly as possible.
98. In practice, to speed up the process, these steps are often taken simultaneously.
99. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke.
100. If the stroke is an ischemic stroke, medical providers must act quickly to clear the occlusion (blood clot) causing the stroke.
101. In some cases, medical providers must act quickly to order and perform a thrombectomy to remove the blood clot causing the stroke.
102. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.
103. Fast treatment can lessen the brain damage that stroke can cause.
104. The National Institute of Neurological Disorders recommends time-frames for completing the basic, widely-accepted procedures that hospitals follow to evaluate potential ischemic-stroke patients.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

\*By phone or in person.

105. Emergency-medicine physicians and neurologists must generally perform procedures within these time-frames.
106. With a focus on rapid recognition, evaluation, and treatment of stroke, many hospitals have streamlined care to meet recommended time-goals.
107. That has led to the development of stroke protocols, critical pathways, and acute interventional stroke teams that may be deployed in the field before the patient arrives at the emergency department.

*Stroke treatment: thrombectomy*

108. A blood clot causing a stroke can be removed through a medical procedure called a thrombectomy.
109. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery, which is located in the groin.
110. The catheter is guided through the blood system towards the blood clot.
111. Once the catheter reaches the blood clot, the surgeon can attempt to suction, dissolve, or retrieve the clot.
112. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
113. The main goal of these therapies is to get the artery open and re-establish blood flow.

114. Thus, a doctor should always ask whether he or she is doing everything possible to optimize blood flow to regions of cerebral ischemia.
115. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in probability of good outcome.
116. Every twenty minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
117. It is the responsibility of the practitioner initially evaluating the patient to facilitate the patient's transfer to a thrombectomy suite, whether located at the same or another hospital.

## Supporting Literature

118. *Acute Stroke Care* (3<sup>rd</sup> Ed.), Denny, Carter M., et al., Cambridge University Press, 2020.
119. *Caplan's Stroke, A Clinical Approach* (5<sup>th</sup> Ed.), Louis R., Caplan (Ed.), Cambridge University Press, 2016.
120. *Clinical Neuroanatomy* (28<sup>th</sup> Ed.), Waxman, Stephen G., McGraw-Hill Education, 2017.
121. *Clinical Neurology and Neuroanatomy*, Berkowitz, Aaron L., McGraw-Hill Education, 2017.
122. *Imaging Anatomy: Brain and Spine*, Osborn, Anne G., Salzman, Karen L., et al., Elsevier, 2020.
123. *Nolte's The Human Brain, an Introduction to Its Functional Anatomy* (8<sup>th</sup> Ed.), Vanderah, Todd W., Gould, Douglas J., Elsevier, 2021.
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# **Medical Chronology**



## Treatment of Michaela Smith

### *Prologue: Michaela Suffers a Kick to the Right Side of Her Head*

1. On or about June 21, 2019, Michaela was kicked on the right side of the head. HMC 30, HMC 71.
2. The accident occurred during physical training for her job as a detention officer for the sheriff's department. HMC 30, HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

3. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own shortly thereafter. HMC 30, HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216  
H&P  
Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

June 28, 2019 – Michaela's First Visit to Hamilton

### *Onset of Symptoms*

4. On June 28, 2019, Michaela again took part in training for her job. HMC 2, HMC 6, HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

5. The training involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

6. After the training, Michaela drove herself home and did “well for a couple of hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETELY OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

7. Between 20:30 and 21:30 that same evening, Michaela started experiencing a constellation of symptoms, including:

- throbbing headache
- shortness of breath
- swelling throat
- slurred speech
- bilateral facial and hand numbness
- near syncope
- vomiting
- facial pain
- rhinorrhea
- nausea
- dizziness
- difficulty talking, with thick speech
- inability to open her mouth completely or swallow freely

HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244

**H&P**

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

8. Michaela had no prior history of a similar problem. HMC 71.

Initial Provider Contact 6/28/2019 2338  
 HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.  
 no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton Emergency Department ("ED")*

9. At 21:43, Michaela arrived at the Hamilton emergency department. HMC 65.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB:	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmplnt: <u>Poss Allergic Reaction</u>			

HMC 65.

10. Michaela's parents were with her.

Holsonback, Shaw n D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.



11. At 22:41, Michaela was admitted to the Hamilton ED, which identified headache, shortness of breath, and unspecified nausea with vomiting as the reasons for her visit. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT

Reason For Visit Diagnosis	
Code	Description
R51	Headache
R06.02	Shortness of breath
R11.2	Nausea with vomiting, unspecified

HMC 79.

12. Between 22:53 and 22:59, RN Kayla Rewis triaged Michaela. HMC 68.

13. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

14. At that time, these were Michaela’s complaints: “soreness/swelling to throat, headache, vomiting, and near syncopal [fainting] episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rewis, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259

**NURSING TRIAGE (Adult)**

**HPI:**

Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

15. At 23:38, Emergency Physician Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

16. At that time, Dr. Holsonback noted the prior kick to Michaela's head: "Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness headache w/o syncope at the time, sx resolved." HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

17. At that time, Michaela's neurological condition was: "motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside." HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.

**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.

**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.



18. Her mental status was: “speech clear, oriented X 3, normal affect, responds appropriately to questions.” HMC 72.

19. Michaela’s general appearance was “well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort.” HMC 71.

**PHYSICAL EXAM:**

GENERAL APPEARANCE: well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

20. As part of his examination, Dr. Holsonback obtained a National Institute of Health Stroke Scale (NIHSS) score for Michaela. HMC 72.

21. Michaela scored a 0 (that is, normal) on each of the 11 elements that make up the NIHSS. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.

22. Michaela’s total score was thus also 0 (normal), on a scale of 0 to 42. HMC 72.

23. The NIHSS is a common diagnostic method for quickly assessing the severity of a stroke.

24. The Scale (also known as a Score) looks at 11 different elements that evaluate specific ability in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

25. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.

*Michaela Undergoes a Brain CT Scan*

26. Despite her NIHSS score, Dr. Holsonback moved quickly to get Michaela a CT scan. HMC 64.

27. At 23:47, Dr. Holsonback ordered a stat head CT scan, for “headache right side”—the same side where Michaela had received a kick during training at work a week earlier. HMC 64, HMC 30, HMC 71.

Order Type: Radiology  
Order Sub Type: CT

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47 06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.

Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

Holsonback, Shawn D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**


Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

28. The scan was administered by 23:54, within minutes of Dr. Holsonback's order.

HMC 61; Appendix.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
This interpretation is based upon the receipt of 32 images.			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.

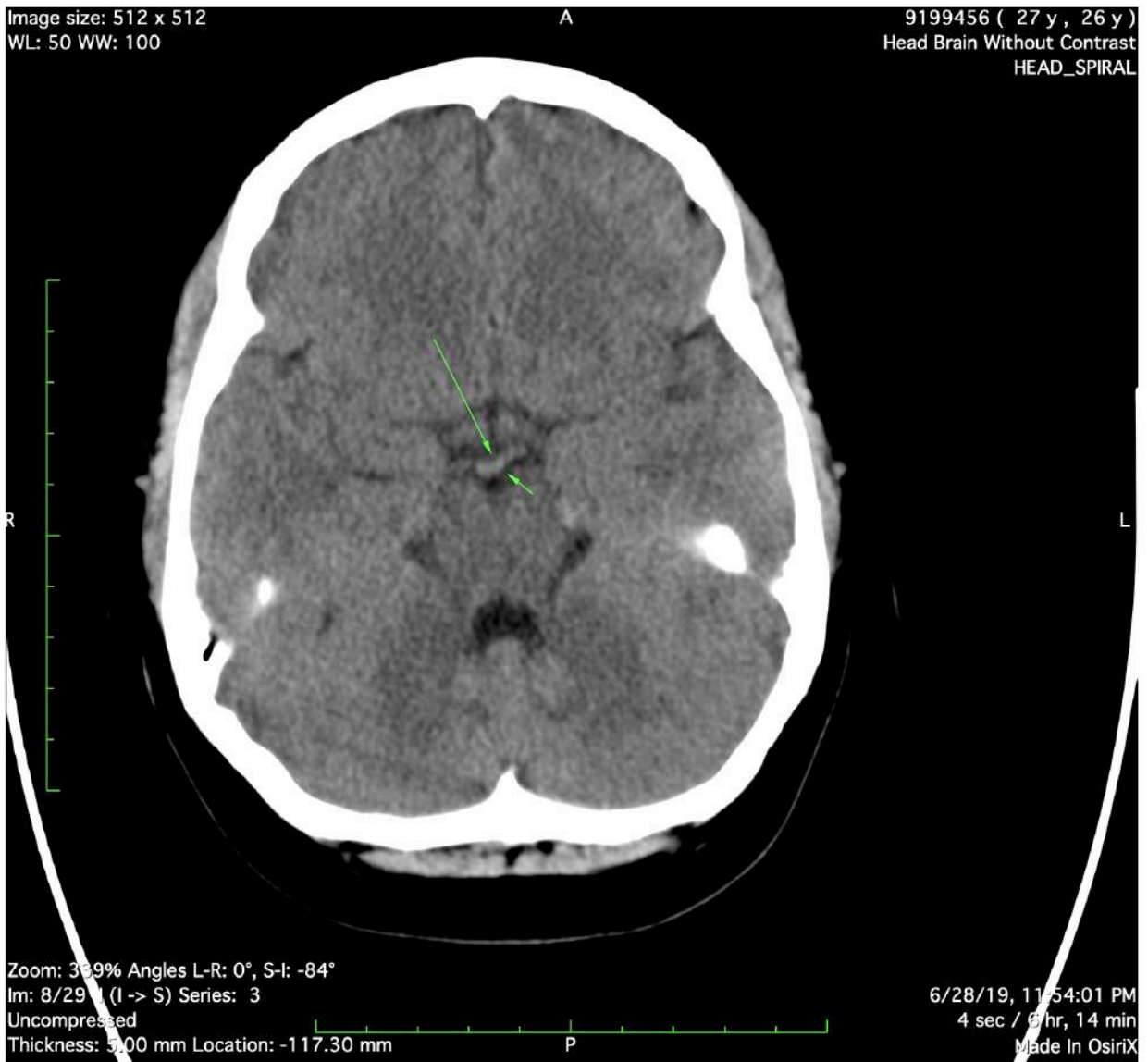
29. The CT scan revealed that Michaela was having a brainstem or posterior-circulation stroke.

30. Image 7 of 29 of the CT scan, for example, showed a white hyperdense sign of a basilar-artery thrombosis:



See Appendix.


31. Image 8 of 29 of the CT scan revealed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:



See Appendix.

*Radiologist Cooney Fails to Identify the Signs of Stroke on the CT Scan*

32. At 00:18, acting as a vRad employee, Radiologist Michael Cooney read the 32 images associated with the study. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA		
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720		
<b>Study Type:</b>	CT HEAD WO		
<b>Ordered As:</b>	CT HEAD WO		
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Accession:</b>	3948616
<b>Date of Exam:</b>	28 Jun 2019 EDT	<b>Account Number:</b>	
<b>Patient ID:</b>	9199456	<b>Patient DOB:</b>	
<b>Patient Location:</b>	Unknown	<b>Caretaker:</b>	
<b>Account #:</b>		<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>This interpretation is based upon the receipt of 32 images.</b>			
<b>EXAM:</b> CT Head Without Contrast			
<b>EXAM DATE/TIME:</b> 6/28/2019 11:52 PM			

HMC 61.

33. Dr. Cooney found no evidence of hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.



34. Dr. Cooney's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. Dr. Cooney did not even mention the sign. HMC 61.

35. Dr. Cooney's findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. Dr. Cooney did not even mention the streak. HMC 61.

36. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded that the study showed "no acute intracranial abnormality." HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

37. At 00:28, Dr. Holsonback noted Dr. Cooney's reading of the CT scan as showing "no acute intracranial abnormality." HMC 72.

Holsonback, Shaw n D.O. Created: 6/29/2019 0027 Last Entry: 0028  
MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
without Informing Her She Has a BAO*

38. At 00:57, Dr. Holsonback rechecked Michaela. HMC 72.

39. She was "resting, feeling better," with a "headache still present" and "all numbness resolved." HMC 72.



40. At 02:15, Michaela continued to feel “better,” had “no focal neurological deficits,” and agreed to a discharge. HMC 2, HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

41. At 02:15, Michaela signed her disposition summary. HMC 65-66.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: **Smith, Michaela E**  
EDM Code: **ER0170**  
Med Rcrd: **9199456**


MD Electronic Sg Holsonback, Shawn D.O. 6/29/2019 0214

**MY SIGNATURE BELOW INDICATES:**  
> I have received and understood the oral instructions regarding my current medical problem.  
> I will arrange follow-up care as instructed above.  
> I acknowledge receipt of the written instructions as outlined on this and any previous page(s).  
I will read and review these instructions.  
> I understand that a copy of the medical record is available to the practitioner or medical organization providing follow-up care, treatment, and services.

x Michaela Smith x Ashlynn R. M. Smith  
Patient (or Legal Guardian) Signature Staff (Witness) Signature Driver

HMC 66.

42. The disposition summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” and her chief complaint as “Poss Allergic Reaction.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	101737552 05LB01 06/28/2019 OP
May return to work/school: <u>1-2 Days</u>	Smith, Michaela E EMR
Restrictions: <u>None</u>	Physician, On Duty
Critical Care Time: <u>none</u>	

HMC 65.

43. The summary instructed Michaela to follow up with Dalton Family Practice, and permitted her to return to work, in 1-2 days, without restrictions. HMC 65.

44. The summary also instructed her to return to “Return to the Emergency Department sooner if worse.” HMC 65.

45. Michaela “verbalized understanding and ability comply” with these instructions. There were no learning or communication “barriers” and she received no “medical driving restrictions.” HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

46. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.

47. Her pain was 0 of 10. HMC 70.

48. At 02:27, Michaela was discharged in “stable” condition and left for home. HMC 65, 70.

49. Neither any provider nor the discharge instructions informed Michaela or her parents of the occlusion in her basilar artery.

<b>Hamilton Medical Center - Emergency Department</b> 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary (for discharged patient; English)</b>			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
Rm (last): _____		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Triage: <u>Kayla R. R.N.</u>	MLP: _____		
RN Eval: <u>Stacey S. R.N.</u>	PMD Ph: <u>(706) 278-0138</u>		
PMD: <u>Duckett, Jennifer P.A.</u>	Chief Cmplnt: <u>Poss Allergic Reaction</u>		

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING/COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

50. Michaela was “comfortable going home.” HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

51. At home, she “went to bed about 03:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

## **June 29, 2019 – Michaela Returns to Hamilton by Ambulance**

### *Michaela Wakes with Global Alteration of Consciousness*

52. As demonstrated below, Michaela awoke with altered mental status and other classic signs and symptoms of stroke. These signs and symptoms amounted to a global alteration of consciousness, reflecting the onset of a neurological emergency some time after her discharge from Hamilton.



53. At about 07:15, Michaela's mother heard her moaning in her bedroom, went to check on her, and found her "with altered mental status and poor mobility." HMC 6, HMC 30.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

54. Michaela talked "through her gritted teeth" but could not "really open her mouth" and had "problems with moving and slurred speech." HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

55. Speaking “through her teeth,” Michaela told her mother that she was “unable to get out of bed” and thus “had wet on herself.” HMC 6, HMC 2.

56. When she awoke, Michaela was also “foaming at the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 08:14 Last Entry: 08:27

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

57. Thus, “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

58. The paramedics were then called. HMC 2, HMC 6.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2, 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

59. Upon arriving, the paramedics “were not able to get the patient up to walk” and Michaela had to be “brought into the emergency room by stretcher.” HMC 6.

60. After that Michaela did not speak again. HMC 6.

*Michaela Returns to Hamilton with Classic  
Signs of Stroke—a BAO*



61. By 08:19, the ambulance arrived at the Hamilton emergency department. HCM 24, HMC 25.

62. Michaela thus returned to Hamilton as a clinically different patient, whose neurological condition had deteriorated markedly overnight.

63. From the time of her arrival, Michaela demonstrated “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, MHC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

64. These symptoms alone were major signs of massive brain injury.

65. These symptoms alone made clear that Michaela was facing a neurological emergency that required an expedited and urgent diagnostic evaluation and possible intervention.

66. Extensor posturing, for example, is typically a result of severe brain injury.

67. What’s more, the presence of “extensor posturing” by itself made clear that the emergency likely involved injury to Michaela’s brainstem.

68. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was identified as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

69. Between 08:14 and 08:27, RN Megan Martin triaged Michaela.

70. During the assessment, Michaela “was squinting her eyes and looking around, while still shaking[.]” HMC 26.

71. Nurse Martin also gave Michaela a MEND exam. HMC 26.

72. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

■ **HPI:** Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

73. Michaela also mumbled that she could not talk. HMC 26.

74. Nurse Martin noted that Michaela’s last-known-well was about “10pm 6/28/19,” per the EMS. HMC 26.

75. By 08:29, Nurse Martin ordered an “electrocardiogram with physician review.” HMC 28.

Martin, Megan R.N. Created: 6/29/2019 0838 Last Entry: 0838  
Order(s) performed by "Nurse":  
- ELECTROCARDIOGRAM WITH PHYSICIAN REVIEW  
Order Notes:  
EKG completed - at 6/29/2019 0829 by Martin, Megan R.N. and given to Hawkins David F. M.D. for review at 6/29/2019 0834.

HMC 28.

76. The EKG was completed at 08:29 and “given to Hawkins, David F. M.D. for review at 6/29/2019 0834,” HMC 28.

*Dr. Hawkins Documents but Fails to Treat the Stroke*

77. Michaela returned to Hamilton with classic and obvious signs of stroke. HMC 30-31.

78. At some point between 09:12 and 12:44, Emergency Room Physician David F. Hawkins examined Michaela. HMC 30-31.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244  
H&P  
Initial Provider Contact 6/29/2019 0912  
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

79. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.

H&P

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

Initial Provider Contact 6/28/2019 2338

HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX

nothing worsens Sx.

nothing improves Sx.

no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

80. Michaela generally appeared “unresponsive, uncooperative,” with “no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2.” HMC 31.

81. Michaela’s neurological condition was this: “extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs . . . Will not follow commands.” HMC 31.

**GENERAL APPEARANCE:** somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2

**VITALS: SEE NN,**

**PULSE OXIMETRY:** 97% on RA.

**EARS:** canals clear bilat, TMs clear, no discharge from ears.

**EYES:** PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

**NOSE:** no nasal discharge.

**MOUTH:** (-)decreased moisture. + GAG

**THROAT:** no tonsillar inflammation, no airway obstruction.

**NECK:** supple, no neck tenderness, (-)thyromegally.

**BACK:** (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

**CHEST WALL:** no chest tenderness.

**LUNGS:** no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

**HEART:** normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

**ABDOMEN:** normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

**EXTREMITIES:** good pulses in all extremities, no swelling/tenderness in the extremities, no edema. FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTURING

**SKIN:** warm, dry, good color, no rash.

**NEURO:** EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE

**ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS**

**MENTAL STATUS:** unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

82. Michaela's extremities were "flaccid" with "occ spastic tone in arms and legs as in posturing." HMC 31.

83. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

84. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including alcohol abuse, depression, drug abuse, eating disorder, and schizophrenia. HMC 31.

**DIFFERENTIAL Dx:**

**PSYCHIATRIC Dx:** adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.

**NEURO Dx:** CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

85. Dr. Hawkins's differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA: "CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor." HMC 31.

**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

86. Although he identified stroke (“CVA” and “TIA”) as a differential diagnosis, Dr. Hawkins did not order vascular imaging to confirm or rule out a stroke, and did not take any other action to treat the stroke.<sup>1</sup>

87. In fact, despite his differential diagnosis of a stroke, and despite Michaela’s deteriorated clinical presentation, Dr. Hawkins failed to order even a new CT scan of Michaela’s brain (which would have taken minutes to complete) and failed to obtain a new stroke score for Michaela.

*Dr. Johnson Also Fails to Identify the Stroke in the CT Scan*

88. At 09:15, Radiologist Kevin Johnson interpreted and submitted a final report on the same CT scan taken overnight. HMC 30.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

HMC 60.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 9:15A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 60.

89. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus

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<sup>1</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.



disease, or mastoid or middle-ear effusions. He also found that the gray-white differentiation was within normal limits. HMC 60.

90. Dr. Johnson's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. Dr. Johnson did not even mention the sign. HMC 60.

91. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. Dr. Johnson did not even mention the streak. HMC 60.

92. Instead, contrary to the plain images, Dr. Johnson *affirmatively* concluded that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat Michaela's Stroke for Hours*

93. At 10:00, RN Lindsey Andrews called the Georgia Poison Center regarding Michaela's symptoms. HMC 28.

94. The Poison Center recommended a chest x-ray, and a CT scan of the head: "the physician may consider doing a CT of the head to rule out something unrelated to the pepper spray incident." HMC 28.



Andrew s, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

95. At 10:08, Dr. Hawkins ordered a stat chest x-ray. HMC 15.

<b>Hamilton Medical Center</b> PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180 Radiology Services	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB: <input type="text"/>	<b>MR/RAD #:</b> 09199456/09199456 <b>ADMIT #:</b> 101737594 <b>HOSP/SVC:</b> EMR <b>ORDER DATE:</b> Jun 29 2019 10:08A <b>ROOM #:</b> ECD-RM2201 <b>REF #:</b> 3948717
<b>Ordering Dr:</b> DAVID MD HAWKINS <b>Attending Dr:</b> DAVID MD HAWKINS	

HMC 15.

96. But he did not order a CT scan.

97. At 10:31, Dr. Johnson read the chest x-ray recommended by the Poison Center and concluded it was a "normal exam." HMC 15, HMC 22.

**\*\*\*Final Report\*\*\***

**REASON FOR EXAM:** per GA Poison Center

**PROCEDURE:** DIA 1030 - **CHEST SINGLE VIEW** - Jun 29 2019 10:23AM

**RESULT:**  
Per Georgia Poison Center

**TECHNIQUE:** Single frontal view of the chest was obtained

**COMPARISON:** None

**FINDINGS:** The lungs are clear. The heart size is normal. The bones appear intact.

**IMPRESSION:**  
**Normal exam.**

KJ/dmc  
Job #12358370

HMC 15.

**INTERPRETED BY:** KEVIN JOHNSON MD on Jun 29 2019 10:31A  
**SIGNED BY:** KEVIN JOHNSON MD on Jun 29 2019 12:09P

HMC 15.

98. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter mental status after heavy physical activity.” HMC 23.

Order Type: Radiology				
Order Sub Type: MRI				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ?	Complete	
	06/29/19 11:22	HEAT EXPOS Stat		06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

99. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

100. At 12:45, Dr. Hawkins discussed Michaela's case with Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1245 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

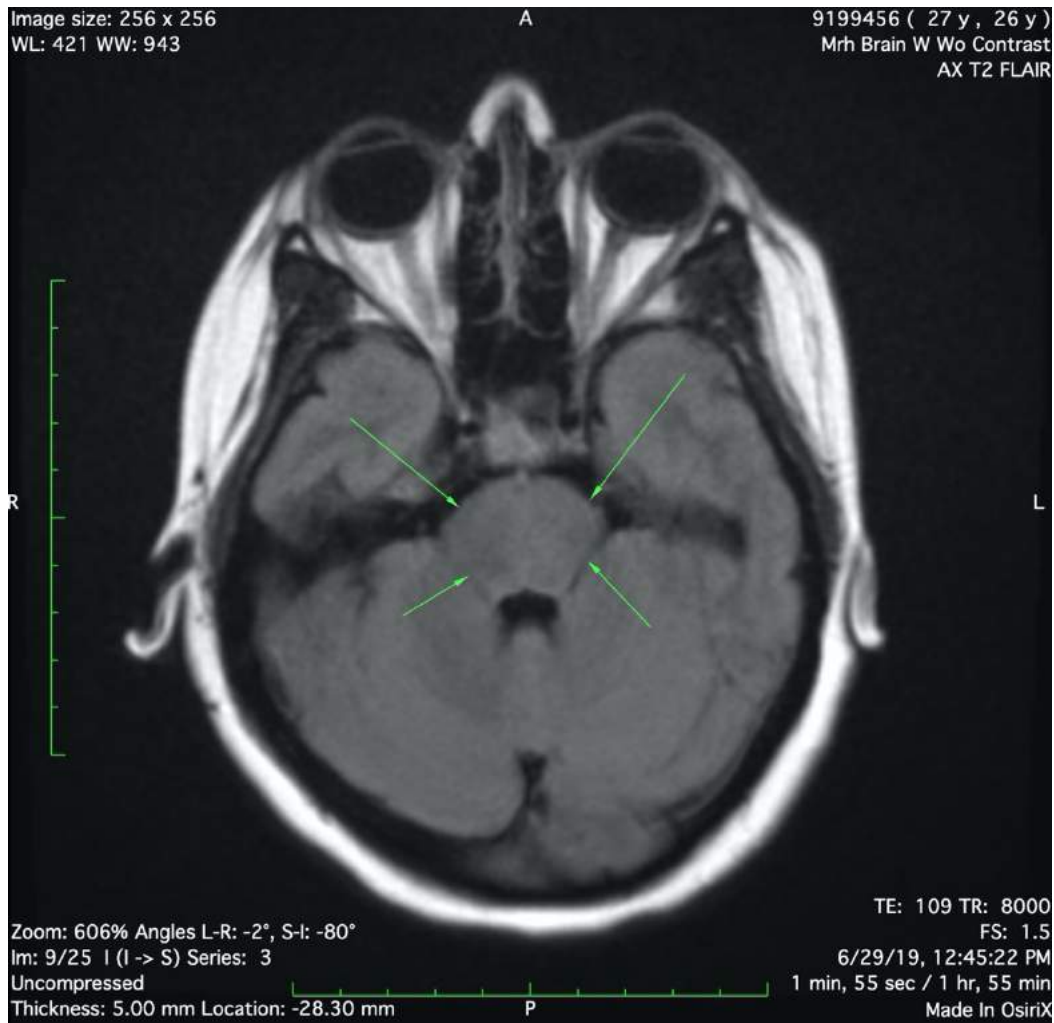
101. Dr. Glass agreed with administering the MRI, in order to distinguish "function from organ cause." HMC 32.

102. Dr. Glass also agreed to see Michaela in the ER for evaluation. HMC 32.

### *The MRI Confirms a Yet-Treatable Ischemic Stroke*

103. At 12:45, Michaela underwent the brain MRI, for "altered mental status after physical activity." HMC 16.

104. Although the MRI's DWI sequence showed that Michaela's brainstem was ischemic (thus confirming she was having a stroke), the MRI's FLAIR sequence remained normal—that is, Michaela's brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.



*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

105. At 12:54, Dr. Hawkins admitted Michaela to the hospital floor for observation. HMC 32.
106. At that time, Michaela continued to exhibit classic stroke signs and symptoms. See HMC 32.
107. Michaela, for example, had a decreased level of consciousness, had a bizarre affect with no interaction, showed general weakness, was not speaking, was tearful, was hyperventilating, had spasticity to her extremities, had no laterizing signs, and was urinating on herself. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

108. Despite her clinical presentation, Dr. Hawkins admitted Michaela for “observation,” noting that the CT scan of “last night” was negative. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

109. The reason for her admission was; “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

110. At 13:29, Dr. Johnson interpreted Michaela’s MRI. At 13:30, Dr. Johnson discussed his findings with Dr. Hawkins. HMC 16.

IMPRESSION:  
NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.  
No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

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**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P**

HMC 16.

111. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

112. The MRI also showed: “gray-white differential within normal limits” and “normal flow voids are maintained within the major intracranial vascular pedicles,” and “no sites of pathologic contrast enhancement.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.



113. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.

114. Dr. Johnson failed to include the brainstem ischemia visible in the DWI sequence. HMC 16. (In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.)

115. Instead, contrary to the DWI imaging, Dr. Johnson concluded that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

**COMPARISON: CT head 6/28/2019; no prior MRI**

**FINDINGS:** The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

**IMPRESSION:**

**NOTE:** Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

**No definitive acute abnormalities are identified on this motion-compromised examination.**

HMC 16.

116. In addition, Dr. Johnson again reviewed Michaela’s CT scan, for “comparison” purposes. Dr. Johnson thus had a second opportunity to interpret the CT scan. HMC 16.

117. Dr. Johnson failed again to catch and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to catch and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a “normal exam.” See HMC 16, HMC 61.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat the Stroke for Additional Hours*



118. At 14:05, RN Gabe Herman performed a neuro check, including a Glasgow Common Scale (GCS) assessment. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534  
 Nurse Note:  
 NEURO CHECK - 6/29/2019 1405  
 EYE OPENING: eyes open to verbal stimuli 3  
 VERBAL RESPONSE: verbal incomprehensible sounds 2,  
 MOTOR RESPONSE: motor flexion withdrawal 4  
 GLASCOW COMA TOTAL 7

119. The GCS is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients.

120. The Scale assesses the patient according to three aspects of responsiveness: eye-opening, motor, and verbal responses.

**TABLE 38-2**  
**Glasgow Coma Scale**

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

121. At 14:18, Internist Ananka Myrie called Dr. Hawkins. Dr. Myrie informed him that she wanted neurology and psychiatry evaluations of Michaela before admitting her. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
 Results Reviewed by ED Physician:  
 MRH BRAIN W/WO CONTRAST  
 CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

122. Between 14:17 and 14:22, Dr. Hawkins called Dr. Glass again, to inform him of the negative MRI findings. HMC 32.

123. Dr. Hawkins and Dr. Glass discussed the facts that Michaela still appeared “stuporous,” interacted only “intermittently” and “primatively” with her parents, and may have suffered an “atypical seizure.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422

MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

124. Dr. Glass “did not suggest medication prior to his exam.” HMC 32.

125. At 14:51, Dr. Hawkins turned over Michaela’s care to Emergency Physician Jonathan Thompson. HMC 32.

126. At that time, the emergency department continued waiting for Dr. Glass’s evaluation. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451

Results Reviewed by ED Physician:

MRH BRAIN W/WO CONTRAST

LACTATE

MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Despite Examining Michaela, Dr. Glass Still  
Does Not Diagnose and Treat the Stroke*

127. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

128. At that time, Michaela continued to exhibit signs and symptoms of stroke:

- “Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—”
- “She can at times open her eyes and close them to command and does appear to look at me at times.”
- “At times she appears to have a deconjugate gaze but at other times not.”
- “At times she will have extensor posturing type movements of the upper extremities.”

- “She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently [sic].”
- “She has bilateral Babinski. She has bilateral Hoffmann’s in her hands.”

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann's in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

129. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” and despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with pepper spray” and then went to bed “doing fairly well,” Dr. Glass did not turn his attention to diagnosis of stroke, despite Michaela’s presentation. *See HMC 6-7.*

130. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass wondered if "a hypoxic event" or "unlikely" seizures might be the cause of her condition.

- "I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well . . ."
- "Her MRI scan did not show a structural abnormality to account for the symptoms."
- "I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here."
- "I will get an emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy."

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.



1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

131. As a result, despite Michaela's clinical presentation, Dr. Glass failed to review the CT scan or MRI for himself, failed to order a new CT scan or vascular imaging, and failed order or provide any treatment for Michaela's BAO.

132. Instead, Dr. Glass noted that the "CTA scan of the brain was normal," the "CT scan of the brain did not show any acute changes," and the "MRI scan of the brain with and without contrast showed significant motion artifact but was normal." HMC 3, HMC 6.

**Laboratories and Diagnostics:**

CT scan of the brain was normal.

MRI scan of the brain with and without contrast showed significant motion artifact but was normal.

HMC 3.

CT scan of the brain did not show any acute changes

MRI scan of the brain with and without contrast showed motion artifact but no significant abnormality

Ammonia, urine drug screen, TSH and EtOH were all okay

HMC 6.

*Dr. Glass Signs Off on Transfer to Erlanger for a  
Neuro Evaluation*

133. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time.” HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

134. Dr. Glass agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

135. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.



136. At 17:35, Michaela was transferred to Erlanger by EMS. The reason for the transfer was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.

**Appropriateness**

— Appropriate transport service equipment and personnel are requested to provide appropriate level of care  
 — Basic: \_\_\_ Advanced:  Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_  
 Agency: Hamilton EMS  
 — The receiving facility has available space for the patient.  
 — Transferring physician has discussed patient status with accepting physician — *Auto accept thru transfer center*  
 — the receiving facility has agreed to accept the patient and provided adequate treatment  
 Facility: Erlanger Time: \_\_\_\_\_  
 Name of Physician accepting patient: Ben Smith Phone: \_\_\_\_\_  
 Approved by: \_\_\_\_\_ Title: \_\_\_\_\_  
 — Reason for Transfer: altered mental status  
 — Risk of Transfer: transport, anxiety compromise  
 — Benefits to Transfer: Neuro evaluation  
 — It is medically necessary to transport the patient by ambulance  
 Signature of transferring physician: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Transferring facility: Hamilton Fax: \_\_\_\_\_  
 Name of Patient's primary care physician: none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother  
 Refusal to transfer signature/relationship: \_\_\_\_\_  
 Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

— Report given to: Owens RN By: Debi Adams RN Time: 1702  
 — Police notified (if applicable). Agency: \_\_\_\_\_  
 — Family notified. Name: \_\_\_\_\_  
 — Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS \_\_\_ documented. Disposition of valuables: \_\_\_\_\_  
 Signature of RN: Debi Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

137. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp Financial Class		
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger After an MRA Reveals a Brainstem and Right-Side Stroke*

138. At 18:39, Michaela arrived at Erlanger emergency department by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

139. At 01:10 overnight, June 30, 2019, Michaela was transferred from the ER to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

140. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.

CONSULTATION	
<b>Patients Name:</b> SMITH, MICHAELA E	
<b>Hospital Number:</b> 000101737594	<b>Date of Birth:</b>
<b>Room Number:</b> ECD RM	<b>Patient Status:</b> O
<b>To Attending Physician:</b> David F. Hawkins, MD	<b>Consulting Physician:</b> Jeffrey Glass, MD
<b>Dictated by:</b> Jeffrey Glass, MD	
<b>Date dictated:</b> 06/30/2019 12:02 P	
<b>Date transcribed:</b> 06/30/2019 12:39 P jc2	
Signed by Glass M.D., Jeffrey on 01-Jul-2019 17:45:02 -04:00	

HMC 5.

141. Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.”

HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

142. At Erlanger, Michaela’s condition “progressively worsened.”

143. On July 1, 2019, Michaela was placed on a ventilator and a feeding tube.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

144. On the afternoon of July 2, 2019, a brain CT scan produced an “urgent critical result,” including “a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation.”

BEH 310.

CT brain without IV contrast		Resulted: 07/02/19 1616, Result status: Final result
Ordering provider: William Albert Shelton, MD 07/02/19 1516	Order status: Completed	
Resulted by: Andrew J Hill, MD	Filed by: Interface, Radiology/Cardiology Results In 07/02/19 1618	
Performed: 07/02/19 1527 - 07/02/19 1539	Accession number: E1142983	
Resulting lab: CARESTREAM PACS/PS360		
Narrative:		
<b>**URGENT CRITICAL RESULT **</b>		
This report was faxed to BEH NNICU at 1608 hours on 07/02/2019 -- H. Andrus/Editor.		
HISTORY: Altered mental status.		
TECHNIQUE: <b>Noncontrast brain CT.</b> Automated dose control used during this exam.		
FINDINGS		
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.		
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.		
No evidence of acute intracranial hemorrhage or extra-axial collection. No midline shift.		
Mucous retention cyst left maxillary sinus. Orbits are intact. The skull is intact.		
Impression:		
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.		
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.		
Findings given to Dr. Tom Devlin at 1612 on 07/02/2019 by Dr. Andrew Hill.		



BEH 310.

145. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

146. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

Performed: 07/02/19 1927 - 07/02/19 2050  
Resulting lab: CARESTREAM PACS/PS360  
Narrative:

Accession number: E1143287

**\*\*URGENT UNEXPECTED FINDING\*\***

This report was faxed to BEH NNICU at 2239 hours on 7/2/2019 and received by Liz Hughes, RN, at 2242 hours on 7/2/2019 -- G. VanOstrand/Editor.

HISTORY: Stroke, follow up

EXAMINATION: MRI BRAIN WITHOUT CONTRAST, MR ANGIOGRAM NECK WITH AND WITHOUT CONTRAST, MR ANGIOGRAM BRAIN WITHOUT CONTRAST

TECHNIQUE: Multiecho multisequence imaging of the head was performed without intravenous contrast administration.

3-D time-of-flight MRA of the head was performed without intravenous contrast. MIP reconstructions of the circle of Willis were generated.

MRA of the neck was performed without and with intravenous contrast. MIP reconstructions of neck vessels were generated. 20 cc of MultiHance was administered intravenously.

Where applicable, stenosis measurements are performed per NASCET criteria; with mild (<50%), moderate (50-70%), severe (70-99%).

COMPARISON: CT head, same day.

BEH 319.

147. The studies were tagged as an "urgent unexpected finding." BEH 319.

148. The findings of the head MRI included:

- A large acute infarct involving the right cerebellar hemisphere, and brain stem
- Diffuse cerebral edema.
- Absent ICA flow voids bilaterally
- Basilar-artery flow void
- A mass effect on the brainstem
- Cerebellar tonsillar herniation at least 2 cm below the foramen magnum
- Compression of the cervicomedullary junction

HMC 319.

MRI Head:

A large acute infarct is seen involving the right cerebellar hemisphere, and brainstem. Diffuse cerebral edema is present. There is subtle increased T2 signal involving the cerebral cortex bilaterally. Bilateral thalamic acute lacunar infarcts.

Absent ICA flow voids bilaterally. Basilar artery flow void is present.

There is mass effect on the brainstem. Cerebellar tonsillar herniation noted at least 2 cm below the foramen magnum. There is compression of the cervicomedullary junction. Subcentimeter pineal cyst noted.

HMC 319.

149. The findings of the head MRA included: “No evidence of flow-related enhancement noted in the intracranial vessels.” BEH 319.

150. The findings of the neck MRA included “diffuse attenuated caliber of vertebral arteries noted on both sides.” BEH 319.

MRA head: No evidence of flow-related enhancement noted in the intracranial vessels.

MRA NECK: No evidence of flow-limiting stenosis or occlusion of cervical carotid or vertebral arteries noted. No dissection identified. However, there is diffuse attenuated caliber of vertebral arteries noted on both sides.

HMC 319.

151. In summary, the findings of the three studies were: “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the

brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels

BEH 319.

152. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

153. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

154. Michaela Smith was 26 years old. HMC 67, HMC 44.



Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: Smith, Michaela E  
Pt Acct: 101737552

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ED RECORD

Patient: Smith, Michaela E Age/DOB: \_\_\_\_\_ Sex: F SS #: \_\_\_\_\_  
Age: 26yr Med Rcrd: 9199456

Mailing Address: 1452 Piedmont Dr Arrival (HIS): 6/28/2019 2243  
Mailing Other: \_\_\_\_\_ Dispo Summary Printed 6/29/2019 0215  
City: Dalton ED Record Printed: \_\_\_\_\_  
State: GA Zip: 30721 Initial Provider Contact: 6/28/2019 2327  
Mode of Arrival: Car

MD ED: Holsonback, Shawn D.O. RN Eval: Stacey S. R.N.  
MLP: \_\_\_\_\_ PMD: Duckett, Jennifer P.A.

HMC 67.

# APPENDIX

# CT Scan Imaging



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y, 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 339% Angles L-R: 0°, S-I: -84°

Im: 7/29 (I -> S) Series: 3

Uncompressed

Thickness: 5.00 mm Location: -122.30 mm

P

6/28/19, 11:54:01 PM

4 sec / 6 hr, 14 min

Made In OsiriX

Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 374% Angles L-R: 0°, S-I: -84°  
Im: 8/29 | (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 fr, 14 min  
Made In OsiriX

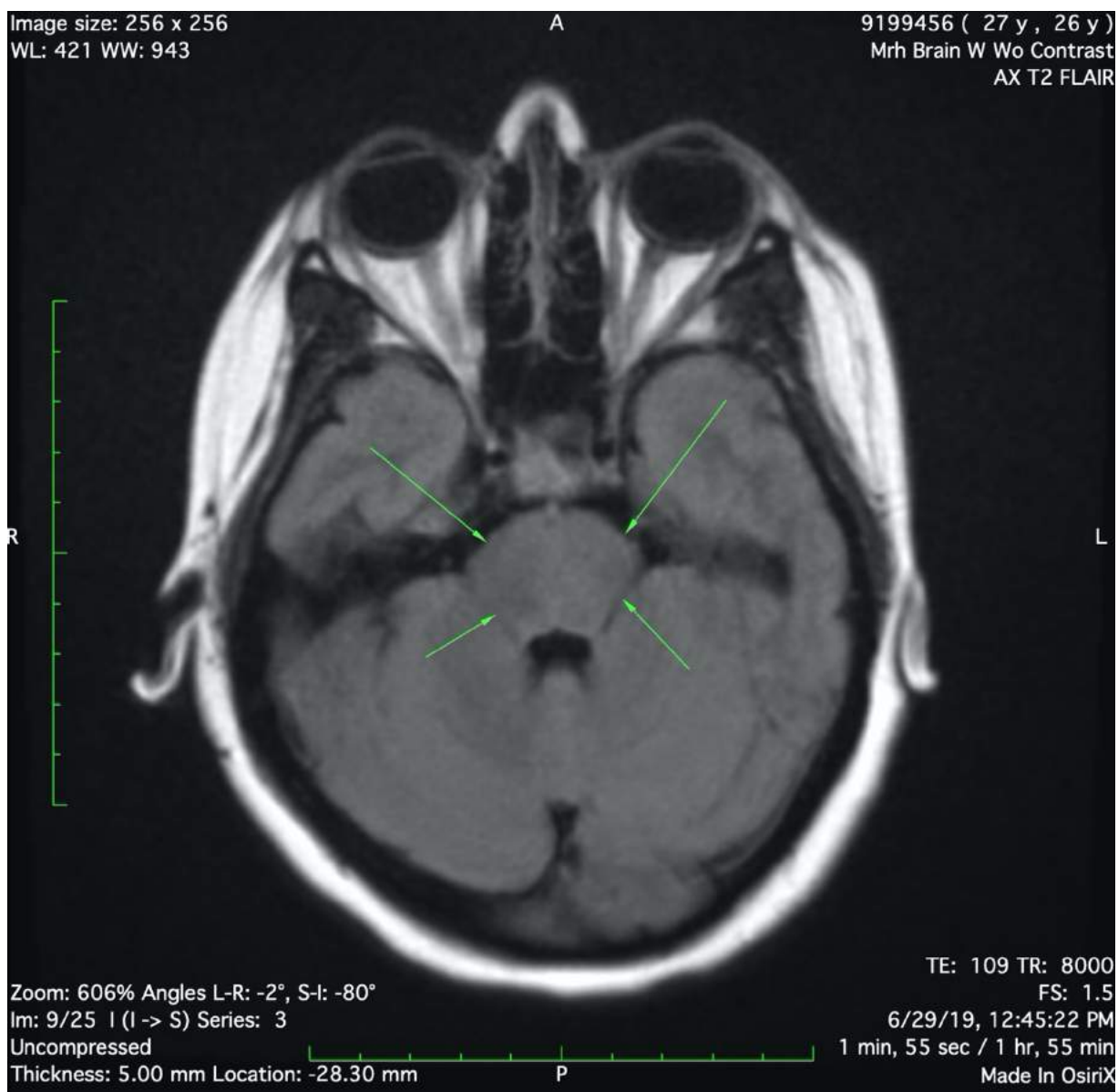
Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



# MRI Imaging





**AFFIDAVIT OF ELAD LEVY, M.D., REGARDING  
MICHAELA ELIZABETH SMITH**

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Elad I. Levy, M.D., who after first being duly sworn, states as follows.

**Introduction**

1. This affidavit addresses medical negligence that allegedly occurred during Michaela Smith's visit to Hamilton Medical Center ("Hamilton") in Dalton, Georgia, on June 28 and 29, 2019.
2. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.
3. This affidavit addresses a specific question that Plaintiffs' counsel have asked me to address: causation. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues the Defense might raise or that otherwise might arise as the case unfolds.
4. Plaintiffs' counsel drafted this affidavit after consulting with me, and I reviewed the draft and edited it to make sure it correctly states my views.
5. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details.
6. I hold all the opinions expressed below to a reasonable degree of medical certainty — that is, more likely than not. If additional information becomes available later, my views may change.
7. I understand that Plaintiffs' counsel will provide this affidavit to the Defendants, and that their insurance company will hire lawyers and medical experts to review this case and to review this affidavit. If anyone on the Defense believes that I have not been given, or have overlooked or misconstrued, any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiffs' counsel. The Defense need not wait to take my deposition to

communicate with me. I will consider any information the Defense wishes to bring to my attention, and, if appropriate, I will provide a supplemental affidavit.

### **Evidence Considered**

8. I have reviewed medical records from Hamilton pertaining to Michaela Smith's visits on June 28 and 29, 2019. I have also reviewed medical records from Baroness Erlanger Hospital ("Erlanger"), the facility where Michaela was hospitalized and died, after her discharge from Hamilton.

### **Principal Opinions**

9. My principal opinions are summarized here. In deposition or trial testimony, I may elaborate upon these principal opinions, and in doing so, I may offer related, subsidiary, or incidental opinions.

10. At 23:54 on June 28, 2019, during her first visit to Hamilton, Michaela underwent a non-contrast head CT scan. At 0:18 on June 29, 2019, Radiologist Michael Cooney read and reported on the CT scan.

11. Dr. Cooney did not identify or report the hyperdensity of Michaela's thrombosed basilar artery visible in the CT scan imaging.

12. At 2:27, Michaela was discharged from Hamilton looking neurologically normal.

13. In light of those facts and of her age and medical history, Michaela was a candidate for mechanical thrombectomy, should her condition have worsened. Moreover, at minimum, ICU admission and medical therapy must be initiated with a basilar thrombus. Further, imaging such as CTA or MRA should have been done immediately.

14. At that time, moreover, mechanical thrombectomy likely would have led to a full and normal recovery.

15. At 9:15 on June 29, 2019, during Michaela's second visit to Hamilton, Radiologist Kevin Johnson reviewed and submitted a final report on the same CT scan.

16. Dr. Johnson also did not identify or report the hyperdensity of Michaela's thrombosed basilar artery.
17. At that time, in light of her age and medical history, Michaela was a candidate for mechanical thrombectomy.
18. At that time, moreover, mechanical thrombectomy likely would have led to a functional recovery.
19. At 12:45 on June 29, 2019, Michaela's brain MRI showed that her brainstem, although ischemic, had not yet suffered permanent stroke changes.
20. Specifically, the FLAIR sequence of the MRI demonstrated that Michaela's brainstem had not yet suffered permanent stroke changes and generally remained normal, despite the occlusion in her basilar artery.
21. In light of those findings and of Michaela's age and medical history, she remained at that time a candidate for mechanical thrombectomy.
22. At that time, moreover, mechanical thrombectomy likely would have led to a functional recovery.
23. In addition, in light of those findings and of Michaela's age and medical history, mechanical thrombectomy likely would have led to a functional recovery had it been performed that day, before or upon Michaela's transfer to Erlanger.
24. Thus, any failure that delayed the diagnosis and treatment of Michaela's stroke while she was at Hamilton caused her pain and suffering, injury, and death.

### **Qualifications**

25. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based on my own personal knowledge and belief.
26. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.
27. My Curriculum Vita, which is attached as Exhibit A, provides further detail about my qualifications. I incorporate and rely on that information here.



28. The events at issue here occurred in June 2019.
29. I am qualified to provide expert testimony pursuant to OCGA 24-7-702.
- a. In June 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of New York to practice as a physician. That is where I was practicing in June 2019.

- b. In June 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to.

I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to June 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am a physician specializing neurological surgery, cerebrovascular disease, cranial surgery, and radiology, in the settings of hospitals and other long-term care facilities, and for many years I have had great familiarity with the causation issues on which I offer opinions here.

### **Attached Documents**

30. The documents identified below are attached to this affidavit largely for the benefit of the insurance adjustors responsible for evaluating this case on behalf of the Defendants, and for the lawyers provided by the insurance company.

31. Attached to this affidavit is a document that recites medical principles that apply here. The Defendants themselves will not need that recitation of basic medical information. Plaintiff's counsel created the medical-principles document for the benefit of the Defense. I have reviewed the document, and the principles stated there are correctly stated and apply here.

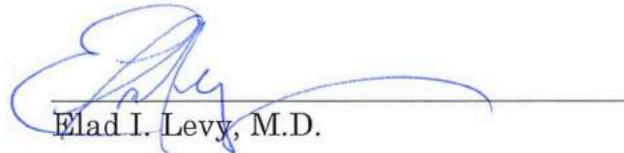
32. Also attached to this affidavit is a chronology of facts pertaining to this case. In forming my substantive view of the case, I have relied on the medical records

themselves, not the chronology. The chronology, however, provides a useful reference for relevant facts contained in the records in less-organized fashion. Plaintiff's counsel created the chronology. I have not edited it.

### Supporting Literature

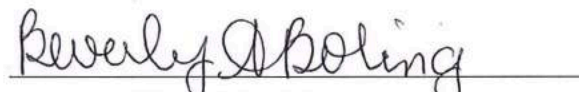
33. The general points discussed above are elementary, are likely well known to the Defendants, and should not require a literature search. Insofar as any Defendant consulted or should have consulted reliable authorities on these points in treating Michaela Smith, the literature cited in the attached medical-principles document represents such authorities, which here may also prove helpful to adjustors and lawyers in their evaluation of this case.

BEVERLY A. BOLING  
Notary Public, State of New York  
No. 01BO4919321  
Qualified in Erie County  
Commission Expires February 1, 2023

  
Elad I. Levy, M.D.

SWORN TO AND SUBSCRIBED before me

this 14<sup>th</sup> day of April, 2021.

  
NOTARY PUBLIC

My Commission Expires: 2/1/22

## CURRICULUM VITAE

### BIOGRAPHICAL

<b>Name:</b>	<b>Elad I. Levy, MD, MBA, FACS, FAHA, FAANS</b>	<b>Birth Date:</b>	8/29/1972
		<b>Birth Place:</b>	Tiberias, Israel
		<b>Citizenship:</b>	United States
<b>Home Address:</b>	888 LeBrun Road Amherst, NY 14226		
<b>Home Phone:</b>	(716) 833-8111		
<b>Office Address:</b>	UB Neurosurgery Inc. 40 George Karl Blvd Suite 200 Williamsville NY 14221	<b>Work Phone:</b>	(716) 218-1000
		<b>Work Fax:</b>	(716) 218-1010
		<b>Email:</b>	elevy@ubns.com

### ACADEMIC APPOINTMENTS:

3/17/20 – Present	Distinguished Professor State University of New York At Buffalo
7/01/13 – Present	Professor and Chair of Neurological Surgery Neurosurgery Department State University of New York at Buffalo
07/01/10 - Present	Professor of Neurosurgery Professor of Radiology Neurosurgery Department State University of New York at Buffalo
7/1/04 – 2010	Associate Professor of Neurosurgery (tenure track) Associate Professor of Radiology Neurosurgery Department State University of New York at Buffalo

### EDUCATION AND TRAINING

#### UNDERGRADUATE:

1989-1993	Dartmouth College Hanover, NH	Molecular Biology/Biochemistry
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**GRADUATE:**

1993-1997      George Washington University      MD  
                    School of Medicine  
                    Washington, DC

**POST-GRADUATE:**

1997-1998      University of Pittsburgh      Surgical Internship  
                    Pittsburgh, PA

1998-2004      University of Pittsburgh      Neurosurgical Residency  
                    Pittsburgh, PA

2001-2003      State University of New York at Buffalo      Fellowship in Endovascular Surgery  
                    Buffalo, NY

2011-2013      Northeastern University      MBA  
                    Boston, MA

**APPOINTMENTS AND POSITIONS****NATIONAL COMMITTEES / ASSOCIATIONS:**

2005 – 2008      Fellowship Chair for Congress of Neurological Surgeons

2007              Cerebrovascular Section Representative for the 2007 Congress of Neurological Surgeons (CNS) Annual Meeting Scientific Planning Committee

2007 - 2008      Nominated for Member-at-Large of the 2007 -2008 Congress of Neurological Surgeons (CNS) Executive Committee

2007 – Present      Cerebrovascular Complications Conference Co-Chair, Cerebrovascular Section of the American Association of Neurological Surgeons / Congress of Neurological Surgeons

2007– Present      Endovascular Neurosurgery Research Group (ENRG) Board member and Co-Founder

2007 - 2008      Fellowship Committee Chair, Congress of Neurological Surgeons (CNS)

2008              American Association of Neurological Surgeons / Congress of Neurological Surgeons (AANS/CNS) Joint Guidelines Committee member

2008              Congress of Neurological Surgeons (CNS) Ad Hoc Committee on Best Practices and Ethical Standards

2008 – Present      American Medical Association (AMA) member



2008 Congress of Neurological Surgeons (CNS) Scientific Program Strategic Planning/Oversight Committee

2008 Congress of Neurological Surgeons (CNS) Neurosurgical Forum Committee

2008 Congress of Neurological Surgeons (CNS) Cerebrovascular Section Liaison

2008 Congress of Neurological Surgeons (CNS) Abstract Selection Committee for Cerebrovascular Section

2008 Congress of Neurological Surgeons (CNS) 2009 Practical Course Chair

2008 – Present American Academy of Neurological Surgery (AANS) member

2009 – Present Medical Society of the State of New York

2009 – Present American Association of Neurological Surgeons (AANS) Mentor

2009 – Present Kaleida Health Medical and Dental Staff Ad Hoc Committee

2009 – Present Society of Neurointerventional Surgery (SNIS) Membership-Senior Member of the Society

2009 Oral Board Preparatory Course Instructor

2009 Consultant for the Physicians' Council for Responsible Reform

2009 Congress of Neurological Surgeons Chair (CNS) for Neurowiki

2010-2011 Congress of Neurological Surgeons (CNS) Ex-Officio Member of the Executive Committee

2010-2011 Congress of Neurological Surgeons (CNS) Chair of the Bylaws Committee

2010-2011 Congress of Neurological Surgeons (CNS) Vice Chair of the CNS University Committee

2010-2013 American Association of Neurological Surgeons (AANS) Information Technology Committee member

2012 – 2015 American Association of Neurological Surgeons (AANS) Development Committee

2012 Congress of Neurological Surgeons (CNS) Public Relations Subcommittee

2012 – 2013 Congress of Neurological Surgeons (CNS) Vice Chair of the Scientific Planning Committee (SPC)

2012 Congress of Neurological Surgeons (CNS) Ambassador Program Committee Member

2012 Congress of Neurological Surgeons (CNS) Industry Allies Council (IAC) Committee Member

- 2012 New York State Department of Health and the American Stroke Association, Planning Committee Member for the 5<sup>th</sup> Annual New York State Stroke Conference On June 6, 2012 in Rochester and Tarrytown, NY
- 2013 Nomination to Serve on American Heart Association/American Stroke Association (AHA/ASA) Writing Group; Inclusion/Exclusion Criteria for IVtPA
- 2013 - 2014 Medical Society of the State of Pennsylvania
- 2013 - 2014 Medical Society of Erie County
- 2013 - 2014 Congress of Neurological Surgeons (CNS) Chair of the Scientific Planning Committee (SPC)
- 2013 Selected by the American Heart Association (AHA) Manuscript Oversight Committee (MOC) to serve on the writing group for a scientific statement entitled “Scientific Rationale for the Inclusion and Exclusion Criteria for Intravenous Thrombolysis”
- 2013 – 2015 Served on the Neurosurgery Research and Education Foundation Committee (NREF) for AANS
- 2014 – 2015 Congress of Neurological Surgeons (CNS) Chair of the Annual Meeting Committee
- 2014 – 2015 Congress of Neurological Surgeons (CNS) Senior Advisor, Case Based Learning
- 2014 Journal of Neurotrauma – Ad Hoc Reviewer
- 2014 – 2015 Congress of Neurological Surgeons (CNS) Education Division - Purpose of this Division is to serve as an advisory board for CNS educational initiatives, to oversee CME compliance and identify new opportunities for delivering effective and innovative education to CNS members
- 2015 The Lancet Medical Journal– Ad Hoc Reviewer
- 2015 The Lancet Neurology Medical Journal – Ad Hoc Reviewer
- 2015 Committee Member of The Neurosurgery Research and Education Foundation (NREF) created by the American Association of Neurological Surgeons (AANS)
- 2015 Committee Member of the Congress of Neurological Surgeons (CNS) 2018 Meeting Site
- 2016 - 2017 Chair Pub Committee for CNS
- 2016 - 2017 Chair Ad Hoc Technology Committee for CNS
- 2017-2020 Appointed Member of the Ethics Committee for American Association of Neurological Surgeons (AANS) 3 year term, commencing April 2017 and ending with the Annual Meeting 2020
- 2017 Editor of the *Congress Quarterly*

2017 Ad Hoc Reviewer for the *Journal of Neurosurgery*

2017-2018 Congress of Neurological Surgeons Executive Committee as Ex-Officio

2017 – Present Director, American Board of Neurological Surgeons, for a 6 year term

2018 – 2021 Appointed Secretary to the Congress of Neurological Surgeons (CNS) Executive Committee

2018 – 2020 Appointed to the 2018 American Association of Neurological Surgeons (AANS) Ethics Committee – 2 year term

2018-2021 Chair of the CNS Foundation

**PROFESSIONAL APPOINTMENTS:**

2004 OR Committee, Millard Fillmore Hospital

2005 Faculty Practice Management Planning Governing Board Member, State University of New York at Buffalo

2005 Faculty Practice Management Planning Audit Committee, State University of New York at Buffalo

2006 – Present Director, Stroke Research, Department of Neurosurgery, State University of New York at Buffalo

2006 – Present Co-Director Cerebrovascular Surgery, Department of Neurosurgery, State University of New York at Buffalo

2006 – Present Assistant Director: Resident Clinical Education, Department of Neurosurgery, State University of New York at Buffalo

2006 – 2010 Secretary, University at Buffalo Neurosurgery, Inc.

2006 – 2013 Director of Endovascular Fellowship Program, Department of Neurosurgery, State University of New York at Buffalo

2006 – Present Co-director of Kaleida Health Stroke Center

2006 – Present Director of Endovascular Stroke Treatment and Research, Department of Neurosurgery, State University of New York at Buffalo

2006 – Present Director of the Toshiba Neuroendovascular Cath Lab, Department of Neurosurgery, State University of New York at Buffalo

2009 – 2010 Appointed to Health Sciences Institutional Review Board (HSIRB)

2010 Served on Codman’s Neurovascular Acute Ischemic Stroke Study Advisory Board

2010 – 2012 Reappointment to the Health Sciences Institutional Review Board (IRB)

2011 – 2014 2013	Service to the University ad hoc Committee for unqualified (tenure promotions) Kaleida Utilization Management Physician Leader
2014	Invited as Spring Guest Examiner for the Oral Examinations for the American Board of Neurosurgeons (ABNS) May 8 – 9, 2014, Houston, Texas
2016	Invited as Spring Guest Examiner for the Oral Examinations for the American Board Of Neurosurgeons (ABNS) April 17-20, 2016, Houston, Texas
2017	Invied as Spring Guest Examiner for the Oral Examinations for the American Board of Neurosurgeons (ABNS) May 7-10, 2017, Houston Texas
2017	Director, American Board of Neurological Surgery
2017-2018	Congress of Neurological Surgeons Executive Committee as Ex-Officio

**NON-ACADEMIC APPOINTMENTS:**

2001-2003	University of Buffalo, SUNY Buffalo, NY	Visiting Fellow
2009	Scientific Staff Buffalo Police Department	
2010 – Present	Founder and President of “Program for Understanding Childhood Concussion & Stroke” (PUCCS) As of 2013 raised 300k for this charity	
2013-2014	NFL Unaffiliated Neurotrauma Consultant (Buffalo Bills Home Games)	
2014-2015	NFL Unaffiliated Neurotrauma Consultant (Buffalo Bills Home Games)	

**CERTIFICATION AND LICENSURE**

**SPECIALTY CERTIFICATION:**

***-Status: Board Certified  
Diplomate of the American Board of Neurological Surgery***

Passed Oral Board Examination	May 23, 2007
American Board of Neurological Surgery (written) (Passed 95 <sup>th</sup> percentile)	2001

**MEDICAL/PROFESSIONAL LICENSURE**

Commonwealth of Pennsylvania	MD-068575L	8/4/99 – Present
State of New York	220891-1	8/1/01- Present
Commonwealth of Massachusetts	242239	1/6/10- Present

Curriculum Vitae 01-05-21	Elad Levy, MD
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## **HOSPITAL AFFILIATIONS:**

### **Kaleida Health**

**Buffalo General Hospital**, Buffalo NY

Staff Status: Attending

Dates: 07/01/04 – Present

### **Kaleida Health**

**DeGraff Memorial Hospital**, North Tonawanda NY

Staff Status: Attending

Dates: 07/01/04 - Present

### **Kaleida Health**

**Millard Fillmore Suburban Hospital**, Williamsville NY

Staff Status: Attending

Dates: 7/1/04 – Present

### **Kaleida Health**

**Women & Children's Hospital of Buffalo**, Buffalo NY

Staff Status: Attending

Dates: 07/1/04 – Present

**Erie County Medical Center**, Buffalo, NY

Staff Status: Attending

Dates: 08/01/18- Present

**Strong Health, University of Rochester Medical Center**, Rochester NY

Staff Status: Attending

Dates: 12/05 – 04/13

**Olean General Hospital**, Olean NY

Staff Status: Associate

Dates: 09/27/06 – 8/30/2013

**Wyoming County Community Hospital**, Warsaw, NY

Staff Status: Telemedicine Privileges

Dates: 06/01/07 – 05/07/17

**United Memorial Medical Center**, Batavia NY

Staff Status: Provisional Telemedicine

Dates: 03/23/07 – 06/30/16

**St. Joseph Hospital**, Cheektowaga, NY

Staff Status: Courtesy

Dates: 09/22/16 – Present

**Sisters of Charity Hospital**, Buffalo NY

Staff Status: Courtesy

Dates: 09/22/16 – Present

**Mercy Hospital of Buffalo**, Buffalo, NY

Staff Status: Active

Dates: 09/22/16 – Present

**Kenmore Mercy Hospital**, Kenmore NY

Staff Status: Active

Dates: 09/22/16 – Present

**Bertrand Chaffee Hospital**, Springville NY

Staff Status: Consulting

Dates: 08/26/08 – 07-26-16

**Roswell Park Cancer Institute**, Buffalo NY

Staff Status: Consulting

Dates: 08/27/2017 – Present

**Niagara Falls Memorial Medical Center**, Niagara Falls, NY

Staff Status: Consulting

Dates: 07/15/19 - Present

**MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES**

1999 – Present	Member of American Association of Neurological Surgeons (AANS)
2006 – Present	Member of Congress of Neurological Surgeons (CNS)
2007 – Present	Ex officio member, Executive Council, AANS/CNS Cerebrovascular Section
2008 – Present	Fellow of the American College of Surgeons (FACS)
2009 - Present	Fellow of the American Heart Association/American Stroke Association (FAHA)
2010 - Present	Congress of Neurological Surgeons (CNS), Compliance & Ethics Committee Chair
2012 – Present	Ex-Officio and University Chair of Congress of Neurological Surgeons (CNS)
2012 – 2013	Member of the Information Technology Committee for American Association of Neurological Surgeons (AANS)
2012 – 2015	Appointment to the Development Committee for American Association of Neurological Surgeons (AANS)
2012- Present	Vice Chair Scientific Planning Committee CV Program for Congress of Neurological Surgeons (CNS)
2015-Present	Elected Member into the Society of Neurological Surgeons “The Senior Society” (SNS). Neurosurgery’s oldest professional society, to which membership is limited to only 200 active members.

- 2014 Chairman Scientific Planning Committee Program for Congress of Neurological Surgeons (CNS)
- 2015 Annual Meeting Chairman for Congress of Neurological Surgeons (CNS)
- 2017-2018 Congress of Neurological Surgeons Executive Committee as Ex-Officio
- 2017-2018 Chairman Congress of Neurological Surgeons (CNS) Development Committee

### HONORS/AWARDS

- 2021 March 2021, Recognized as one of NY Top Doctors by NY Top Docs – Doctors approved through a review process that are cleared as being among the best in the state,
- 2021 January 2021, Buffalo Spree Magazine “Top Doctors” Award recognized by peers as one of the Top Doctors in the healthcare field
- 2020 January 2020, Buffalo Spree Magazine “Top Doctors” Award recognized by peers as one of the Top Doctors in the healthcare field
- 2019 Chosen for Marquis “Who’s Who in the World” - A distinction reserved for less than 3% of professionals world-wide
- 2019 March 2019 Received Buffalo Business First’s Inaugural Excellence in Health Care Award. This award honors extraordinary professionals in the medical and health fields. Winners are chosen from among more than 100 nominations
- 2019 January 2019 Received the 2018 Albert Nelson Marquis Lifetime Achievement Award – Recognized for hard work and dedication to the healthcare profession
- 2019 January 2019, Buffalo Spree Magazine “Top Doctors” Award recognized by peers as one of the Top Doctors in the healthcare field
- 2018 Drake Lectureship Award – recognizes contributions to advancing human knowledge and creativity
- 2018 July 2018 “Patient Choice Award” Award given based on excellent ratings and reviews on Vitals.com
- 2018 June 2018, “Teacher of the Year Award” recognized by Residents and Fellows at the University at Buffalo Neurosurgery for dedication to teaching and mentoring, given by the Department of Family Medicine, Jacobs School of Medicine and Biomedical Sciences, University at Buffalo
- 2018 January 2018, Buffalo Spree Magazine “Top Doctors” Award recognized by peers as one of the Top Doctors in the healthcare field
- 2017 February 2017, Buffalo Business First “Power 250 Award” for most influential



- business and community leaders.
- 2016 February 2016, Buffalo Business First “Power 250 Award” for most influential business and community leaders
- 2016 November 4, 2016, Recipient of the L. Nelson Hopkins, MD Professor and Endowed Chair of Neurosurgery Award.
- 2016 Castle Connolly Award for 2016 “America’s Top Doctors” – This award is based on an extensive nomination process open to all licensed physicians in America. Recipients of this award are regarded as the most outstanding healthcare providers.
- 2016 Sept 18, 2016 Journal of Neurosurgery Award for UB’s Department of Neurosurgery ranked as the 17<sup>th</sup> most academically productive neurosurgical program in the nation with 13 faculty members producing 146 publications and arnering 2,812 citations during the five-year period 2009-20013
- 2015 Galbraith Award – CNS Oral Presentation abstract citation  
Dumont TM, Sonig A, Mokin M, Eller JL, Sorkin GC, Snyder KV, Hopkins LN, **Levy EI**, Siddiqui AH: 163. Submaximal Angioplasty for Symptomatic Intracranial Atherosclerosis: A Prospective, Phase I Study (CNS Oral presentations). Neurosurgery Clinical Neurosurgery 62 Suppl 1:219, August 2015 (DOI 10.1227/01.neu.0000467127.23075.ec). PMID 261820
- 2015 Named Top Doctor by NY Top Docs
- 2015 The George Washington University “Distinguished Alumni Achievement Award” for special recognition of professional accomplishments. The “Distinguished Alumni Achievement Award” is one of the most prestigious honors bestowed by the University
- 2014 State University of New York “Chancellor’s Award” for Excellence in Scholarship and Creative Activities
- 2014 Kaleida Health “Spirit Award” recognizing significant and spirited Support of Kaleida Health and all Dr. Levy’s contributions to seek to improve the health of the Western New York Community
- 2014 Best of Amherst Award – Physicians
- 2014 Recipient of the “2014 Hero of the Heart” Award for the American Heart Association in Western New York Recognized as a “world renowned physician”. Given to community members who help spread the American Heart Association’s lifesaving mission
- 2014 Showcased in Buffalo Spree Magazine as one of “America’s Top Doctors”
- 2013 Showcased in Buffalo Spree Magazine as one of the “Top Docs” in Buffalo and Western New York

- 2013 D'Youville College Achievement in Health Care Award (recognizes individuals who have made significant contributions to the health care profession in Western New York)
- 2012 George Thorn Young Investigator Award from UB School of Medicine (Award given only when faculty of exceptional talent, and less than 45 years of age have been identified)
- 2010 MDx Medical Inc. Patients' Choice Recognition
- 2009 Business First – Top 50 Doctors in Western New York
- 2009 MDx Medical Inc. Patients' Choice Recognition
- 2008 Thomas J. Linnemeier Spirit of Interventional Cardiology Young Investigator Award (Runner-Up)
- 2008 Alpha Omega Alpha Summer Fellowship for participation on research proposal on Stretch-Activated Channels and Vascular Remodeling
- 2005 Louise Eisenhardt Award presented at the American Association of Neurological Surgeons Annual Meeting for: Continuous Magnesium infusion for cerebral vasospasm prophylaxis in aneurismal subarachnoid hemorrhage.
- 2003-2004 Resident Teaching Award, Department of Neurosurgery at the University of Pittsburgh
- 2002-2003 AANS/CNS Joint Cerebrovascular Section Mullen Endovascular Fellowship Award
- 2003 Annual Meeting of the Southern Neurosurgical Society Award for Best Paper in the Basic Science Category (awarded for the histological response of cerebral vessels after randomized blinded implantation of heparin-coated and uncoated endoluminal stents)
- 1997 Graduate with Distinction, Doctor of Medicine George Washington University, Washington DC
- 1997 Kane-King-Dodek Society (elected active fellow)
- 1997 Walter Freeman Award (for best medical student paper based on original investigation)
- 1996 Beaumont Society Dr. Harold Lamport Biomedical Research Award (For meritorious research completed during medical training at G.W.U.M.C.)
- 1995 Beaumont Society Poster Presentation Award (for medical student poster presentation of data concerning cytokine production by meningiomas and other brain neoplasms)
- 1994 Gill Foundation Fellowship (summer research fellowship awarded to first year medical students)

- 1992                      Presidential Scholar Research Assistantship Department of Molecular Biology  
Dartmouth College
- 1991                      Dartmouth College Presidential Citation  
(for distinguished research in the social sciences)

## PUBLICATIONS

### PUBLICATIONS AS FIRST AUTHOR – PEER REVIEWED

1.     **Levy EI**, Paino JE, Caputy AJ, Sarin PS, Goldstein AL, Wright DC, Sekhar. ELISA Quantification of Cytokine Concentrations in Human Meningiomas. *Neurosurgery* 1996 39(4): 823-829.
2.     **Levy EI**, Resnick DK, Jannetta PJ, Bissonette DJ. Pediatric Hemifacial Spasm: The Efficacy of Microvascular Decompression. *Pediatric Neurosurgery* 1998 27: 238-241.
3.     **Levy EI**, Firlik AD, Kanal E, Rubin G, Kirby L, Yonas H. Development of Obstructive Hydrocephalus Following LP Shunting for Communicating Hydrocephalus Secondary to Subarachnoid Hemorrhage from Ruptured Aneurysms. *Journal of Clinical Neurology and Neurosurgery* 1999 101(2):79-85.
4.     **Levy EI**, Clyde B, McLaughlin MR, Jannetta PJ. Microvascular Decompression for Severe Refractory Hypertension. *Neurosurgery* 1998 43(1):1-6.
5.     **Levy EI**, Firlik AD, Wisniewski S, Rubin G, Jungreis CA, Wechsler LR, Yonas H. Factors affecting survival rates for acute vertebrobasilar artery occlusions treated with intra-arterial thrombolytic therapy: a meta-analytical approach. *Neurosurgery* 1999 45(3):539-45.
6.     **Levy EI**, Rubin G, Scarrow AM, Kanal E, Yonas H, Kirby L. Reversible Ischemia Determined By Xenon-enhanced CT Scan After Ninety Minutes of Complete Basilar Artery Occlusion. *AJNR* 1998 19:1943-1946.
7.     **Levy EI**, Scarrow AM, Firlik AD, Kanal E, Rubin G, Kirby L, Yonas H. Development of obstructive hydrocephalus with lumboperitoneal shunting following subarachnoid hemorrhage. *Clinical Neurol Neurosurg* 1999 101:79-85.
8.     **Levy EI**, Scarrow A, Hamilton RC, Wollman MR, Fitz C, Pollack IF. Medical management of eosinophilic granuloma of the cervical spine. *Pediatric Neurosurgery* 1999 31(3):159-62.
9.     **Levy EI**, Heiss JD, Kent MS, Riedel CJ, Oldfield EH. Spinal cord swelling preceding syrinx development. Case report. *Journal of Neurosurgery* 2000 92(1 Suppl): 93-7.
10.    **Levy EI**, Niranjana A, Thompson TP, Scarrow AM, Kondziolka D, Flickinger JC, Lunsford LD. Radiosurgery for childhood intracranial arteriovenous malformations. *Neurosurgery* 2000 47(4):834-41.
11.    **Levy EI**, Scarrow AM, Jannetta PJ. Microvascular decompression in the treatment of hypertension: review and update. *Surgical Neurology* 2001 55(1):2-10.

12. **Levy EI**, Horowitz MB, Cahill AM. Lingual artery embolization for severe and uncontrollable postoperative tonsillar bleeding. *Ear Nose Throat Journal* 2001 80(4):208-11.
13. **Levy EI**, Horowitz MB, Koebbe CJ, Jungreis C, Pride GL, Dutton K, Purdy PD. Transluminal stent-assisted angioplasty of the intracranial vertebrobasilar system for medically refractory, posterior circulation ischemia: early results. *Neurosurgery* 2001 48(6):1215-1223.
14. **Levy EI**, Yonas H. Cerebral Revascularization for Cerebral Ischemia and Stroke Prevention in Patients with Atherosclerotic Occlusive Disease: Defining the Population that Benefits. *Neurosurgery Clinics of North America*. 2001 12(3):489-98.
15. **Levy EI**, Harris AE, Omalu BI, Hamilton RL, Branstetter BF, Pollack IF. Sudden death from fulminant acute cerebellitis. *Pediatric Neurosurgery* July 2001 35(1):24-8.
16. **Levy EI**, Koebbe CJ, Horowitz MB, Jungreis C, Pride GL, Dutton K, Kassam A, Purdy PD. Rupture of intracranial aneurysms during endovascular coiling. Management and outcomes. *Neurosurgery* 2001 49: 807-813.
17. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Horowitz MB, Qureshi AI, Guterman LR, Hopkins LN. Intracranial stenting for cerebrovascular pathology. *Contemporary Neurosurgery* 2001 23 (25): 1-9.
18. **Levy EI**, Horowitz MB, Koebbe C, Jungreis CC. Target specific trimodal endovascular management of carotid blowout syndrome: Case report. *ENT Journal* 2002 81(2):115-8.
19. **Levy EI**, Boulos AS, Guterman LR. Stent-assisted endoluminal revascularization for the treatment of intracranial atherosclerotic disease. *Neurological Research* 2002 24(4):337-46.
20. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Transradial cerebral angiography: an alternative route. *Neurosurgery* 2002 51:335-342, 2002.
21. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Brainstem infarction after delayed thrombosis of a stented vertebral artery fusiform aneurysm: Case Report. *Neurosurgery* November 2002 51(5):1280-5.
22. **Levy EI**, Bendok BR, Boulos AS, Qureshi AI, Guterman LR, Hopkins LN. Endovascular surgery: the future without limits. *Clinical Neurosurgery* 2002; 49:229-46.
23. **Levy EI**, Hanel RA, Bendok BR, Boulos AS, Hartney ML, Guterman LR, Qureshi AI, Hopkins LN. Staged stent-assisted angioplasty for symptomatic intracranial vertebrobasilar artery stenosis. *J Neurosurg*. 2002 Dec; 97(6):1294-301.
24. **Levy EI**, Boulos AS, Hanel RA, Fermin T, Alberico RA, Franckowiak MD, Nemes B, Paciorcek AM, Guterman LR, Hopkins LN. In vivo model of intracranial stent implantation: a pilot study examining the histological response of cerebral vessels following randomized blinded implantation of heparin-coated and uncoated endoluminal stents. *J Neurosurg* March 2003 98(3):544-53.
25. **Levy EI**, Kim SH, Bendok BR, Qureshi AI, Guterman LR, Hopkins LN: Transradial Stenting of the Cervical Internal Carotid Artery: Technical Case Report. *Neurosurgery* August 2003 53(2):448-52.
26. **Levy EI**, Hanel R, Boulos AS, Bendok BR, Kim SH, Gibbons KJ, Qureshi AI, Guterman LR, Hopkins LN. Comparison of periprocedure complications resulting from direct stent placement

compared with those due to conventional and staged stent placement in the basilar artery. *J Neurosurg* October 2003 99(4):653-660.

27. **Levy EI**, Hanel R, Howington J, Nemes B, Boulos A, Tio F, Paciorek AM, Amlani S, Kagan-Hallett K, Duffy Fronckowiak, Guterman L, Hopkins L: Sirolimus-eluting stents in the canine cerebral vasculature: A prospective, randomized, blinded study assessing safety and vessel response. *J Neurosurg*.2004 Apr: 100(4):688-94.
28. **Levy EI**, Horowitz M, Jovin T, Kassam A. Successful management of post tumor resection middle cerebral artery thrombosis with angioplasty/stenting and low dose intra-arterial/intravenous IIb/IIIa inhibitor infusion: Case Report. *Neurosurgery*. 55(3):713,Sept. 2004.
29. **Levy EI**, Hopkins LN: Emergency Stent Placement for Symptomatic Acute Carotid Artery Occlusion After Carotid Endarterectomy. *J Neurosurgery* 101:151-153, July 2004.
30. **Levy EI**, Hanel RA, Lau T, Koebbe CJ, Levy N, Padalino DJ, Malicki K, Guterman LR, Hopkins LN: Frequency and Management of Recurrent Stenosis After Carotid Stent Implantation. *J Neurosurgery* 102: 29-37, January 2005.
31. **Levy EI**, Howington JU, Engh JA, Hanel RA, Levy N, Kim SH, Gibbons KJ, Guterman LR, Hopkins LN: Submaximal Angioplasty and Staged Stenting for Severe Posterior Circulation Intracranial Stenosis: A Technique in Evolution. *Neurocrit Care* 2:189-197, April 2005.
32. **Levy EI**: New Minimally Invasive Surgical Technique Moves Lumbar Spinal Fusion to the Cath Lab. *Cath Lab Digest* (Special Clinical Issue), 13 (8) August 2005.  
[www.cathlabdigest.com/cld/displayArticle.cfm?articleID=article4552](http://www.cathlabdigest.com/cld/displayArticle.cfm?articleID=article4552)
33. **Levy EI**, Ecker RD, Hanel RA, Sauvageau E, Wehman JC, Guterman LR, Hopkins LN: Acute M2 Bifurcation Stenting for Cerebral Infarction: Lessons Learned from the Heart. *Neurosurgery* 58:2006.
34. **Levy EI**, Ecker RD, Horowitz MB, Gupta R, Hanel RA, Sauvageau E, Jovin TG, Guterman LR, Hopkins LN: Stent-Assisted Intracranial Recanalization for Acute Stroke: Early Results. *Neurosurgery* 58:458-463, March 2006.
35. **Levy EI**, Ecker RD, Hanel RA, Sauvageau E, Wehman JC, Guterman LR, Hopkins LN: Acute M2 Bifurcation Stenting for Cerebral Infarction: Lessons Learned from the Heart: Technical Case Report *Neurosurgery* 58:E588, March 2006.
36. **Levy EI**, Hanel RA, Tio FO, Garlick DS, Bailey L, Cunningham MR, Williard C, Sherman D, Dooley JF, Kopia GA: Safety and Pharmacokinetics of Sirolimus-eluting Stents in the Canine Cerebral Vasculature – 180-day Assessment. *Neurosurgery* 59:925-934, October 2006.
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61. Jonathan M. Coutinho, Univ of Toronto, Toronto, ON, Canada; David S. Liebeskind, Neurovascular Imaging Res Core and the Univ of California Los Angeles Stroke Ctr, Los Angeles, CA; Lee-Anne Slater, Univ of Toronto, Toronto, ON, Canada; Raul G. Nogueira, Emory Univ Sch of Med, Atlanta, GA; Blaise Baxter, Erlanger Hosp at Univ of Tennessee, Chattanooga, TN; Antoni Davalos, Hosp Germans Trias i Pujol, Barcelona, Spain; Alain Bonafé, Hôpital Gui-de-Chauliac, Montpellier, France; Reza Jahan, Univ of California Los Angeles, Los Angeles, CA; Mayank Goyal, Univ of Calgary, Calgary, AB, Canada; **Elad I. Levy**, Buffalo General Hosp, Buffalo, NY; Osama Zaidat, Medical Coll of Wisconsin, Milwaukee, WI; Jan Gralla, Bern Univ Hosp and Univ of Bern, Berne, Switzerland; Jeffrey L. Saver, David Geffen Sch of Med at the Univ of California Los Angeles, Los Angeles, CA; Vitor M. Pereira, Univ of Toronto, Toronto, ON, Canada, Acute Endovascular Treatment Posters “The Role Of Intravenous Thrombolysis In Patients With Acute Ischemic Stroke Treated With Mechanical Thrombectomy” *International Stroke Conference*, Feb 17, 2016, Los Angeles CA
62. Mokin M, **Levy EI**: The SWIFT PRIME abstract, “Predictive Value Of Rapid-assessed Cerebral Blood Volume And Cerebral Blood Flow CT Perfusion Thresholds On Final Infarct Volume Following Successful Reperfusion” accepted for a moderated poster presentation.
63. Xiang J, Yu J, Snyder KV, **Levy EI**, Siddiqui AH, Meng H: Hemodynamic-Morphological Discriminant Models for Intracranial Aneurysm Rupture Remain Stable with Increasing Sample Size. *J Neurointerv Surg* 8:104-110, January 2016 (epub December 8, 2014 DOI 10.1136/neurintsurg-2014-011477). PMID: 25488922
64. Nimer Adeeb MD1,2, Christoph J. Griessenauer MD1, Adam A. Dmytriw MD, MSc1,3,4, Hussain Shallwani MD5, Raghav Gupta, Paul M. Foreman MD6, Hakeem Shakir MD5, Justin Moore MD, PhD1, Nicola Limbucci MD7, Salvatore Mangiafico MD7, Ashish Kumar MD4, Caterina Michelozzi MD8, Yuchen Zhang BS3, Vitor Mendes Pereira MD, MSc3, Charles C. Matouk MD9, Mark R. Harrigan MD6, Adnan H. Siddiqui MD, PhD5, **Elad I. Levy MD**, MBA5, Leonardo Renieri MD7, Thomas R. Marotta MD4, Christophe Cognard MD8, Christopher S. Ogilvy MD1, Ajith J. Thomas MD, Risk of branch occlusion and ischemic complications with Pipeline Embolization Device in treatment of posterior circulation aneurysms

Won best poster award at *Congress of Neurological Surgeons 2017 Annual Meeting* in Boston, MA

65. Peter Kan, Georgios Maragkos, Aditya Srivatsan, Visish M. Srinivasan, Jeremiah Johnson, Jan-Karl Burkhardt, Stephen Chen, Howard A. Riina, Omar Tanweer, **Elad I. Levy**, Alejandro M. Spiotta, Bradley Gross, Jacob Cherian, Alexander A. Khalessi, Aditya S. Pandey, Andrew J. Ringer, Ricardo Hanel, Rafael A. Ortiz, Michael Levitt, Ajith Thomas. Middle Meningeal Artery Embolization for Chronic Subdural Hematoma: A Multi-Center Experience of 160 Consecutive Embolizations. Sunrise Science and Late Breaking Session. CNS, San Francisco, 2019.
66. Salem MM, Sweid A, Kuhn AL, Dmytriw AA, Waqas M, Adeeb N, Kan P, Puri AS, Marotta TR, **Levy EI**, Moore JM. Repeat Flow Diversion for Previously Failed Flow Diversion in A Multicenter Cohort. CNS, San Francisco, 2019.
67. “Strokenomics”: bending the cost curve in stroke care, Stephan A. Munich MD, Kunal Vakharia MD, Matthew J. McPheeters MD, MBA, Michael K. Tso MD, PhD, FRCSC, Adnan H. Siddiqui MD, PhD, Kenneth V. Snyder MD, PhD, Jason M. Davies MD, PhD, and **Elad I. Levy MD**, MBA, 2019 ; <https://doi.org/10.3171/2019.11.JNS191960>

### PROFESSIONAL ACTIVITIES

#### **TEACHING:**

Vertebroplasty: Indications and Treatment Options. Course Faculty at American Association of Neurological Surgeons Annual Meeting, San Diego CA	April 2003
Vertebroplasty: Indications and Treatment Options. Course Faculty at American Association of Neurological Surgeons Annual Meeting, Denver, Colorado.	October 2003
Kyphoplasty course instructor, Course Faculty at Congress of Neurological Surgeons Annual Meeting, Denver, Colorado.	October, 2003
Endovascular Summit 2004 Faculty at Hoag Heart and Vascular Institute, Newport Beach, CA.	January 2004
Clinical Faculty: Vertebroplasty Course: Association of Neurological Surgeons Annual Meeting, Orlando Florida.	May 2004
Speaker: “Future of Intracranial Stenting (breakfast seminar): Association of Neurological Surgeons Annual Meeting, Orlando Florida	May 2004
Endovascular For Young Neurosurgeons and Trainees Practical Course at American Association of Neurological Surgeons Annual Meeting, Orlando, Florida	May 2004
CREST Training, 2004: Course Co-director	August 2004
CREST Training 2005. Millard Fillmore Gates Hospital. Course Co-director	August 2005
Carotid Artery Stenting Training Program. Millard Fillmore Gates Hospital. Course Co-director	November 2005

CREST Training 2005. Millard Fillmore Gates Hospital. Faculty	December 2005
Abbott Training, Abbott Vascular Devices, Carotid Qualification Program, Millard Fillmore Gates Hospital. Faculty	February 2006
AANS Resident Endovascular Course, Memphis, Tennessee, March 31, 2006 – April 1, 2006. Faculty	April 2006
CREST Training. Millard Fillmore Gates Hospital. Faculty	May 2006
Cordis Carotid Artery Stenting Course. Faculty	May 2006
Cordis Senior Fellows Training Program. Cincinnati. OH, June 1-2, 2006. Presenter and Panelist	June 2006
Abbott Carotid Artery Course. Millard Fillmore Gates Hospital. Faculty	July 2006
CREST Training. Millard Fillmore Hospital. Faculty	October 2006
Cordis Training. Millard Fillmore Hospital. Faculty	Dec 2006
Abbott REC Training Millard Fillmore Gates Hospital. Faculty	Jan 2007
Abbott Carotid Stent Training. Gates Vascular Institute. Faculty	Dec 2012
Abbott Carotid Stent Training. Gates Vascular Institute. Faculty	July 2013
Covidien Pipeline Training Gates Vascular Institute Faculty	May 2013
Abbott Carotid Stent Training Gates Vascular Institutue Faculty	Feb 2014
Covidien Pipeline Training Gates Vascular Institute Faculty	March 2014
Covidien Pipeline Training Gates Vascular Institute Faculty	Oct 2014
Boston Scientific Carotid Stent Training Gates Vascular Institute Faculty	Oct 2014
American Board of Neurological Surgeons (ABNS) Guest Examiner for Spring Oral Exams, Houston, Texas	May 2014
American Board of Neurological Surgeons (ABNS) Guest Examiner for Spring Oral Exams in Houston, Texas	April 2016
American Board of Neurological Surgeons (ABNS) Guest Examiner for Spring Oral Exams in Houston, Texas	May 2017
American Board of Neurological Surgeons (ABNS) Guest Examiner for Spring Oral Exams in Scottsdale, Arizona	May 2018
Medtronic Pipeline training St. Anthony's Hospital, Kansas City, Kansas	Jan 2019
Speaker at Medtronic Sales Meeting, Laguanna Cliffs Marriott Resort, San Diego California	May 2019
American Board of Neurological Surgeons (ABNS) Guest Examiner for Curriculum Vitae 01-05-21	May 2019 Elad Levy, MD

**SYLLABI CONTRIBUTIONS:**

1. **Levy EI**, Hanel RA, Harrigan MR, Howington JU, Guterman LR, and Hopkins LN: Intracranial Atherosclerotic Disease: Natural History and Results of Intervention. *Peripheral Angioplasty and All That Jazz*, New Orleans LA, April 29-May 2, 2003.
2. **Levy EI**, Hanel RA, Harrigan MR, Howington JU, Kim SH, Qureshi AI, Guterman LR, Hopkins LN: Stroke: Complications and How to Avoid and Manage Them. *Peripheral Angioplasty and All That Jazz*, New Orleans LA, April 29-May 2, 2003.
3. Hanel RA, **Levy EI**, Harrigan MR, Howington JU, Kim SH, Qureshi AI, Guterman LR, Hopkins LN: Stroke By the Numbers: A Public Health Crisis. *Peripheral Angioplasty and All That Jazz*, New Orleans LA, April 29-May 2, 2003.
4. Hanel RA, **Levy EI**, Harrigan MR, Howington JU, Kim SH, Qureshi AI, Guterman LR, Hopkins LN: Stroke: Technique of Thrombolysis and Intervention. *Peripheral Angioplasty and All That Jazz*, New Orleans LA, April 29-May 2, 2003.
5. Harrigan MR, Hanel RA, **Levy EI**, Howington JU, Kim SH, Qureshi AI, Guterman LR, Hopkins LN: Carotid Angioplasty and Stenting Technique. *Peripheral Angioplasty and All That Jazz*, New Orleans LA, April 29-May 2, 2003.
6. **Levy EI**, Bendok BR, Qureshi AI, Guterman LR, Hopkins LN: Carotid Stenting: How to stay out of trouble *International symposium on Endovascular Therapy, Miami Beach FL*, January 19-23, 2003.
7. **Levy EI**, Guterman LR, Hopkins LN: Managing adverse events when stenting is the treatment of choice for carotid intervention. *International symposium on Endovascular Therapy*, Miami Beach FL, January 25-29, 2004 .
8. **Levy EI**: The Future of Endovascular Neurosurgery. The *AANS course on Endovascular for Young Neurosurgeons and Trainees*: Overview, Case Reviews, and Complications. Orlando FL, May 2, 2004.
9. Guterman LR, **Levy EI**: Carotid Update: Experiences in the Sapphire Trial and Future of Stenting in the Brain. Panel Discussion, Orlando FL, May 4, 2004.
10. **Levy EI**: Endovascular Therapy of Cerebrovascular Disease Management in Western New York. *University of Rochester Medical Center*, May 11, 2004.
11. Samuelson RM, Siddiqui AH, **Levy EI**, Hopkins LN: Advances in Endovascular Therapy for Prevention and Treatment of Stroke. *2007 Capital Region Stroke Symposium*, Harrisburg PA, October 18, 2007.
12. Atwal GS, Samuelson RM, Morrison AM, Siddiqui AH, **Levy EI**, Hopkins LN: Why I Believe that Octogenarians Must be Treated by Carotid Stenting. *Multidisciplinary European Endovascular Therapy (MEET) 2008 Congress*, Cannes, June 28, 2008.

13. Atwal GS, Samuelson RM, Morrison AM, Siddiqui AH, **Levy EI**, Hopkins LN: Why I Don't Believe in the EVA-3S Results. *Multidisciplinary European Endovascular Therapy (MEET) 2008 Congress*, Cannes, June 28, 2008.
14. Atwal GS, Samuelson RM, Morrison AM, Siddiqui AH, **Levy EI**, Hopkins LN: New Trials in Progress: CREST. *Multidisciplinary European Endovascular Therapy (MEET) 2008 Congress*, Cannes, June 28, 2008.
15. Natarajan SK, Snyder KV, Siddiqui AH, Hopkins LN, **Levy EI**: Carotid Angioplasty and Stenting for Occlusive Disease (chapter 42), in Sekhar LN, Fessler RG (eds) *Atlas of Neurosurgical Techniques: Brain*, Volume 1, 2<sup>nd</sup> edition. New York (NY) Thieme, 2016, p. 616-633. (invited contributor)

## **RESEARCH**

### **FEDERAL DRUG ADMINISTRATION (FDA):**

10/08            Awarded Investigational Device Exemption (IDE) #G0600521 from the FDA (G060052/A1 for "A Phase I Study to Evaluate the Safety of Wingspan<sup>TM</sup> Stent-Assisted Recanalization for Acute Intracranial Arterial Occlusion")

**Status**            Final FDA Approval Granted

### **SUBMITTED GRANTS:**

#### **NIH**

Source Type:            Peer Reviewed – NIH/NINDS

Grant Title Number:    Optimizing Approaches to Endovascular Therapy of Acute Ischemic Stroke 1 R21 NS109575-01

Role in Project:        Co-Investigator

Years Inclusive:        Start date 4/1/2019 to March 31, 2021

\$ Amount:                \$130,822.00

Status:                    Approved for funding

#### **NIH**

Source/Type:            NIH Agency for Healthcare Research and Quality (AHRQ)

Grant Title/Number:    Treatment Planning Using Patient Specific Vascular Phantoms Program Announcement Number/URL PA-16-240

Role in Project:        Co Investigator

Years Inclusive:        Projected start date 04/01/2018 –

\$ Amount:                \$1,993,683.00 The proposed project total (all years)

Status:                    Pending

#### **NIH**

Source/Type:            Peer reviewed public funding (Challenge Grant)-NIH/NINDS

Grant Title/Number:    SMARTS Trial (Stent vs. Maximal Medical Therapy for Acute Revascularization Therapy after Acute Ischemic Stroke)

NIH RO1  
Role in Project: Principal Investigator  
Years Inclusive: 2010-2015  
\$ Amount: \$5,000,000  
Status: Submitting 10/09; Award Pending

**NIH**

Source/Type: Peer reviewed – NIH/NINDS  
Grant Title/Number: Stenting and Aggressive Medical Management for Preventing Recurrent stroke in Intracranial Stenosis (SAMMPRIS) U01 NS058728-01A1 (Chimowitz)  
Role in Project: Site Principal Investigator  
Years Inclusive: 05/2008 – 04/20013  
Amount: \$177,869  
Status: Active  
Coordinating Center: Medical University of South Carolina  
Compares stenting plus medical therapy vs. medical therapy alone in patients with recently symptomatic intracranial atherosclerotic stenosis 70-99%.

**NIH**

Source/Type: Peer reviewed public funding (Challenge Grant)-NIH/NINDS  
Grant Title/Number: Minocycline to prevent vasospasm after Aneurysmal Subarachnoid Hemorrhage  
NIH RO1  
Role in Project: Principal Investigator  
Years Inclusive: 09/01/09-08/31/11  
\$ Amount: \$986,106  
Status: Not funded-Corporate funded

**NIH**

Source/Type: Peer reviewed public funding (Challenge Grant)-NIH/NINDS  
Grant Title/Number: Minocycline as Neuroprotectant for Acute Ischemic Stroke  
NIH RO1  
Role in Project: Co Investigator  
Years Inclusive: 09/01/2009-08/31/2011  
\$ Amount: \$974,021  
Status: Not funded-Corporate funded

**NIH**

Source/Type: Peer reviewed public funding - NIHS / NINDS  
Grant Title/Number: Specialized Programs of Translational Research in Acute Stroke (SPOTRIAS)  
Stoke Intervention and Research in Endovascular Neuroscience (SIREN)  
Role in Project: Principal Investigator (30%)  
Years Inclusive: 4/1/08 – 3/31/11  
\$ Amount: \$1,500,00 per yr  
Status: Not Funded – Revisions Pending

**NIH**

Source Type: Peer reviewed public funding – NIH/NINDA  
Grant Title Number: Exercise testing to diagnose concussion and reveal physiological mechanisms  
Role in Project: Co-Investigator (2.50%)  
Years Inclusive: 2014-2019  
\$ Amount: \$3,783,874.00



**NIH**

Source Type:  
 Grant Title/Number: Cerebral Aneurysm Risk Prediction Using Integrated Hemodynamic Models  
 R01 NS064592  
 Role in Project: Co-Investigator (0.75%)  
 Years Inclusive: 2014-2019  
 \$ Amount: \$1,905,181.00

**NIH**

Source Type:  
 Grant Title/Number: POSITIVE:PerfusiOn imaging Selection of Ischemic STroke Patlents for  
 EndoVascular ThErapy  
 Role in Project: Co-Investigator (0.01%)  
 Years Inclusive: 2013-2015  
 \$ Amount: \$140,000.00

**NIH**

Source Type: Peer Reviewed - NIH/NINDS  
 Grant Title/Number: Drug Eluting Coils for Improved Treatment of Brain Aneurysms  
 R43NS090821  
 The major goals of this project are to use biologically-derived small molecules to improve the outcomes of intracranial aneurysms that are treated through endovascular coiling.  
 Role in Project: Co-Investigator  
 Years Inclusive: 5/21/15 – 10/31/15  
 \$ Amount: \$225,000.00

**AWARDED GRANTS:****CORPORATE FUNDED**

Source/Type: NIH  
 Grant Title/Number: Micro-Radiographic Imager for Neurovascular Interventions  
 5R01EB002873-06A1  
 Role in Project: Co- PI  
 Suny Research Foundation  
 Years Inclusive: Budget Period: 08/01/2013 – 07/31/2014  
 Project Period : 09/20/2003 – 07/31/2016  
 Amount: \$595,362

Source Type: Covidien  
 Grant Title/Number: International Retrospective Study of Pipeline Embolization Device (IntrePED)  
 Role in Project: Site Co-Investigator  
 Years Inclusive: 07/2012 – 07/2015  
 \$ Amount: \$ 44,642  
 Status: Active

Source Type: NIH  
 Grant Title/Number: Microangiographic guidance of flow Modifying Stents  
 Role in Project: Co-I  
 Years Inclusive: Renewal 8/15/12 – 7/31/17  
 Amount: \$1,786,951 (direct) \$2,526,475 (total)

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Elad Levy, MD

Source Type: Covidien  
Grant Title/Number: Aneurysm Study of Pipeline in an observational Registry (ASPIRE)  
Role in Project: Co-Investigator  
Years Inclusive: 11/2012 – 11/2017  
\$ Amount: \$10,158  
Status: Active

Source Type: University of Florida/ev3  
Grant Title/Number: AMERICA: Axiom MicroFX for Endovascular Repair of Intracranial Aneurysm  
Role in Project: N/A  
Years inclusive: 06/2011 – 06/2014  
\$ Amount: \$6,031  
Status: Active

Source/Type: Non-peer reviewed– American Heart Association  
Grant Title/Number: SYSTEMATIC META-review of stenting with embolic protection for patients with asymptomatic carotid stenosis  
Role in Project: Co Investigator  
Years Inclusive: 1/1/2010-1/1/2012  
\$ Amount: \$ 110,000

Source/Type: Non-peer reviewed - Boston Scientific Corporation  
Grant Title/Number: A Phase I Study to Evaluate the Safety of Wingspan™ Stent-Assisted Recanalization for Acute Intracranial Arterial Occlusion”  
Role in Project: Principal Investigator (30%)  
Years Inclusive: 8/1/07 – 8/30/10  
\$ Amount: \$ 325,000

Source/Type: Non-peer reviewed– Kaleida Health, Volcano and ev3  
Grant Title/Number: PREMISE Trial – Prospective Randomized Endovascular Therapy in Multiple Sclerosis  
Role in Project: Site Co-Investigator  
Years Inclusive: 2010-2013  
\$ Amount: \$300,000  
Status: Active

Source/Type: Non-peer reviewed – NIH/NINDS  
Grant Title/Number: Mechanisms of Stroke in Inter-cranial Stenosis and Stenting (MOSISS R01NS069938 (Romano)  
Role in Project: Site Co-Investigator  
Years Inclusive: 04/2010 – 03/2014  
\$ Amount: \$1,603  
Status: Active

Source/Type: Non-Peer reviewed– Codman & Shurtleff  
Grant Title/Number: N/A  
Role In Project: N/A  
Years Inclusive: 03/2010 – 02/2015  
\$ Amount: \$64,519  
Status: Active

Source/Type: Non-peer reviewed - Cordis  
Grant Title/Number: Feasibility Study to Assess Blinded Deployment of Bare Metal and Drug Coated Intracranial Stents in the Canine Basilar Artery  
Role in Project: Project Coordinator, Co-PI (5%)  
Years Inclusive: 7/1/02 – 6/30/03  
\$ Amount: \$ 618,000

Source/Type: Non-peer reviewed - Boston Scientific Corporation  
Grant Title/Number: The Evaluation of Self-expanding Intracranial Paclitaxel Eluting Stents in a Canine Basilar Model: Feasibility Study.  
Role in Project: Project Coordinator, Co-PI (5%)  
Years Inclusive: 7/1/02 – 6/30/03  
\$ Amount: \$ 31,322

Source/Type: Non-peer reviewed - Cordis  
Grant Title/Number: Comparison of histologic effects following drug-coated and bare stent-implantation in the canine basilar artery: 30 day results.  
Role in Project: Project Director (5%)  
Years Inclusive: 2002-3003  
\$ Amount: \$ 98,000

Source/Type: Non-peer reviewed - Cordis  
Grant Title/Number: Feasibility Study to Assess Deployment of Bare Metal Intracranial Stenting in the Canine Basilar Artery  
Role in Project: Project Director (5%)  
Years Inclusive: 2002-2003  
\$ Amount: \$ 40,000

Source/Type: Non-peer reviewed - Boston Scientific Corporation  
Grant Title/Number: The Study of Taxol-Eluting Stents in the Canine Basilar Artery For Neurotoxicity and Inhibition of Restenosis.  
Role in Project: Project Director (5%)  
Years Inclusive: 2002-2003  
\$ Amount: \$36,000

Source/Type: Cordis  
Grant Title/Number: Inhibition of in-stent stenosis and neointimal proliferation following endoluminal implantation of heparin-coated versus uncoated stents in the canine basilar artery.  
Role in Project: Project Director (5%)  
Years Inclusive: 2002-2003  
\$ Amount: \$20,000

Source/Type: Boston Scientific Corporation  
Grant Title/Number: Feasibility Study of the Sole Therapy Aneurysm Stent Porous Design in a Canine Basilar Artery Model.  
Role in Project: Investigator (2%)  
Years Inclusive: 2003-2004  
\$ Amount: \$20,000

Source/Type: Boston Scientific Corporation  
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Grant Title/Number: Feasibility Study to Evaluate Patency of Jailed Intracranial Perforators Using Braid or Covered Porous Stents in a Canine Basilar Artery Model.

Role in Project: Investigator (2%)

Years Inclusive: 2003-2004

\$ Amount: \$20,000

Source/Type: Non-peer reviewed– Boston Scientific Corporation

Grant Title/Number: Ability of Wingspan self expanding stents to recanalize vessels occluded by thrombi as compared to balloon expandable stent.

Role in Project: Project Coordinator, Co-PI (5%)

Years Inclusive: 2005-2006

\$ Amount: \$17,907

Source/Type: Non-peer reviewed– Boston Scientific Corporation

Grant Title/Number: Histological Evaluation of the Basilar Artery after Wingspan Stent Placement.

Role in Project: Project Coordinator, PI (3%)

Years Inclusive: 2006-2007

\$ Amount: \$50,000

Source/Type: Non-peer reviewed corporate funding – Kaleida Health, Volcano and ev3

Grant Title/Number: PEMiSE Trial – Prospective Randomized Endovascular Therapy in Multiple Sclerosis

Role in Project: Site Co-Investigator

Years Inclusive: 2010 –

\$ Amount: \$300,000

Source Type: Non-peer reviewed - Covidien

Grant Title/Number: PUFs – Pipeline for Uncoilable or Failed Aneurysms  
NSG1390908A

Role in Project: Site Principal Investigator

Years Inclusive: 2013

\$ Amount: \$50,000

Source Type: Non-peer reviewed– ev3

Grant Title/Number: AMERICA Axiom™ MicroFX™ for Endovascular Repair of IntraCranial Aneurysm: A multi-Center, Prospective Observational Registry  
NSG1970411E

Role in Project: Principal Investigator

Years Inclusive: 2013

\$ Amount: \$25,000

Source Type: Non-peer reviewed– Codman

Grant Title/Number: CODMAN ENTERPRISE® Vascular Reconstruction Device and Delivery  
NSG0100607H

Role in Project: Principal Investigator

Years Inclusive: 2013

\$ Amount: \$200,000

Source Type: Non-peer reviewed– Tyco Healthcare Group LP, dba Covidien,  
through its ev3 Neuro Division

Grant Title/Number: International Retrospective Study of Pipeline Embolization Device (IntrePED)  
NSG2130312E  
Role in Project: Principal Investigator  
Years Inclusive: 2013  
\$ Amount: \$65,000

Source Type: Non-peer reviewed– Penumbra  
Grant Title/Number: THERAPY Trial: The Randomized, Concurrent Controlled Trial to  
Assess the Penumbra System’s Safety and Effectiveness in the  
Treatment of Acute Stroke  
NSG2120212A  
Role in Project: Principal Investigator  
Years Inclusive: 07/2012 – 06/2014  
\$ Amount: \$50,000

Source Type: Non-peer reviewed– Penumbra  
Grant Title/Number: The START Trial: Clinical Outcome in Acute Stroke Treatment after Imaging  
Guided Patient Selection for Interventional Revascularization Therapy  
NSG1680110A  
Role in Project: Principal Investigator  
Years Inclusive: 2010 – 2013  
\$ Amount: \$25,000

Source Type: Non-peer reviewed  
Grant Title/Number: Vitesse Intracranial Stent Study for Ischemic Therapy  
NSG1310808A  
Role in Project: Principal Investigator  
Years inclusive: 2013  
\$ Amount: \$25,000

Source Type: Non-peer reviewed– W.L. Gore & Associates, Inc.  
Grant Title/Number: GORE Carotid Stent Clinical Study for the treatment of carotid artery  
Stenosis in patients at increased risk for adverse events from carotid endarter  
Role in Project: Principal Investigator  
Years inclusive: 2014 - 2016  
\$ Amount: \$200,000.00

Source Type: Non-peer reviewed– Research Foundation for SUNY  
Grant Title/Number: Development of Hand-held Biosensors for Rapid Diagnosis and Study of  
Neural Disease and Neurotoxins  
SUNY Health Now Network of Excellence Award 2014  
Role in Project: Invesitgator  
Years inclusive: 2014  
\$ Amount: \$150,000

Source Type: Mayo Clinic Jacksonville/NIH  
Grant Title/Number: CREST -2 Revascularization and Medical Management for Asymptomatic  
Carotid Stenosis Trial  
Role in Project: Investigator  
Years Inclusive: 2015 –  
Amount: \$82,000.00

Curriculum Vitae  
01-05-21

Elad Levy, MD

Source Type: MicroVention Sponsors  
Grant Title/Number: COAST Coiling of Aneurysms Smaller Than 5mm with Hypersoft Devices:  
Hypersoft @coils  
Role in Project: Investigator  
Years Inclusive: 2015  
Amount: \$0 to date

Source Type: Medical University of South Carolina NIH  
Grant Title/Number: COMPASS A Comparison of Direct Aspiration vs Stent Retriever as a First  
Approach Devices  
Role in Project: Investigator  
Years Inclusive: 2015  
Amount: \$75,000.00

Source Type: Codman Sponsor  
Grant Title/Number: CODMAN ENTERPRISE Vascular Reconstruction Device and Delivery  
System NSG0100607H  
Role In Project: Principal Investigator  
Years Inclusive: 2017  
Amount:

#### CURRENT CLINICAL TRIALS

**Stroke:** Tiger, Excellent  
**Carotid:** Confidence, Crest 2, Crest H, Crest Registry, Stance (CEA) Performance II  
Trial (PI)  
**ICH:** Enrich, Invest Feasibility, Invest Registry  
**Aneurysm:** Coast (<4.9), Feast (6-14), Strling, NAPA  
**Other:** River

#### CLINICAL TRIALS PENDING

**Stroke:** Extremis, Tesla  
**LVO:** Endlow  
**3D:** Complete  
**F/D-surpass:** Evolve  
**Pipeline:** Advance  
**Other:** PROST, Restore 1, Aspire, CLIF

#### CLINICAL STUDIES APPROVED AND ACTIVE

06/2015 CREST-2 Revascularization and Medical Management for Asymptomatic Carotid Stenosis

3/26/15 TREVO Retriever Registry Trial to assess real world performance of the Trevo Retriever, which is intended to restore blood flow in the neurovasculature by removing thrombus in subjects experiencing ischemic stroke

02/2017 SYNAPTIVE STUDY00000758

05/2015 FEAT Framing Eighteen coils in cerebral Aneurysms Trial.

01/2015 COAST Coiling of Aneurysms Smaller Than 5mm with Hypersoft Devices: Hypersoft (g) coils

10/2015 COMPASS A Comparison of Direct Aspiration vs Stent Retriever as a First Approach Devices

8/2018 Neuroform Atlas™ STUDY00002176

11/2018 CODMAN ENTERPRISE Vascular Reconstruction Device and Delivery System HUD #04-0147 030-428032

11/2018 Confidence STUDY00000334

01/2019 Excellent External IRB STUDY00002796

04/2019 HUD # H02002: Humanitarian Use Device û Smart Therapeutics, Inc. û Neuroform Microdelivery Stent for the Treatment of Wide Neck Intracranial Aneurysms 030-515308

04/2019 GORE« Carotid Stent Clinical Study for the treatment of carotid artery stenosis in patients at increased risk for adverse events from carotid endarterectomy - The Gore SCAFFOLD Clinical Study 030-474333

04/2019 Aneurysm Management by Dual Trained Neurosurgeons STUDY0002744

08/12/19 CONTEGO Mecial P2 – Performance II Trial Protection against Embolization during carotid artery stenting using a 3-in-1 delivery system comprised of a pOst-dilation balloon, integrated eMolic filter and a Novel Carotid stEnt

**CLINICAL STUDIES APPROVED PROPOSALS NON -ACTIVE**

9/28/2009 Stenting vs. maximal Medical treatment for Acute Revascularization Therapy after ischemic Stroke (SMARTS)

8/30/2010 MOSISS

5/19/2011 “Gaining Efficacy Long Term: Hydrosoft, and Emerging, New, Embolic Coil (Gel-the-nec)”

7/26/2011 AMERICA Axium™ MicroFX™ for Endovascular Repair of IntraCranial Aneurysm: A Multi-Center, Prospective Observational Registry

10/17/2011 The Start Trial: Clinical Outcome in Acute Stroke Treatment after Imaging Guided Patient Selection for Interventional Revascularization Therapy



- 6/25/2012 The THERAPY Trial: The Randomized, Concurrent Controlled Trial to Assess the Penumbra System's Safety and Effectiveness in the Treatment of Acute Stroke
- 6/26/2012 International Retrospective Study of Pipeline Embolization Device (IntrePED)
- 12/6/2012 Aneurysm Study Of Pipeline In An Observational Registry
- 5/6/2014 Mechanisms of early recurrence in intracranial atherosclerotic disease MyRIAD)
- 3/26/2015 Adjunctive Neurovascular Support of Wide-neck aneurysm Embolization and Reconstruction (ANSWER) Study
- 12/1/2015 DAWN™ Trial: DWI or CTP Assessment with Clinical Mismatch in the Triage of Wake Up and Late Presenting Strokes Undergoing Neurointervention

### VISITING PROFESSOR INVITED LECTURES

1. Boulos, AS, **Levy, EI**, Lopes D., Bendok BR, Kim SH, Hanel R, Qureshi AI, Gutterman LR, Hopkins LN, Novel Endovascular Treatment of Cerebral Aneurysms, Neuroscience Grand Rounds, September 2002, Albany, NY.
2. **Levy EI** Current Standards for treatment for ruptured and non-ruptured Aneurysms, Clinical trial results. Presented: Grand Rounds at the VA Hospital, Buffalo, January 6, 2005.
3. **Levy EI** Discussion on Microvascular Decompression: Presented Millard Fillmore Hospital Grand Rounds 1/6/2005.
4. **Levy EI** Current Standards for Treatment of Ruptured and Non-Ruptured Aneurysms. Presented for Grand Rounds at Sisters of Charity Hospital, Buffalo NY. February 15, 2005.
5. **Levy EI** Contemporary Management of Intracranial Aneurysms. Presented for Internal Medicine Grand Rounds at Millard Fillmore Hospital, Buffalo, NY. February 28, 2005.
6. Hanel RA, **Levy EI**, Guterman, LR, Hopkins LN. Cerebrovascular revascularization on the era of endovascular neurosurgery. Visiting Professor of Neurosurgery. University of Rochester, Rochester, NY Apr 27, 2005
7. Hanel RA, **Levy EI**, Horowitz M, Guterman LR, Hopkins LN. Interventional endovascular therapy applied to ENT. Otolaryngology Grand Rounds, SUNY Buffalo, Apr 28, 2005.
8. **Levy EI** New Treatment Modalities for Stroke and Stroke Intervention. Oral Presenter. Grand Rounds at Kenmore Mercy Hospital, Buffalo, NY. May 3, 2005.
9. **Levy, EI**. The current role of Extra-Intracranial Bypass surgery for neurovascular pathologies. Visiting Professor. Grand Rounds at West Virginia University. Morgantown, WV. November 21, 2008.
10. **Levy, EI**. The current role of Extra-Intracranial Bypass surgery for neurovascular pathologies. Visiting Professor. Grand Rounds at West Virginia University. Morgantown, WV. November 21, 2008.

11. **Levy, EI** Acute stroke: transition from rehabilitation to intervention. Visiting Professor. GrandRounds at Massachusetts General Hospital, Boston, MA. January 22, 2009.
12. **Levy, EI** Live Case Presentation, Schwartz Rounds. Al Ford Auditorium, Women and Children's Hospital, Buffalo, NY. November 12, 2010.
13. **Levy, EI** Stroke: At The Cutting Edge Of Neurosurgical Intervention. Visting Professor. Neurosurgery Grand Rounds at Thomas Jefferson University. Philadelphia, PA. April 1, 2011.
14. **Levy, EI** Current and Future Intervention For Stroke: A Surgical Disease. Visiting Professor. Neurosurgery Grand Rounds at UC San Diego School of Medicine, San Diego, CA. May 13, 2011.
15. **Levy, EI** Stroke intervention: The Cutting Edge and Beyond. Visiting Professor. Neurosurgery Grand Rounds at UCSF Clinical/Faculty Appreciation Day. San Franciso, CA. August 11, 2011.
16. **Levy, EI** Why the Time is Now for Endovascular to be a Neurosurgical Subspecialty. Visting Professor Neurosurgery Grand Rounds at John Hopkins Hosptial, Baltimore, MD, January 17, 2013.
17. **Levy, EI** Neurosurgery: The Field Gets Bigger as the Access Gets Small. Visiting Professor. Neurosurgery Grand Rounds at Louisiana State University, Department of Neurosurgery (LSU). Shreveport, Louisiana, May 8, 2013.
18. **Levy, EI** Neurosurgery: Endovascular Treatment of Acute Ischemic Stroke: The End or Just the Beginning?. Visiting Professor, Neurosurgery Grand Rounds at Ohio State University/Wexner Medical Center, Columbus, Ohio, November 2013.
19. **Levy, EI.** Neurosurgery: Invited to be Bronson Ray Day Special Guest Lecturer; Grand Rounds at the Weil Cornell Medical College/NY Presbyterian Hospital's Department of Neurological Surgery, New York, New York, June 10 – June 12, 2015.
20. **Levy, EI.** Neurosurgery: Stroke and the Neurosurgeon. Visiting Professor, Neurosurgery Grand Rounds at the University of Utah, Salt Lake City, Utah, September 2015.
21. **Levy, EI.** Neurosurgery: Training the Next Generation of Neurovascular Surgeons. Invited to be Honored Graduation Day Visiting Professor, Neurosurgery Grand Rounds at the Rush University Medical Center, Chicago, IL, June 15, 2016.
22. **Levy, EI** Neurosurgery: Importance of Endovascular Training for Residents. Invited to be Visiting Professor and Grand Rounds Speaker at Stanford University, Stanford California, May 4-5, 2017.
23. **Levy, EI** Neurosurgery: Stroke: A Paradigm Shift From Rehabilitation and Intrvention. Invited to be visiting Professor and Grand Rounds Speaker at Cornell Weill Medicine Department of Neurosurgery, New York, New York, March 19, 2018.
24. **Levy, EI** Neurosurgery: Lessons Learned Around The Boathouse. Invited to be Visiting Professor and Grand Rounds speaker at the University of South Florida, Department of Neurosurgery, Tampa, Florida, March 21-22, 2019.
25. **Levy, EI** Neurosurgery: Lessons Learned Around the Boathouse for Endovascular Neurosurgery. Served as the 2019 Peter Jannetta Lecturer. Annual Lecture in honor of Dr. Peter Jannetta to

highlight the impact his work had at the University of Pittsburgh. UPMC Presbyterian, Pittsburgh, PA. April 3, 2019.

26. **Levy, EI** Neurosurgery: Strokenomics-Extending the Tmline and Bending the Cost Cure. Served as the 2019 Peter Janetta Lecturer. Annual Lecture in honor of Dr. Peter Jannetta to highlight the impact his work had at the University of Pittsburgh. UPMC Presbyterian, Pittsburgh, PA. April 3, 2019.
27. **Levy, EI** Neurosurgery: Strokenomics-Extending the Timeline and Bending the Cost Curve. Invited to be Visiting Professor and Grand Rounds Speaker at Albert Einstein College of Medicine Montefiore Medical Center, Bronx, New York, April 18-19, 2019.
28. **Levy, EI** Neurosurgery: Lessons Learned Around the Boathouse for Endovascular Neurosurgery. Invited to be Visiting Professor and Grand Rounds Speaker at UNC Chapel Hill and Carolinas Medical Center, Atrium Health, Charlotte, North Carolina, September 12-13, 2019.

#### **INTERNATIONAL PRESENTATIONS, ORAL POSTERS, AND INVITED LECTURES**

1. Scarrow AM, **Levy EI**, Pascucci L, Albright AL. Outcome analysis of third ventriculostomy. International society of Pediatric Neurosurgeons, Salt Lake City, Utah, 1999.
2. Scarrow AM, **Levy EI**, Resnick DK, Adelson PD, Sclabassi RJ. Cervical spine evaluation in obtunded or comatose pediatric trauma patients. International society of Pediatric Neurosurgeons, Salt Lake City, Utah, 1999.
3. **Levy EI**, Niranjana A, Thompson T, Scarrow AL, Flickinger J, Kondziolka D, Lunsford LD. Radiosurgery for Childhood Intracranial Arteriovenous Malformations. 10<sup>th</sup> International meeting of the Leksell Gamma Knife Society, Squaw Valley, 2000.
4. Boulos AS, Bendok BR, **Levy EI**, Kim SH, Guterman LR, Hopkins LN. The Endovascular Treatment of Ruptured Aneurysms. The 60<sup>th</sup> Annual Meeting of the Japan Neurosurgical Society. October 2001, Okayama, Japan. (invited lecture: LN Hopkins).
5. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Problems and Pitfalls in Carotid Artery Stenting. Fourteenth Annual International Symposium on Endovascular Therapy. Miami Beach, FL, January 2002. (invited lecture: LN Hopkins).
6. Hanel RA, Qureshi AI, Siddiqui AM, Kirmani JF, Boulos AC, Kim S, Bendok BR, **Levy EI**, Guterman LR, Hopkins LN. Endovascular treatment of ischemic stroke. Teleconference, Constantino Constantini Cardiology Clinic, June 21, 2002, Curitiba - PR, Brazil.
7. **Levy EI**, Hanel RA, Boulos AS, Guterman LR, Hopkins LN. In Vivo Model of Intracranial Stent Implantation: Histological Response of Cerebral Vessels After Randomized Blinded Implantation of Heparin-Coated and Uncoated Endoluminal Stents. Brazilian Meeting of Neurosurgery, September 2002, Fortaleza, Brazil.

8. Kim SH, Siddiqui AM, Qureshi AI, Boulos AS, **Levy EI**, Bendok BR, Harrigan M, Howington JU, Yahia AM, Guterman LR. Carotid Stenting and Thrombolysis in Patients with Acute Carotid Artery Dissection and Ischemic Stroke.. 2nd International Course on Carotid Angioplasty ICCA- II. Frankfurt, Germany, October 2002.
9. Kim SH, Siddiqui AM, Qureshi AI, Bendok BR, **Levy EI**, Yahia AM, Suri A, Kirmani JF, Xavier AR, Guterman LR, Hopkins LN. Carotid Angioplasty and Stenting in Patients with Near Occlusion of Carotid Artery. 2nd International Course on Carotid Angioplasty ICCA- II. Frankfurt, Germany, October 2002.
10. **Levy EI**, Hanel RA, Guterman LR, Hopkins LN. Intracerebral Rescue for Thromboembolic Complications Following Carotid Stenting. Multidisciplinary European Endovascular Therapy (MEET) 2003: Multidisciplinary Course on Endovascular Therapy of Carotid Artery and Thoracic Aorta; Marseille, France, June 26-28, 2003.
11. Hanel RA, **Levy EI**, Lau T, Bendok BR, Guterman LR, Hopkins LN. Incidence and Treatment of In-stent Stenosis after Carotid Angioplasty and Stenting. Oral Presentation, WFITN Meeting, Recife, Brazil Nov 1 - Nov 5, 2003.
12. **Levy EI**, Hanel RA, Boulos AS, Tio FO, Paciorek AM, Kagan-Hallet KS, Fronckowiak MD, Guterman LR, and Hopkins LN: Sirolimus-eluting Stents in the Canine Cerebral Vasculature: Assessment of Safety Profile and Vessel Response. Oral Presentation, *Joint Meeting of the American Academy of Neurological Surgery, the German Academy of Neurosurgery, and the German Society of Neurosurgery*, Dresden (Germany), October 6,-2004.
13. **Levy EI**, Hanel RA, Sherman D, Bailey L, Cunningham M, Williard C, Dooley J, Kopia G: Six-Month Pharmacokinetics and Pharmacodynamics of Sirolimus-Eluting Stents in the Canine Cerebral Circulation: A Randomized, Blinded Assessment. (abstract P184). *Stroke* 36:473, February 2005. Poster Presentation, *AHA International Stroke Conference 2005*, New Orleans LA, February 2-4, 2005.
14. **Levy, EI**. Carotid Artery Stenting: Planning the Procedure. Live Case Commentator. Endovascular Therapy International, University of Siena, Italy. March 17-19, 2005.
15. **Levy EI**. Interpretation of the intracranial angiography at baseline and during complications. Oral Presenter. Endovascular Therapy International, University of Siena, Italy. March 17-19, 2005.
16. **Levy EI**. Tips and Tricks. Moderator. Endovascular Therapy International, University of Siena, Italy. March 17-19, 2005.
17. **Levy EI**. Treatment of Acute Stroke. Oral Presenter. Endovascular Therapy International, University of Siena, Italy. March 17-19, 2005.
18. Hopkins LN, Ecker RD, **Levy EI**, Guterman, LR and Hanel RA. Vertebral Artery Intervention and Its Impact on the Posterior Circulation. Syllabus Abstract. Multidisciplinary European Endovascular Therapy (MEET) Congress. Cannes, French Riviera. June 9-12, 2005.

19. **Levy EI.** “Aneurysmal Subarachnoid Hemorrhage: Management Strategies”. Oral Presentation. 1<sup>st</sup> Conference of Chinese Neurosurgeons, November 5-9, 2005. Shanghai, China November 5, 2005, Zhenjiang, China, November 6, 2005, Tianjing, China, November 9, 2005.
20. **Levy EI.** “How to Judge Coil Embolization in 2005”. Oral Presentation. 1<sup>st</sup> Conference of Chinese Neurosurgeons, November 5-9, 2005. Shanghai, China November 5, 2005, Zhenjiang, China, November 6, 2005.
21. **Levy EI.** “Orbit Complex Coils for Intracranial Aneurysms: Higher Packing Density Improves Midterm Angiographic Results”. Oral Presentation. 1<sup>st</sup> Conference of Chinese Neurosurgeons , November 5-9, 2005. Zhenjiang, China, November 6, 2005, Beijing, China, November 7, 2005, Tianjing, China, November 9, 2005.
22. **Levy EI.** “How to Achieve Higher Packing Density in the Aneurysm Coiling: Technical Tips”. Oral Presentation. 1<sup>st</sup> Conference of Chinese Neurosurgeons, November 5-9, 2005. Beijing, China, November 7, 2005.
23. Fiorella D, **Levy EI**, Turk A, Albuquerque FC, Nieman D, Qagaard-Kienitz B, Woo H, Rasmussen PA, Hopkins LN, Masaryk TJ, Hanel RA, McDougall CG. *Intracranial Atheroma Case Discussion, Evidence Based Management of Cerebrovascular Disease, Part II*, Joint Program of International Stroke Conference and AANS/CNS Cerebrovascular Section and ASITN, Kissimmee, FL, February 17, 2006.
24. **Levy EI.** When and how to treat vertebral arteries and carotid dissections. Oral Presenter. Endovascular Therapy International, Laguna Palace Hotel, Venice Mestre, Italy. March 23-25, 2006
25. **Levy EI.** Interventional Techniques. Oral Presenter. Endovascular Therapy International, Laguna Palace Hotel, Venice Mestre, Italy . March 23-25, 2006
26. **Levy EI.** Cabernet study. Oral Presenter. Endovascular Therapy International, Laguna Palace Hotel, Venice Mestre, Italy March 23-25, 2006.
27. **Levy EI**, Wingspan Stent HDE Clinical Study 12 Month Follow-up. Presenter. Semana del Intervencionismo Minimamente Invasivo. Buenos Aires, Argentina. April 5-8, 2006.
28. **Levy EI**, Endovascular advances in the treatment of complex aneurysms and Orbit experience. Oral Presenter. Cerebrovascular Disease Forum. Huashan Hospital. Shanghai, China. April 25, 2006.
29. **Levy EI**, Stroke Intervention: patient selection and treatment.. Oral Presenter. Cerebrovascular Disease Forum. Huashan Hospital. Shanghai, China. April 26, 2006.
30. **Levy EI**, Endovascular advances in the treatment of complex aneurysms and Orbit experience. Oral Presenter. Cerebrovascular Disease Forum. Semina in Huashan Hospital. Shanghai, China. April 27, 2006.
31. **Levy EI**, Beijing Aneurysm Training Course in J&J Medical University. Faculty. Cerebrovascular Disease Forum. Beijing, China. April 28, 2006.
32. Yamamoto J, Ecker RD, Tummala RP, Sauvageau E, **Levy EI**, Hopkins LN: Internal “Cross-Clamping” Technique for Treatment of Symptomatic Carotid Stenosis with Intraluminal Thrombus

(abstract). Accepted for presentation at *The 65th Annual Meeting of the Japanese Neurosurgical Society*, Kyoto Japan, October 18, 2006.

33. Meng H, Swartz DD, Wang Z, Hoi Y, Kolega J, Metaxa E, Szymanski MP, Gao L, Paciorek AM, Yamamoto J, Sauvageau E, **Levy EI**, Hopkins LN: *In Vivo* Hemodynamics Correlated with Vascular Responses Associated with Cerebral Aneurysm Development. *5th World Congress of Biomechanics*, Munich (Germany), July 29-August 4, 2006. In Liepsch D (ed): *International Proceedings G729C1618:479-483*, MEDIMOND Monduzzi Editore (Bologna, Italy), 2006
34. Albuquerque FC, McDougall CG, Hanel RA, Fiorella D, **Levy EI**, Turk AS, Niemann DB, Aagaard-Kienitz B, Woo H, Rasmussen PA, Hopkins LN, Masaryk TJ: Preliminary Multicenter Experience with the Wingspan Stent for the Treatment of Intracranial Stenosis. Accepted for oral presentation at the *Joint International Stroke Conference--AANS-CNS Cerebrovascular Section--ASITN Meeting*, San Francisco CA, February 8, 2007
35. **Levy EI**. Current status of CAS in the US: Learnings for the Japanese Market. The 6th JASTNEC (The 6th Meeting of Japanese Society for Treatments at Neck in Cerebrovascular Disease). Fukuoka, Japan, June 13 -16, 2007.
36. **Levy EI**. Intracranial Stenosis and Aneurysms. Lecture at Technion, Israel Institute of Technology, Rambam Healthcare Campus, Haifa, Israel,, October 15, 2007.
37. **Levy EI**. Interventional Stroke Treatment Current Concepts and Future Directions. Poriah Hospital, Haifa, Israel, October 15, 2007.
38. Sharma J, Matthews MS, Mocco J, Snyder KV, Ionita C, Siddiqui AH, Hopkins LN, Levy EI: The Adjunctive Use of Intra-arterial Eptifibatid as a Revascularization Tool in Acute Cerebrovascular Ischemia. Oral Presentation, *61<sup>st</sup> American Academy of Neurology Annual Meeting*, Seattle WA, April 25-May 2, 2009
39. **Levy EI**, Hauck, EF: Invited Lecturer, "The Current State of Carotid Stenting" Carmel Hospital, Haifa, Israel. June 3, 2009.
40. Meng H, Dhar S, Gao L, Hoi Y, Kolega J, **Levy E**, Mandelbaum M, Metaxa E, Mocco J, Natarajan SK, Siddiqui A, Tremmel M, Wang Z, Xiang J, Hopkins LN: Hemodynamic Factors Contributing to Aneurysm Formation and Rupture (abstract\_LS01-02). Oral Presentation, *The 6<sup>th</sup> International Intracranial Stent Meeting 2009: Tidal Wave from Coil to Prosthesis, from Embolization to Reconstruction* (in conjunction with the 17<sup>th</sup> Meeting of Neuroendovascular Therapy Sendai Seminar 2009), Sendai Japan, August 5-7, 2009.
41. Meng H, Gao L, Kolega J, **Levy EI**, Mandelbaum M, Metaxa E, Mocco J, Natarajan SK, Siddiqui AH, Tremmel M, Hopkins LN. (2009, August). *Flow-induced Basilar Bifurcation Aneurysm Model in Rabbit*. Oral Presentation presented at: The 6<sup>th</sup> International Intracranial Stent Meeting 2009: Tidal Wave from Coil to Prosthesis, from Embolization to Reconstruction; Sendai, Japan.
42. Natarajan SK, Snyder KV, Siddiqui AH, Ionita CC, Hopkins LN, **Levy EI**. (2009, September). Safety and Efficacy of Endovascular Therapy after 8 Hours of Acute Ischemic Stroke Onset and Wake-up Strokes. (Paper A-161-0003-02461).Poster presentation, Open Session 1: Cerebrovascular Disease 1, on September 13, 2009. *13<sup>th</sup> Congress of the European Federation of Neurological Societies (EFNS)*; Florence, Italy.

43. Ohta H, Hauck EF, Natarajan SK, Siddiqui AH, **Levy EI**, Hopkins LN, Takeshima H: Analysis of Enterprise Stenting for Cerebral Aneurysms. Oral Presentation, *The 25<sup>th</sup> Annual Meeting of the Japanese Society for Neuroendovascular Therapy*, Toyama, Japan, November 19-21, 2009.
44. Ohta H, Siddiqui AH, Hauck EF, **Levy EI**, Hopkins LN, Takeshima H: Intracranial Stenting for Cerebral Aneurysms under Local Anesthesia: A Retrospective Analysis. Oral Presentation, *The 68<sup>th</sup> Annual Meeting of the Japan Neurosurgical Society*, Tokyo, Japan, October 14-16, 2009.
45. **Levy EI**, Special Lecture, :Carotid Revascularization: “Modern management of carotid stenosis and future perspective base on CREST”, *26<sup>th</sup> Annual JSNET Meeting*, Fukuoka, Japan., November 18, 2010.
46. **Levy, EI**, Seminar, BSJ Session: “Selection of the device; closed cell/open cell for stent, filter/balloon for EPD” , *26<sup>TH</sup> Annual JSNET Meeting*, Fukuoka, Japan., November 18, 2010.
47. **Levy, EI**, Special Comment: Intracranial Stenting for Arteriosclerotic “Stenosis of Intra Cranial arteries including Wingspan, DES and SAMPRIS”, *26th Annual JSNET Meeting* Fukuoka, Japan., November 18, 2010.
48. **Levy, EI**, BSCI Keynote Lecture: Teaching Seminar: “Effective use and Appropriate patient Selection of Carotid Wallstent and Filterwire EZ” *26<sup>th</sup> Annual JSNET Meeting*, Fukuoka, Japan, November 19, 2010.
49. **Levy, EI**, Commentator Korean-Japanese Friendship Conference on ”Advanced Endovascular Treatment for Cerebral Aneurysm”, *KSIN-JSNET Joint Session*, Fukuoka, Japan, November 19, 2010..
50. **Levy, EI**, ,Oral Presentation “Morbidity and Mortality after treatment of Intracranial aneurysms with pipeline embolization device: Analyses of an International Multicenter Registry” *Israel Neurological Society Annual Meeting of the Israel Neurosurgical Society*, Jerusalem, Israel March 20, 2014.
51. **Levy, EI**, Oral Presentation “Coiling in Conjunction with Pipeline Embolization Device for the Treatment of Intracranial Aneurysms” *Israel Neurological Society Annual Meeting of the Israel Neurosurgical Society*, Jerusalem, Israel, March 20, 2014.
52. **Levy, EI**, Oral Presentation “Primary Stentriever vs Combined Stentriever plus Aspiration Thrombectomy Approaches in Vitro Stroke Model Comparison” *Israel Neurological Society Annual Meeting of the Israel Neurosurgical Society*, Jerusalem, Israel, March 20, 2014.
53. **Levy, EI**, Oral Presentation “Thrombus Density Predicts Successful Recanalization with Solitaire Stent-Retriever Thrombectomy in Acute Ischemic Stroke” *Israel Neurological Society Annual Meeting of the Israel Neurosurgical Society*, Jerusalem, Israel, March 20, 2014.
54. **LEVY, EI**, Oral Presentation “New Aneurysm Technology” *29<sup>th</sup> Annual Scientific Congress of the Turkish Neurosurgical Society*, Antalya, Turkey, April 19, 2015.
55. **LEVY, EI**, Oral Presentation “Stroke: A Paradigm Shift to Intervention” *2<sup>nd</sup> CAANS Continental Congress, 25<sup>th</sup> SNSA Scientific Meeting*, Cape Town, South Africa, July 26-29, 2016.



56. **Levy, EI**, Oral Presentation “Novel Interventions For Intracranial Aneurysms”, *2<sup>nd</sup> CAANS Continental Congress, 25<sup>th</sup> SNSA Scientific Meeting*, Cape Town, South Africa, July 26-29, 2016.
57. **Levy, EI**, Oral Presentation “Patients’ Selection For Thrombectomy”, *2<sup>nd</sup> Annual International Meeting on Comprehensive Approaches in Stroke Treatment*, (CAST) Tel-Aviv, Israel, October 22-23, 2017.
58. **Levy, EI**, Oral Presentation “Atherosclerotic Disease of Intra and Extra Cranial Vessell”, *2<sup>nd</sup> Annual International Meeting on Comprehensive Approaches in Stroke Treatment*, (CAST) Tel-Aviv, Israel, October 22-23, 2017.
59. **Levy, EI**, Oral Platform Presentation “Horizontal Deployment of an Intracranial Stent via an Antegrade Approach for Coil Embolization of a Basilar Apex Aneurysm: Technical Note” (ASNR) American Society of Neuroradiology, Vancouver, Canada June 4-7, 2018.

#### **NATIONAL PRESENTATIONS, ORAL POSTERS, AND INVITED LECTURES**

1. **Levy EI**, Paino J, Sarin PS, Goldstein AL, Wright D, Sekhar LN. Differential Cytokine Expression in Meningiomas: Correlation of IL-1beta and IL-6. 1994 George Washington Medical Center Faculty Research Day, Washington, D.C. (poster).
2. **Levy EI**, Paino J, Sarin PS, Goldstein AL, Wright D, Sekhar LN. Differential Cytokine Expression in Meningiomas: Correlation of IL-1beta and IL-6. 1995 American Association of Neurological Surgeons Annual Convention, Orlando, Florida (poster).
3. **Levy EI**, Paino J, Sarin PS, Goldstein AL, Wright D, Sekhar LN. Differential Cytokine Expression in Meningiomas: Correlation of IL-1beta and IL-6. 1995 George Washington University Medical Center Washington, DC.
4. Bejjani GK, Richardson P, Jurjus AR, Raso J, Nadel A, Sullivan BJ, **Levy EI**, Duong DH, Sekhar LN. The Glutaraldehyde Tanned Porcine Nerve Xenograft: Electrophysiological and Morphological Evaluation. 1997 Congress of Neurological Surgeons, New Orleans, LA.
5. Scarrow A, Segal R, **Levy EI**, Sclabassi R. Outcome Analysis of Anterior and Posterior Cervical Spine Decompression for Cervical Spondylotic Myelopathy: Correlation with Functional Results and SSEP’s. 1998 AANS/ CNS Joint Section on Disorders of the Spine and Peripheral Nerves, Orlando, FL (poster).
6. Kondziolka D, **Levy EI**, Niranjan A, Bissonette D, Flickenger JC, Lunsford LD. Long-term Outcomes After Meningioma Radiosurgery: The Physicians’ and Patients’ Perspective. 1998 American Association of Neurological Surgeons, New Orleans, LA.
7. **Levy EI**, Rubin G, Firlik AD, et al. The Remote Effects of Acute Ischemic Stroke: Transhemispheric Diaschisis. 1998 American Association of Neurological Surgeons, New Orleans, LO (poster).

8. **Levy EI**, Firlik AD, Rubin G. et al. 1998 Is Intra-arterial Thrombolysis for Acute Vertebrobasilar Artery Occlusion Justified? A Meta-analysis of Prognostic Factors. 1998 Congress of Neurological Surgeons Annual Meeting, Seattle, WA.
9. Rubin G, **Levy EI**, Firlik AD, Yonas H, Wechsler LR. Are XeCT CBF Studies able to Predict Outcome in Patients with Acute Ischemic Stroke? A Review of 50 Patients. 1998 Congress of Neurological Surgeons Annual Meeting, Seattle, WA (oral poster).
10. Jannetta PJ, **Levy EI**, Clyde B, McLaughlin MR. Microvascular Decompression of the Left Lateral Medulla Oblongata for Severe Refractory Neurogenic Hypertension. National Heart, Lung, and Blood Institute Special Emphasis Panel on Vascular Medullary Compression and High Blood Pressure, 1998, NIH, Bethesda, MD.
11. **Levy EI**, Firlik AD, Rubin G, et al. Is Intra-arterial Thrombolysis With Urokinase for Acute Vertebro-Basilar Artery Occlusion Justified? Patient Outcomes and Review of the Literature. 1998 24<sup>th</sup> Annual Symposium at the Barrow Neurological Institute, Phoenix, AZ, 1998.
12. **Levy EI**, Resnick DK, Jannetta PJ, et al. Pediatric Hemifacial Spasm: The Efficacy of Microvascular Decompression. 1998, American Association of Neurological Surgeons, Philadelphia, PA. (poster).
13. Resnick DK, **Levy EI**, Jannetta PJ, et al. Pediatric Trigeminal Neuralgia: The Efficacy of Microvascular Decompression American Association of Neurological Surgeons, Philadelphia, PA, 1998. (poster).
14. Rubin G, Firlik AD, Yonas H, Wechsler LR, **Levy EI**. Effect of Reperfusion Therapy on Cerebral Blood Flow in Acute Stroke. ASITM AANS/CNS Cerebrovascular Section Meeting, Orlando, FL. 1998.
15. **Levy EI**. Antibiotic Prophylaxis and Empiric Treatment for the Critical Patient 1998 Regional Symposium on Effective Antibiotic Treatment.
16. Lee S, **Levy EI**, Scarrow AM, Jannetta PJ. Recurrent Trigeminal Neuralgia Due To Veins Following Microvascular Decompression. Congress of Neurosurgery, Boston, MA 1999.
17. Segal R, Beth-Ott M, **Levy EI**. Reardon R. Prospective Study of Long-term Results of Totally Implantable Spinal Cord Stimulation (SCS) in Cohort of 78 Patients. Congress of Neurosurgery, Boston, MA 1999.
18. Hadjipanayis C, **Levy EI**, Firlik AD, Kondziolka D, Flickinger JC, Lunsford LD. Stereotactic Radiosurgery, In The Management Of Motor Cortex Arteriovenous Malformations. Congress of Neurosurgery, Boston, MA 1999.
19. **Levy EI**, Resnick DK, Adelson PD, Sclabassi RJ. Cervical spine evaluation in obtunded or comatose pediatric trauma patients. Scarrow AM. AANS/CNS Section on Spine and Peripheral Nerve Surgery, Salt Lake City, UT 1999.

20. **Levy EI**, Firlik AD, Hadjipanayis CG, Kondziolka D, Lunsford LD. Stereotactic Radiosurgery for the Management of Motor Cortex AVM's. 1999 Annual Meeting of the AANS/CNS Section on Cerebrovascular Surgery & American Society of Interventional and Therapeutic Neuroradiology ASITN 1999 Cerebrovascular Disease, Nashville, TN (poster).
21. Richardson P, Jurjus A, Sullivan B, Nadel A, Lopes E, **Levy EI**, Sekhar LN. Peripheral Nerve Xenograft: The Value of Gluteraldehyde Tanning and Corticosteroid Immunosuppression. Bejjani GK. 1999 Congress of Neurological Surgeons Annual Meeting, Seattle, Washington (oral poster).
22. **Levy EI**, Firlik AD, Hadjipanayis CG, Kondziolka D, Lunsford LD. Stereotactic Radiosurgery for the Management o Motor Cortex AVM's. 1999 Section on Cerebrovascular Disease, Nashville, TN (poster).
23. **Levy EI**, Niranjana A, Thompson T, Scarrow AL, Flickinger J, Kondziolka D, Lunsford LD. Radiosurgery for Childhood Intracranial Arteriovenous Malformations. 2000 Congress of Neurological Surgeons, San Antonio, TX.
24. Scarrow AL, Kassam AB, Patel A, **Levy EI**, Horowitz M, Yonas H, Jannetta PJ. Effects of botulinum toxin on clinical outcome of microvascular decompression for hemifacial spasm. North American Skull Base Society Meeting, Phoenix, AZ 2000.
25. Horowitz M, **Levy EI**. Intra-procedural Rupture of Intracranial Aneurysms During Coil Embolization: Management and Outcomes. Joint Meeting of the AANS/CNS Section on Cerebrovascular Surgery and ASITN, Waikoloa, Hawaii, February 10, 2001.
26. Horowitz M, **Levy EI**. Transluminal Stent-Assisted Angioplasty of the Intracranial Vertebrobasilar System for Medically Refractory Posterior Circulation Ischemia. Joint Meeting of the AANS/CNS Section on Cerebrovascular Surgery and ASITN, Waikoloa, Hawaii, February 10, 2001.
27. **Levy EI**. Management of Subarachnoid Hemorrhage in the Primary Care Setting. Malone, New York, April 2001 (invited lecturer).
28. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Should Cardiologists be Involved in the Management of Stoke? Transcatheter Cardiovascular Therapeutics, Washington, DC, September 2001 (invited lecture: LN Hopkins).
29. Koebbe CJ, **Levy EI**, Horowitz M, Jungreis CJ, Kassam A, Purdy PD, Pride GL, Dutton K. Endovascular coiling of anterior communicating artery aneurysms: a review of clinical and angiographic outcomes. Congress of Neurological Surgeons, San Diego, CA September 2001 (poster).
30. Maroon J, Gardner P, Wahlig J, **Levy EI**. Golf Induced Stroke from Vertebral Artery Dissection. Congress of Neurological Surgeons, San Diego, CA October 2001 (poster).

31. **Levy EI**, Boulos AS, Bendok KR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Should Endovascular Neurosurgery be within the Department of Neurosurgery? Academy of Neurological Surgeons, Palm Beach, FL, November 2001 (invited lecture: LN Hopkins).
32. Bendok BR, **Levy EI**, Boulos AS, Kim SH, Yahia AM, Qureshi AI, Guterman LR, Hopkins LN. Acculink for Revascularization of Carotids in High Risk Patients (ARCHER) Trial Update. ISET, January 2002, Miami Beach, FL. (invited lecture: LN Hopkins)
33. **Levy EI**, Bendok BR, Boulos AS, Guterman LR, Hopkins LN. Staged Stent-Assisted Angioplasty for Symptomatic Intracranial Vertebrobasilar Stenosis. Society of University Neurosurgeons Annual Meeting June, 2002 Evanston, IL.
34. Bendok BR, Hanel R, Boulos AS, **Levy EI**, Kim SH, Hartney M, Qureshi AI, Guterman LR, Hopkins LN. Stent assisted Coiling of Intracranial Internal Carotid Artery Aneurysms: Clinical and Angiographic follow up. Society of University Neurosurgeons Annual Meeting, June 2002 Evanston, IL.
35. Hanel R, Bendok BR, Boulos AS, **Levy EI**, Qureshi A, Guterman LR, Hopkins LN. Re-do treatment for intracranial aneurysms: an analysis of endovascular therapeutic options. Society of University Neurosurgeons Annual Meeting, June 2002, Evanston, IL.
36. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Towards Lower Morbidity and Greater Patient Comfort in Endovascular Neurosurgery: The Transradial Approach. Cerebrovascular Surgery and ASITN, February 2002, Dallas, TX.
37. Bendok BR, **Levy EI**, Boulos AS, Kim SH, Ringer AJ, Guterman LR, Qureshi AI, Hopkins LN. Prospective assessment of a new thermally detachable platinum microcoil to treat intracranial aneurysms. ANNS April 2002, Chicago, IL (poster).
38. **Levy EI**, Boulos AS, Bendok BR, Kim SH, Ringer AJ, Guterman LR, Qureshi AI, Hopkins LN. Endovascular strategies for carotid disease. ANNS Comprehensive Course on Cerebrovascular Disease, April 2002, Chicago, IL (invited lecture and syllabus contribution: LN Hopkins).
39. Kim SH, Qureshi AI, Yahia AM, Boulos AS, Bendok BR, **Levy EI**, Guterman LR, Hopkins LN. Use of Combined Transfemoral and Transradial Arterial Approach for Treatment of Chronic Subclavian Artery Occlusion with Angioplasty and Stent Placement. AANS Annual Meeting, April 2002 Chicago, IL (poster).
40. Pilot Trial of Safety and Effectiveness of Continuous Intravenous Magnesium Sulfate for Prevention of Cerebral Vasospasm in Patients with Aneurysmal Subarachnoid Hemorrhage. Kirmani JF, Yahia AM, Qureshi AI, Kim SH, **Levy EI**, Bendok B, Polina J, Gibbons K, Guterman LR, Hopkins LN. AANS Annual Meeting, April 2002 Chicago, IL (poster).
41. Boulos AS, **Levy EI**, Bendok BR, Kim SH, Qureshi AI, Guterman LR, Hopkins LN. Preliminary Experience with Distal Protection Devices in the Percutaneous Treatment of

Carotid Artery Disease: A Prospective Analysis of Periprocedural Complications. CNS Meeting, September 2002, Philadelphia, PA.

42. **Levy EI**, Hanel RA, Boulos AS, Fermin T, Nemes B, Paciorcek AM, Alberico R, Guterman LR, Hopkins LN. The First In Vivo Intracranial Stent Model: Histological Response of Cerebral Vessels Following Randomized Blinded Implantation of Heparin-Coated and Uncoated Endoluminal Stent. ASITN AANS/CNS CV Section Meeting, Phoenix, Arizona, February 2003.
43. **Levy EI**, Hanel R, Bendok BR, Boulos AS, Kim S, Guterman LR, Hopkins LN. Staged Stent-Assisted Angioplasty for Symptomatic Intracranial Vertebrobasilar Stenosis. ASITN AANS/CNS CV Section Meeting, Phoenix, Arizona, February 2003.
44. Bendok BR, Hanel R, Boulos AS, **Levy EI**, Kim SH, Hartney M, Qureshi AI, Guterman LR, Hopkins LN. Clinical and angiographic outcomes of Stent-Assisted Coil Treatment of Intracranial Internal Carotid Artery Aneurysms: A Single-Center Experience. ASITN AANS/CNS CV Section Meeting, (poster), Phoenix, Arizona, February 2003.
45. **Levy EI**, Bendok BR, Hopkins LN: When Coils Are Not Enough: Stents for Aneurysms. New Developments and Controversies in Cerebrovascular Intervention Symposium, Phoenix AZ, February 12, 2003.
46. Boulos AS, Bendok BR, Hanel RA, **Levy EI**, Kim SH, Qureshi AI, Guterman LR. Endovascular Reconstruction in Fusiform or Dissecting Posterior Circulation Aneurysms. [Abstract in J Neurosurg 98:694, March 2003]. Oral Presentation, American Association of Neurological Surgeons Annual Meeting, San Diego, California, April 2003.
47. Howington JU, **Levy EI**, Boulos AS, Hanel RA, Guterman LR, Hopkins LN. The histological response of cerebral vessels after randomized blinded implantation of heparin-coated and uncoated endoluminal stents. Oral Presentation (basic science award winner), Annual Meeting of the Southern Neurosurgical Society, Orlando FL, May 2003.
48. **Levy EI**, Boulos AS. Osteoporosis: Diagnosis and Indications for Medical Management Vertebroplasty: Indications and Treatment Options (practical course) at American Association of Neurological Surgeons Annual Meeting, San Diego CA, April 2003.
49. Kim SH, Siddiqui AM, Qureshi AI, Boulos AI, Yahia AM, **Levy EI**, Bendok BR, Harrigan MR, Guterman LR, Hopkins LN. Safety and Short-Term Efficacy of Angioplasty and Stenting for Symptomatic Extracranial Vertebral Artery Stenosis Poster Presentation, American Association of Neurological Surgeons Annual Meeting, San Diego, California, April 2003.
50. Qureshi AI, Boulos AS, Kim SH, Yahia AM, Bendok BR, **Levy EI**, Kirmani JF, Hopkins LN. Carotid Artery and Stent-Assisted Angioplasty Using the FilterWireEX for Distal Protection: an International Multicenter Study (Paper 740). Oral Presentation, American Association of Neurological Surgeons Annual Meeting, San Diego, California, April 2003.

51. **Levy EI**, Hanel RA Nemes B, Howington JU, Am lani S, Fronckowiak MD, Paciorek AM, Tio FO, Boulos AS, Guterman LR, Hopkins LN. Randomized Blinded Implantation of Cordis Cypher™ Sirolimus-eluting Stent Versus Bare Metal BX-Velocity™ Stents To Determine Safety in the Intracranial Vasculature. Trans Catheter Therapeutics, Washington DC, September 15-19, 2003.
52. **Levy EI**, Grube E, Müller R, Gerckens U, Hanel R, Hopkins L, Baim D Matrix VSG, Imaging Findings of a Novel Access-site Management Technology. Poster presentation, TCT 2003, Washington DC, September 15-19, 2003.
53. Kyprianou IS, Wang Z, Hanel RA, **Levy EI**, Nemes B, Rudin S. Development Of Methods For The Use Of Roi Microangiography In Neurointerventional Procedures. RSNA 89th Scientific Assembly and Annual Meeting, Chicago, Illinois November 30-December 5, 2003.
54. Grube E, Müller E, Gerckens U, **Levy EI**, Hopkins LN, Ramee S. Matrix VSG, A Novel Access-site Management Technology, Oral presentation, TCT 2003, Washington DC, September 15-19, 2003.
55. Hanel RA, **Levy EI**, Lau T, Bendok BR, Guterman LR, Hopkins LN. Incidence and Treatment of in-stent stenosis after carotid angioplasty and stenting. Congress of Neurological Surgeons Denver CO, October 18-23, 2003.
56. Hoi Y, Meng H, Bendok BR, Hanel R, Woodward S, **Levy EI**, Guterman LR, Hopkins LN. Effects of Arterial Curvature on Cerebral Aneurysmal Hemodynamics: Implication on Risk Assessment and Coil Treatment, Poster Presentation, Congress of Neurological Surgeons Annual Meeting, Denver CO, October 18-23, 2003.
57. Hanel RA, Padalino D, Bendok BR, **Levy EI**, Guterman LR, Hopkins LN. Carotid Angioplasty and Stenting with Distal Embolic Protection: The New Gold Standard Treatment for Recurrent Carotid Stenosis After Endarterectomy? Accepted for Oral Presentation, 2004 Joint Annual Meeting of the AANS/CNS Cerebrovascular Section & American Society of Interventional and Therapeutic Neuroradiology, San Diego, February 2004
58. **Levy EI**, Hanel RA, Nemes B, Howington JU, Amlani S, Fronckowiak MD, Paciorek A, Randomized Blinded Implantation of Cordis Cyphertm Sirolimus-Eluting Stent Versus Bare Metal Bx-Velocitytm Stents to Determine Safety in the Intracranial Vasculature Accepted for Oral Presentation, 2004 Joint Annual Meeting of the AANS/CNS Cerebrovascular Section & American Society of Interventional and Therapeutic Neuroradiology, San Diego, February 2004.
59. Villalobos H, Hanel RA, **Levy EI**, Guterman LR, Hopkins LN. Endovascular treatment of spontaneous carotid artery dissection. Accepted for Poster Presentation, 2004 Joint Annual Meeting of the AANS/CNS Cerebrovascular Section & American Society of Interventional and Therapeutic Neuroradiology, San Diego, February 2004.
60. Hanel RA, **Levy EI**, Nemes B, Howington JU, Amlani SMD, Iacovos IS Kyprianou, Z Wang, S Rudin PhD, LR Guterman PhD, MD, LN Hopkins MD. A Comparison Between Standard Angiography And Microangiography In The Evaluation Of Stent Implantation In

The Intracranial Vasculature Accepted for Poster Presentation, 2004 Joint Annual Meeting of the AANS/CNS Cerebrovascular Section & American Society of Interventional and Therapeutic Neuroradiology, San Diego, February 2004.

61. **Levy EI**, Hanel RA, Guterman LR, Hopkins LN. Update: Acute stroke intervention. Endovascular Summit, Newport Beach, CA, January 14-17, 2004.
62. **Levy EI**, Hanel RA, Guterman LR, Hopkins LN. Intracranial angioplasty and stenting. Endovascular Summit, Newport Beach, CA, January 14-17, 2004.
63. Branch M, **Levy E**, Snyderman CH, Kassam A. "Transnasal Endoscopic Resection of Synchronous Pituitary Adenoma and Suprasellar Meningioma." An interdisciplinary Approach. North American Skull Base Society Annual Meeting, New Orleans, LA, February 11-17, 2004.
64. Guterman LR, **Levy EI**: Carotid Update: Experiences in the Sapphire Trial and Future of Stenting in the Brain. Panel Discussion, Orlando FL, May 4, 2004.
65. **Levy EI**: Endovascular Therapy of Cerebrovascular Disease Management in Western New York. University of Rochester Medical Center, May 11, 2004
66. **Levy EI**: Vascular Response to Sirolimus-Eluting Stents in the Canine Cerebral Circulation. Presented: September 30, 2004 TCT Conference.
67. **Levy EI**: Mechanical revascularization therapy for acute stroke (alone and in combination with thrombolysis): State-of-the-art. Presented: October 1, 2004 TCT Conference.
68. **Levy EI**: Intracranial Stenting Using Sirolimus Coated Stent: Preclinical Data. Presented: October 10, 2004 LINC Conference.
69. **Levy EI**: DES for Intracranial Stenosis. Presented for Cordis Neurovascular Consulting Meeting, December 4, 2004 in Ft. Lauderdale, Florida.
70. **Levy EI**. Management of Intracranial Atherosclerotic Disease. Special Course Panelist. 2005 Joint Annual Meeting AANS/CNS Cerebrovascular Section & American Society of Interventional & Therapeutic Neuroradiology. New Orleans, LA, February 1-4, 2005.
71. **Levy EI**. Technology Assessment for Ischemic and Hemorrhagic Stroke. Oral Presenter. Cordis WW Research and Development Franchise Meeting. Naples, FL. April 6-7, 2005.
72. **Levy EI**. Acute Stroke Intervention. Oral Presenter. Cardiovascular Grand Rounds, Pinnacle Health, Harrisburg Hospital, Harrisburg, PA. April 14, 2005.
73. Stippler M, **Levy EI**, Kerr ME, Crago EA, Pentz R, Horowitz MB, Kassam A, Yonas H: Continuous Magnesium Infusion for Cerebral Vasospasm Prophylaxis in Aneurysmal Subarachnoid Hemorrhage. Oral Presentation 756, American Association of Neurological Surgeons Annual Meeting, New Orleans LA, April 16-21, 2005.



74. **Levy EI.** Endovascular Mgmt Options in Acute Cerebral Ischemia. Oral Presenter. American Association of Neurological Surgeons Annual Meeting, New Orleans LA, April 16-21, 2005.
75. **Levy EI.** Changing Paradigms in Cerebrovascular Neurosurgery. Panelist. American Association of Neurological Surgeons Annual Meeting, New Orleans LA, April 16-21, 2005.
76. **Levy EI.** "Improving Interventional Treatment of Intracranial Atherosclerotic Disease". Oral Presentation for Boston Scientific Corporation. New Orleans Marriott, New Orleans, LA, April 19, 2005.
77. Hanel RA, **Levy EI**, Guterman LR, Hopkins LN: Intracranial and Vertebral Artery Stenting: Promise of a New Frontier. 2nd Annual Symposium, *Cerebral Revascularization: Latest Indications and Techniques for Stroke Treatment and Prevention*, Chicago IL, September 10, 2005.
78. **Levy, EI.** "Treating Atherosclerotic Disease". Oral Presentation for Boston Scientific Corporation Fellows Meeting. Westin St. Francis Hotel, San Francisco, CA. Sept. 15, 2005
79. **Levi, EI.** Focus Group Meeting. Participant. Sheraton Boston Hotel, Congress of Neurological Surgeons 55<sup>th</sup> Annual Meeting. Boston, MA, Oct. 8-13, 2005.
80. **Levy, EI.** "Endovascular Aneurysm Surgery: Introduction to Endovascular Surgery". Practical Course Co-director for Congress of Neurological Surgeons 55<sup>th</sup> Annual Meeting. Boston MA, Oct. 8-13, 2005.
81. **Levy, EI.** "Vertebroplasty and Kyphoplasty: Novel Technologies". Practical Course Co-director for Congress of Neurological Surgeons 55<sup>th</sup> Annual Meeting. Boston MA, Oct. 8-13, 2005
82. Hoffmann KR, Rudin S, Meng H, Hopkins LN, Guterman L, **Levy E:** Three-Dimensional Analysis of the Cerebral Vasculature: Concepts and Applications. Oral Presentation, *Refresher Course: Multidimensional Image Processing, Analysis, and Display, 91st Scientific Assembly of The Radiographic Society of North America*, Chicago IL, November 27-December 2, 2005.
83. Tawk RG, Villalobos HJ, **Levy EI**, Hopkins LN: Coil Removal for Decompression of the Optic Nerve. Poster Presentation, *2006 Joint Annual Meeting of the AANS/CNS Cerebrovascular Section and American Society of Interventional & Therapeutic Neurology*, Orlando FL, February 17-20, 2006.
84. Fiorella D, **Levy EI**, Turk A, Albuquerque FC, Nieman D, Qagaard-Kienitz B, Woo H, Rasmussen PA, Hopkins LN, Masaryk TJ, Hanel RA, McDougall CG. *Management of Intracranial Occlusive Disease: Surgical and Endovascular Options*, AANS/CNS Cerebrovascular Section Annual Meeting, Orlando, FL, February 19, 2006
85. **Levy EI.** AANS Endovascular Resident Course. Faculty. American Association of Neurological Surgeons. MERI, Memphis, TN. March 31 – April 2, 2006.
86. **Levy EI,** Combined Approaches to Cerebrovascular Disease. Faculty Participant. 74<sup>th</sup> Annual Meeting of the American Association of Neurological Surgeons, San Francisco, CA. April 22 – 27, 2006.

87. **Levy EI.** Vertebroplasty: Indications and Treatment Options. Disease.. Co-Director. 74<sup>th</sup> Annual Meeting of the American Association of Neurological Surgeons. San Francisco, CA. April 22 – 27, 2006
88. Ecker RD, Lau T, **Levy EI**, Hanel RA, Guterman LR, Hopkins LN. 30 Day Morbidity and Mortality for Carotid Intervention by Physicians Who Perform Both CEA and CAS. The University at Buffalo Neurosurgery Department Experience. Oral Presentation. American Society of Neuroradiology 44<sup>th</sup> Annual Meeting, San Diego, CA, May 1-5, 2006.
89. **Levy EI**, VASCULAR RESPONSE TO COMPLEX HEMODYNAMICS IN THE APEX OF A CREATED ARTERIAL BIFURCATION INDICATING ANEURYSM DEVELOPMENT. 2006 Summer Bioengineering Conference. Amelia Island, June 2006.
90. **Levy EI.** Carotid Stenting vs. Carotid Endarterectomy. Oral Presentation. Midwest Heart Foundation Stroke Program. Time is Brain: Multi-Disciplinary Approach to Developing a Stroke Center of Excellence. Hyatt Regency, Chicago, IL. July 15, 2006.
91. **Levy EI.** Intracranial Stenting vs. Medical Management. Oral Presentation. Midwest Heart Foundation Stroke Program. Time is Brain: Multi-Disciplinary Approach to Developing a Stroke Center of Excellence. Hyatt Regency, Chicago, IL. July 15, 2006.
92. **Levy EI.** Advances in Endovascular Surgery for Hemorrhagic Stroke Treatment and Prevention. Oral Presentation. Third Annual Stroke and Neurovascular Symposium. Chicago, IL. September 9, 2006.
93. **Levy EI**, Bendok B, Guterman LR. Introduction to Endovascular Neurosurgery with Hands-on Simulation. Co-director. Congress of Neurosurgeons Annual Meeting. Chicago, IL. October 7, 2006.
94. **Levy EI.** Treatment in Ischemic Stroke Secondary to Intracranial Vascular Disease. Oral Presenter. Congress of Neurosurgeons Annual Meeting. Chicago, IL. October 10, 2006
95. **Levy EI.** Digital Masters Video Symposium. Presenter. Congress of Neurosurgeons Annual Meeting. Chicago, IL. October 11, 2006.
96. **Levy EI.** The Future of Intracranial Stents: Evolving Endovascular Techniques. Presenter. Congress of Neurosurgeons Annual Meeting. Chicago, IL. October 11, 2006.
97. **Levy EI**, Mehta R, Gupta R, Hanel RA, Chamczuk CJ, Fiorella D, Woo HH, Albuquerque FC, Hopkins LN: Deployment of Self-Expanding Stents for Recanalization of Acute Cerebrovascular Occlusions (abstract 804). Oral Presentation (October 9, 2006), *Congress of Neurological Surgeons Annual Meeting*, Chicago IL, October 7-12, 2006.
98. Fiorella D, **Levy EI**, Turk A, Albuquerque FC, Niemann D, Aagaard-Kienitz B, Woo H, Rasmussen PA, Hopkins LN, Masaryk TJ, Hanel RA, McDougall CG: Preliminary Experience with the Wingspan Stent for the Treatment of Intracranial Atheromatous Disease (abstract). Oral Presentation, *Annual Meeting of the American Academy of Neurological Surgery*; Ritz-Carlton Lodge–Reynolds Plantation, Greensboro GA; October 19, 2006.
99. Sauvageau E, Jeziorski AM, Mehta R, **Levy EI**, Hopkins LN: Middle Cerebral Artery Stenting for Acute Ischemic Stroke after Merci Retriever Failure (Abstract 9881). Poster Presentation

- (no. 1961), American Heart Association Scientific Sessions 2006, Chicago IL, November 12-15, 2006.
100. **Levy, EI.** Cervicocerebral Interventions 1. Live Case Session 1 Panelist. Capital Cardiovascular Conference, Harrisburg, PA, November 30 – December 1, 2006.
  101. **Levy, EI.** Cervicocerebral Interventions 2. Live Case Session 2 Panelist. Capital Cardiovascular Conference, Harrisburg, PA, November 30 – December 1, 2006.
  102. Albuquerque F, Fiorella D, **Levy E**, Turk A, Niemann D, Aagaard-Kienitz B, Hanel R, Woo H, Rasmussen P, Hopkins N, Masaryk T, McDougall C: Preliminary Multicenter Experience with the Wingspan Stent for the Treatment of Intracranial Stenosis (abstract 102). Oral Presentation, *Joint International Stroke Conference–AANS-CNS Cerebrovascular Section–ASITN Meeting*, San Francisco CA. *Stroke* 38:477, February 2007.
  103. **Levy, EI.** Endovascular Approaches For Acute Stroke: The Battlefield and Beyond. Presenter. Medical Staff Grand Rounds, St. John’s Hospital, Springfield, MO, March 9, 2007.
  104. **Levy, EI.** Secondary Stroke Prevention – Carotid Endarterectomy. Presenter. Advances in Stroke and Cerebrovascular Disease Management Course. Seattle, WA, March 23, 2007.
  105. **Levy, EI.** Aneurysms: To Clip or Coil?. Presenter. Advances in Stroke and Cerebrovascular Disease Management Course. Seattle, WA, March 24, 2007.
  106. **Levy, EI.** Combined Approaches to Cerebrovascular Disease. Course Faculty. American Association of Neurological Surgeons Annual Meeting, Washington DC, April 14-19, 2007.
  107. **Levy, EI.** Percutaneous Vertebral Body Stabilization and Augmentation. Course Co-Director. American Association of Neurological Surgeons Annual Meeting, Washington DC, April 14-19, 2007.
  108. **Levy, EI.** Endovascular Management of Ischemic and Hemorrhagic Stroke. Presenter. American Association of Neurological Surgeons Annual Meeting, Washington DC, April 14-19, 2007.
  109. Bang JA, Jahromi BS, **Levy EI**, Hopkins LN: Endovascular Management of Giant Saccular Aneurysms: Clinical and Radiographic Outcome in 15 Cases. American Association of Neurological Surgeons Annual Meeting, Washington DC, April 14-19, 2007. Poster presentation.
  110. Jahromi BS, Mehta R, **Levy EI**, Hopkins LN: Early Outcome Following Multimodality Endovascular Rescue in Acute Stroke. American Association of Neurological Surgeons Annual Meeting, Washington DC, April 14-19, 2007.
  111. Albuquerque F, Fiorella D, **Levy E**, Turk A, Niemann D, Aagaard-Kienitz B, Hanel R, Woo H, Rasmussen P, Hopkins N, Masaryk T, McDougall C: Preliminary Multicenter Experience with the Wingspan Stent for the Treatment of Intracranial Stenosis (abstract 102). Oral Presentation, *Joint International Stroke Conference–AANS-CNS Cerebrovascular Section–ASITN Meeting*, San Francisco CA. *J Neurosurg* 106:A953, May 2007.
  112. Samuelson RM, Tummala RP, Jahromi BS, Yamamoto J, Tawk RG, Atwal GS, **Levy EI**, Siddiqui AH, Hopkins LN (abstract P146): Acute Stroke from Traumatic Carotid Artery

Dissection Successfully Treated with Endovascular Carotid Stent Placement. Poster Presentation, *National Neurotrauma Society Symposium*, Kansas City MO, July 29-August 1, 2007

113. Samuelson R, Tummala RP, Jahromi BS, Yamamoto J, Singh G, **Levy EI**, Siddiqui AH, Guidot CA, Hopkins LN: Aortic Arch Anatomy and Neurologic Complications with Carotid Stenting Among Octogenarians (Abstract 815). Accepted for Oral Presentation, *2007 Congress of Neurological Surgeons Annual Meeting*, September 15-20, 2007, San Diego CA. Notes: Presenting author Rod Samuelson. This presentation has two components - an oral presentation during the CNS Neurosurgical Forum and display in the Digital Poster Center.
114. **Levy EI**. Current Trends and Techniques: Treatment of Cerebral Vasospasm. Moderator. *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
115. **Levy EI**. Digital Masters Video Symposium. Carotid Stenting using Distal Embolic Protection. Presenter. *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
116. **Levy EI**. Navigating Change: Managing the Present and Working towards the Future Presenter. *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
117. **Levy EI**. Introduction to Endovascular Neurosurgery: Hands-on Simulators and the Treatment of Intracranial and Extracranial Cerebrovascular Disease. Course Director. *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
118. **Levy EI**. Modern Indications and Techniques for Open Aneurysm Surgery. Presenter *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
119. **Levy EI**. Decision Making Analysis on the Treatment of Aneurysms. Presenter *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007
120. **Levy EI**. Consult with Your Expert Colleagues –Cerebrovascular. Speaker. *2007 Congress of Neurological Surgeons Annual Meeting*, San Diego CA. September 15-20, 2007.
121. Turk AS, **Levy EI**, Albuquerque FC, Pride GL Jr, Woo H, Welch BG, Niemann DB, Purdy PD, Aagaard-Kienitz B, Rasmussen PA, Hopkins LN, Masaryk TJ, McDougall CG, Fiorella D: Influence of Patient Age and Stenosis Location on Wingspan In-Stent Restenosis (ISR). Oral Presentation, *69th Annual Meeting of The American Academy of Neurological Surgery*, Henderson NV, October 31-November 3, 2007
122. **Levy EI**. Plenary Session case presenter. AANS Boards Review Instructor. American Association of Neurological Surgery Boards Review Course. Houston, TX, November 4 – 6, 2007.
123. **Levy EI**. Initial Experience with the Endovascular Treatment of Complex Aneurysms using the Cordis Enterprise Vascular Reconstruction Device. Cordis Lunch Symposium. International Stroke Conference. New Orleans, LA, February 18 – 22, 2008.
124. **Levy EI**. Hemorrhage-Intracranial Aneurysm and Subarachnoid Hemorrhage Oral Abstracts. Co-Moderator. International Stroke Conference. New Orleans, LA, February 18 – 22, 2008.

125. **Levy EI.** Wingspan Stent Registry and Retrospective Data. Presenter. International Stroke Conference. New Orleans, LA, February 18 – 22, 2008.
126. Albuquerque F, Fiorella D, **Levy E**, Turk A, Niemann D, Aagaard-Kienitz B, Hanel R, Woo H, Rasmussen P, Hopkins L, Masaryk T, McDougall C: Preliminary Multicenter Experience with the Wingspan Stent for the Treatment of Intracranial Stenosis (abstract 102). Oral Presentation, *Joint International Stroke Conference–AANS-CNS Cerebrovascular Section–ASITN Meeting*, San Francisco CA. *Stroke* 38:477, February 2007
127. **Levy EI.** New Treatment Paradigms from a Stroke Center Perspective. Key Note Speaker. Cerebrovascular Update 2008. Philadelphia, PA, March 13-14, 2008.
128. **Levy EI.** Crossfires in Neurological Surgery. Participant. Cerebrovascular Update 2008. Philadelphia, PA, March 13-14, 2008.
129. **Levy EI,** Interventional Neurovascular Disease: Management, Complications and Avoidance Strategies. Presenter. American Association of Neurological Surgeons Annual Meeting. Chicago, IL. April 26 – May 1, 2008.
130. **Levy EI,** Post Market Carotid Artery Stenting Results for High Risk Symptomatic Patients and AHA Guidelines for Stroke and Death. Abstract Presentation. American Association of Neurological Surgeons Annual Meeting. Chicago, IL. April 26 – May 1, 2008.
131. Tawk RG, Tummala RP, Mocco J, Samuelson RM, Jahromi BS, Siddiqui AH, **Levy EI,** Hopkins LN: Reversal of Flow within the Internal Carotid Artery for Carotid Stenting. Accepted for Oral Presentation as a Scientific Paper (paper 326) at the ASNR 46th Annual Meeting to be held June 2-5, 2008 in cooperation with the ASFNR, ASHNR, ASPNR, ASSR, and SNIS, Ernest N. Morial Convention Center, New Orleans LA. Presentation date: June 4, 2008.
132. **Levy EI.** Stenting for Acute Stroke; Pros and Cons. Presenter. Society of NeuroInterventional Surgery (SNIS) Annual Meeting at Squaw Creek in Olympic Valley, CA. July 28-August 1, 2008.
133. **Levy EI.** Introduction to Endovascular Neurosurgery: Hands-on Simulators and the Treatment of Intracranial and Extracranial Cerebrovascular Disease for Residents. Practical Course Co-Director. Congress of Neurological Surgeons Annual Conference. Orlando, FL. September 20 – 25, 2008.
134. **Levy EI.** Treatment of Cerebral Vasospasm. Seminar Moderator. Congress of Neurological Surgeons Annual Conference. Orlando, FL. September 20 – 25, 2008.
135. **Levy EI.** Carotid Stenting. Seminar Presenter. Congress of Neurological Surgeons Annual Conference. Orlando, FL. September 20 – 25, 2008.
136. **Levy EI.** Thrombolysis, Thrombectomy and Stenting for Acute Stroke. Seminar Presenter. Congress of Neurological Surgeons Annual Conference. Orlando, FL. September 20 – 25, 2008.

137. **Levy EI.** Advanced Endovascular Techniques for Complex Aneurysms. Digital Masters Video Symposium Presenter. Congress of Neurological Surgeons Annual Conference. Orlando, FL. September 20 – 25, 2008.
138. **Levy EI.** The Interventional Approach to Acute Stroke Therapy: A Moderated Case-based Multi-disciplinary Discussion. Case 1: Stroke in the Emergency Room. Presenter. Transcatheter Cardiovascular Therapeutics (TCT 2008) Conference. Washington, DC. October 12 – 17, 2008.
139. Mocco J, Darkhabani Z, Ogilvy CS, Siddiqui AH, Hopkins LN, **Levy EI:** First Case in the United States of Intracranial Stenosis Treatment with the Pharos Intracranial Stent (Poster 1380). Electronic Poster Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, San Diego CA, May 2-6, 2009. Control/tracking number: 09-A-233-AANS.
140. Mocco J, Sharma J, Snyder KV, Alfay WZ, Siddiqui AH, Hopkins LN, **Levy EI:** Enterprise Vascular Reconstruction Device for Treatment of Acute Thromboembolic Stroke (Poster 1290). Electronic Poster Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, San Diego CA, May 2-6, 2009. Control/tracking number: 09-A-300-AANS.
141. Mocco J (presenting author), Snyder KV, Crumlish AM, Fiorella DJ, Siddiqui AH, Hopkins LN, **Levy EI:** Final Results of an FDA-approved Prospective Multicenter Single-arm Trial of Stent-assisted Recanalization for Acute Ischemic Stroke (abstract 3236, oral presentation 144). February 19, 2009.
142. Samuelson RM, Morrison AM, Atwal GS, **Levy EI,** Hopkins LN, Young HF: Age-Related Geometric Changes of the Aortic Arch as Measured by the “Carotid Aortic Angle.” Neurosurgical Society of the Virginias Annual Meeting. January 23, 2009. White Sulphur Springs, West Virginia
143. **Levy EI,** Siddiqui AH, Hopkins LN: Is Not Essential. 3<sup>rd</sup> International Flow Symposium on Flow Measurement in Cerebrovascular Surgery. Program Faculty. Stanford University, Palo Alto, CA. February 15<sup>th</sup>, 2009.
144. **Levy EI,** Siddiqui AH, Hopkins LN: Drug Eluting Stents: Role in the Treatment of Intracranial Disease? American Heart Association International Stroke Conference. San Diego Conference Center, San Diego, CA. February 20<sup>th</sup>, 2009.
145. Mocco J, Snyder KV, Crumlish AM CCRC, Fiorella DJ, Siddiqui AH, Hopkins LN, **Levy EI:** Final Results of an FDA approved Prospective Multicenter Single-Arm Trial of Stent Assisted Recanalization for Acute Ischemic Stroke. Oral Presentation 144 (Late-breaking abstract), *International Stroke Conference*, San Diego CA, February 19, 2009.
146. Agopian EH, Sharma J, Agrawal S, Baker JG, Janicke D, **Levy EI,** Siddiqui AH, Olson K, Ramanathan T, Munschauer FE III, Ionita CC: Impact of the Site of Intravenous Thrombolysis (in Hospital versus Remote) on Acute Ischemic Stroke Outcome. *Stroke* 40:e247, April 2009 (epub February 16, 2009 DOI: 10.1161/STROKEAHA.108.000015). Poster Presentation P406, *International Stroke Conference*, San Diego CA, February 18-20, 2009.
147. Mocco J, Sharma J, Snyder KV, Siddiqui AH, Hopkins LN, **Levy EI:** The Enterprise Vascular Reconstruction Device for Treatment of Acute Thromboembolic Stroke. *Stroke* 40:e247, April

- 2009 (epub February 16, 2009 DOI: 10.1161/STROKEAHA.108.000015). Poster Presentation P409, *International Stroke Conference*, San Diego CA, February 18-20, 2009.
148. **Levy EI**, Siddiqui AH, Hopkins LN: Interventional Management of Stroke. *Cerebrovascular Update 2009*. Philadelphia, PA March 20<sup>th</sup>, 2009.
  149. Hauck EF, **Levy EI**. Advanced Endovascular Strategies for the Management of Complex and Giant Intracranial Aneurysms. *Sothern Neurosurgery Society Meeting*. Georgia. March 26<sup>th</sup>, 2009.
  150. Hopkins LN, **Levy EI**, Siddiqui AH, Hauck EF: Endovascular I: Cerebrovascular Disease (In Collaboration with the Society for Vascular Medicine) and i2 Subclavian, Vertebral, Neurovascular/Intracranial Intervention and Acute Stroke. *ACC i2 Summit*. Orlando, Florida. March 28<sup>th</sup>, 2009.
  151. Hopkins LN, **Levy EI**, Siddiqui AH, Hauck EF: Ischemic Disease – Thrombolysis, Intracranial Stenting. *Endovascular Techniques for Residents MERI*, Memphis, TN. April 17<sup>th</sup>-19<sup>th</sup>. 2009.
  152. Siddiqui AH, **Levy EI**, Hopkins LN, Hauck EF: Interventional Neurovascular Disease: Avoidance and Management Complication and Endovascular Management of Ischemic and Hemorrhagic Stroke. 77<sup>th</sup> Annual Meeting of the American Association of Neurological Surgeons (AANS). San Diego, CA. May 2<sup>nd</sup>-6<sup>th</sup> 2009.
  153. Matthews MS, Sharma J, Snyder KV, Ionita CC, Siddiqui AH, Hopkins LN, **Levy EI**: The Safety and Efficacy of Intra-arterial Intervention in the First 3 Hours of Acute Ischemic Strokes (poster no. 1516) Poster Presentation, Annual Meeting of *the American Association of Neurological Surgeons*, San Diego, CA May 2-6 2009.
  154. Mocco J, Snyder KV, Siddiqui AH, Hopkins LN, **Levy EI**: SARIS(Stent-Assisted Recanalization in Ischemic Stroke): Mid-Term Results. Oral Presentation. *Annual Meeting of the American Association of Neurological Surgeons*, Sand Diego, CA, May 2-6 2009.
  155. Snyder KV, Mocco J, Albuquerque FC, Bendok BR, Boulos AS, Carpenter JS, Fiorella DJ, Hoh BL, Howington JU, Liebman KM, Rai AT, Rodriguez-Mercado R, Siddiqui AH, Veznedaroglu E, Hopkins, LN, **Levy EI**: Occurrence of In-Stent Stenosis and/or Thrombosis After Enterprise-Assisted Aneurysm Treatment: Midterm Follow-Up of the Interstate Collaboration of Enterprise Stent-coiling (ICES) Multicenter Tegistry. Oral Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, San Diego CA, May 2-6, 2009.
  156. Tanweer O, **Levy EI**: Inhibition of Stretch-Activated Channels Disrupts Nitric Oxide-Mediated Vascular Remodeling (presentation no. 918). Oral Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, San Diego CA, May 2-6, 2009.
  157. **Levy EI**, Siddiqui AH, Hopkins LN, Hauck EF: Intra Arterial Stroke Management and Arterial Dissections Inside and Out of the Head: The Essentials. Ischemic and Hemorrhagic Update at Harvard Medical School. Boston, MA. May 18<sup>th</sup>, 2009.
  158. Siddiqui AH, **Levy EI**, Hopkins LN, Hauck EF: Managing Carotid Stent Complications. 18<sup>th</sup> Annual Peripheral Angioplasty and All That Jazz Conference. New Orleans, LA. May 20<sup>th</sup>-22<sup>nd</sup> 2009.



159. Chamchuk AJ, Ogilvy CS, Snyder KV, Ota H, Siddiqui AH, Hopkins LN, **Levy EI**: Elective Stenting for Intracranial Stenosis under Conscious Sedation. Oral Presentation. *Neurological Society of America Annual Meeting*, Hot Springs, VA, June 7-10, 2009 and *2009 Congress of Neurological Surgeons Annual Meeting*, New Orleans LA, October 24-29, 2009.
160. Matthews MS, Sharma J, Snyder KV, Natarajan SK, Sorkin GC, Westhout FD, Siddiqui AH, Hokins LN, **Levy EI**: Revascularization and Mortality Rates following Endovascular Intervention within 3 Hours of Ischemic Stroke Syptom Onset - Comparison Between Mechanical versus Pharmacological Intra-arterial Therapies. Interactive Oral Presentation, 2009 Congress of Neurological Surgeons Annual Meeting, New Orleans LA, October 24-29, 2009.
161. Ogilvy CS, Snyder KV, Natarajan SK, Yang X, Hopkins LN, Siddiqui AH, **Levy EI**, (abstract ID: 5363 final #:4). Stent assisted Coiling vs. Coiling for Paraclinoid ICA Aneurysms: Risk, Efficacy, and Outcomes. Oral Presentation, Section on Cerebrovascular Surgery Neurosurgical Forum, 2009 *Congress of Neurological Surgeons Annual Meeting*, New Orleans LA, October 24-29, 2009.
162. Ogilvy CS, Yang X, Snyder KV, Hopkins LN, Siddiqui AH, **Levy EI**: Stent-assisted Coiling of Paraclinoid Aneurysms Does Not Increase Risk of Treatment. Oral Presentation, *The American Academy of Neurological Surgery 71<sup>st</sup> Annual Meeting*, West Palm Beach FL, November 4-7, 2009 (presentation date: November 5, 2009).
163. **Levy EI**, Natarajan SK, Karmon Y, Ohta H, Snyder KV, Siddiqui AH, Hopkins LN: Prospective Analysis of Outcomes after CT Perfusion-Guided Stroke Intervention. Oral Presentation, *The American Academy of Neurological Surgery 71<sup>st</sup> Annual Meeting*, West Palm Beach, FL, November 6, 2009.
164. “Neither Time to Treatment Nor the Use of Adjunctive Intra-Arterial Thrombolytics Increase the Risk for Symptomatic Intracranial Hemorrhage After Endovascular Treatment of CT Perfusion or MRI-Selected Stroke Patients Treated at Late Time Windows: Analysis of the Pre-DAWN Dataset” was accepted for platform presentation at the 2010 ISC (Thursday, February 25, 2010).
165. Snyder, KV, Darkhabani Z, Mocco J, Siddiqui AH, **Levy EI**, Hopkins LN: Safety and Efficacy of Arteriovenous Malformation Embolization under Conscious Sedation. Poster Presentation, *XIV World Congress of Neurological Surgery*, Boston, MA August 30-September 4, 2009.
166. Snyder KV, Darkhabani Z, Mocco J, Siddiqui AH, **Levy EI**, Hopkins LN: Use of CT Perfusion to Guide Patient Selection for Endovascular Stroke Intervention: Single-center Experience. Oral Presentation, *XIV World Congress of Neurological Surgery*, Boston MA, August 30-September 4, 2009.
167. Natarajan SK, Karmon Y, Snyder KV, Ohta H, Hauck E, Hopkins LN, Siddiqui AH, **Levy EI**: Endovascular Therapy for Acute Ischemic Stroke in a Real-world Setting: Results of the University at Buffalo Endovascular Stroke Registry (abstract P395). *Stroke* 41:e102, April 2010. Poster Presentation, *International Stroke Conference 2010*, San Antonio TX, February 24-26, 2010.

168. Natarajan SK, Ogilvy CS, Hopkins LN, Siddiqui AH, **Levy EI**: Initial Experience with a Second-generation Everolimus-Eluting Stent for Treatment of Intracranial Atherosclerosis (abstract P230). *Stroke* 41:e61, April 2010. Poster Presentation, *International Stroke Conference 2010*, San Antonio TX, February 24-26, 2010.
169. Tawk RG, Stone JJ, Binning M, Siddiqui A, **Levy E**, Hopkins LN: Near Simultaneous Coiling and Clot Evacuation for Ruptured Aneurysms with Intracranial Hematoma. Poster Presentation, Annual Meeting of the *American Association of Neurological Surgeons*, Philadelphia, PA, May 1-5, 2010.
170. Natarajan SK, Hauck EF, Hopkins LN, **Levy EI**, Siddiqui AH: Endovascular Management of Symptomatic Spasm of Radial Artery Bypass Graft – Technical Case Report (poster 1371). Poster Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, Philadelphia PA, May 1-5, 2010.
171. Natarajan SK, Ogilvy CS, Yang X, Hauck EF, Sun L, Hopkins LN, Siddiqui AH, **Levy EI**: Restenosis Rates following Vertebral Artery Origin Stenting: Does Stent Type Make a Difference. Oral Presentation (Scientific Session V, Cerebrovascular; Presenting Author: Natarajan), *Annual Meeting of the American Association Of Neurological Surgeons*, Philadelphia PA, May 1-5, 2010.
172. Natarajan SK, Xiang J, Tremmel M, **Levy EI**, Mocco J, Meng H: Hemodynamics by Computational Fluid Dynamics Correlate with Intracranial Aneurysm Rupture Status Better than Morphology by 3D Angiography (poster 1095). Poster Presentation, *Annual Meeting of the American Association of Neurological Surgeons*, Philadelphia PA, May 1-5, 2010.
173. **Levy EI**, First Food and Drug Administration Approved Prospective Trial of Primary Intracranial Stenting for Acute Stroke (Stroke 2009) The Stroke and Vascular Neurology is honored to present the Highlights in the field section at the AAN Annual Meeting in Toronto on Thursday April 15 2010.
174. Orion D, Siddiqui AH, **Levy EI**, Hopkins LN: When is Cessation or Reversal of Brain Flow Protection a Must in CAS: What Are Its Disadvantages? (abstract) Oral Presentation, *Veith Symposium*, New York City NY, November 18, 2010.
175. Ionita CC, Siddiqui AH, **Levy EI**, Hopkins LN, Snyder KV, Gibbons KJ: Acute Ischemic Stroke and Infections. *J Stroke Cerebrovasc Dis* epub June 8, 2010 (doi:10.1016/j.jstrokecerebrovasdis.2009.09.011)
176. Hoh BL, Reavey-Cantwell J, Lawson MF, Jahshan S, **Levy EI**, Siddiqui AH: International Partial Dome Protection Prevents Acute Rebleeding and Produces Favorable Clinical Outcomes. 5-11-10 Accepted for Digital Poster Presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010.
177. Jahshan S, Natarajan SK, Karmon Y, Hopkins LN, Siddiqui AH, **Levy EI**: Results of Stent Versus Non-stent Assisted Endovascular Therapies in 489 Cerebral Aneurysms: A Single Center Experience (Abstract 8338, Final 1180). 5-11-10 Accepted for Digital Poster Presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010.
178. Karmon Y, Natarajan SK, Jahshan S, Hopkins LN, Siddiqui AH, **Levy EI**: Access-site

Complications (ASC) after 6615 Neuroendovascular Procedures: Single –Center Experience (abstract 8137, final 24). Accepted for Oral Presentation, Section on Cerebrovascular Surgery Neurosurgical Forum, *2010 Congress of Neurological Surgeons Annual Meeting, San Francisco CA*, October 16-21, 2010. Presenting Author: Karmon

179. Memon MZ, Natarajan SK, Sharma J, Mathews MS, Snyder KV, Siddiqui AH, Hopkins LN, **Levy, EI**: Safety and Feasibility of Intra-arterial Eptifibatide as a Revascularization Tool in Ischemic Stroke (abstract 8109, final 62). 5-11-10 Accepted for Oral Presentation, Section On Cerebrovascular Surgery Neurosurgical Forum, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010. Presenting Author: Memon
180. Memon MZ, Tawk RG, Natarajan SK, Tummala RP, Siddiqui AH, Hopkins LN, **Levy EI**: Provocative Amobarbital Testing Preceding Endovascular Embolization Adds Safety and Prevents Complications in Patients with Occipital Arteriovenous Malformations (abstract 8139, final 1157). 5-11-10 Accepted for Digital Poster Presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010.
181. Natarajan SK, Dandona P, Karmon Y, Yoo A, Kalia J, Hao Q, Hsu D, Chaudhuri A, Paluch R, Meng H, Hopkins LN, Ogilvy CS, Fiorella D, Bendok BR, Nguyen TB, Rymer M, Nanda A, Liebeskind DS, Zaidat OO, Nogueira RG, Siddiqui AH, **Levy EI**: Blood Glucose Predicts Adverse Outcomes after Endovascular Acute Ischemic Stroke Therapy: Derivation of a Glucose-based Prognostic Scale (abstract 6638, final 14). 5-11-10 Accepted for Oral Presentation, Section on Cerebrovascular Surgery Neurosurgical Forum, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco, CA, October 16-21, 2010. Presenting author: Natarajan.
182. Natarajan SK, Ionita C, Wang W, **Levy EI**, Siddiqui AH, Hopkins LN, Bednarek D, Rudin S: Design of a Self-expanding Asymmetric Vascular Stent (SAVS) for Aneurysm Occlusion and Evaluation in a Rabbit Elastase Model (abstract 8212, final 1167). 5-11-10 Accepted for Digital Poster Presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco, CA, October 16-21, 2010.
183. Natarajan SK, Karmon Y, Snyder KV, Ohta H, Hauck EF, Hopkins LN, Siddiqui AH, **Levy EI** (abstract 6860, final 27): Prospective Acute Ischemic Stroke Outcomes after Endovascular Therapy Beyond Traditional Time-windows 5-11-10 Accepted for Oral Presentation, Section on Cerebrovascular Surgery Neurosurgical Forum, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010. Presenting author: Natarajan.
184. Natarajan SK, Nogueira RG, Gupta R, Liebeskind DS, Rymer M, Barreto A, Zaidatt OO, Rai A, Baxter B, Jovin T, **Levy EI**: Neither Time to Treatment nor the Use of Adjunctive Intra-arterial Thrombolytics Increase the Risk for Symptomatic Intracranial Hemorrhage After Endovascular Treatment of CT Perfusion or MRI-selected Stroke Patients Treated at Late Time-Windows (abstract 6639, final 1015). 5-11-10 Accepted for Digital Poster Presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA. October 16-21, 2010.
185. Natarajan SK, Xiang J, Tremmel M, Ma D, Mocco J, Siddiqui AH, **Levy EI**, Meng H: Hemodynamic Conditions with Morphology May Separate Ruptured Cerebral Aneurysms: A Computational Fluid Dynamics (CFD) Analysis (abstract 7747, final 1106). 5-11-10 Accepted For Digital Poster presentation, *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco CA, October 16-21, 2010.

186. **Levy, EI.** Digital Masters Video Symposium. Presenter: Carotid Stenting. *2010 Congress of Neurological Surgeons Annual Meeting*, San Francisco, CA, October 16-21, 2010.
187. Xiang J, Natarajan SK, Tremmel M, Ma D, Mocco J, Hopkins LN, Siddiqui AH, **Levy EI**, Meng H: Hemodynamic-Morphologic Discriminants for Intracranial Aneurysm Rupture. Accepted for Oral Presentation at the *72nd Annual Meeting of the American Academy of Neurological Surgery* to be held in Pebble Beach CA, November 3-6, 2010 (*Presenting author: Dr. Siddiqui; presentation date is Friday, November 5, 2010*).
188. Xiang J, Natarajan SK (co-first author), Tremmel M, Ma D, Mocco J, Hopkins LN, Siddiqui AH, **Levy EI**, Meng H: Hemodynamic-Morphologic Discriminants for Intracranial Aneurysm Rupture (abstract 1943). 10/14/10 Accepted for Moderated Poster Presentation at the *2011 International Stroke Conference*, Los Angeles CA, February 9-11, 2011 (abstract to be published in the February 2011 issue of *Stroke*).
189. **Levy, EI.** Presenter: Controversies in Cerebrovascular and Endovascular Neurosurgery. *2011 AANS 79<sup>th</sup> Annual Scientific Meeting*, Denver, Colorado, April 8 – 13, 2011.
190. **Levy, EI.** Presenter: Bypassing the Carotid Artery. *12<sup>th</sup> Annual UC San Diego Stroke Conference*, San Diego, CA, May 14, 2011.
191. **Levy, EI.** Presenter. Complex Aneurysm Management Maximizing the Interventionalists’s Solution from Coils to Flow Diversion, *2012 AANS/CNS Cerebrovascular Section Meeting, New Orleans, LA* February 1, 2012.
192. **Levy, EI.** Presenter: What More Evidence Do you Want? Devices Reduce Death and Disability *2012 International Stroke Conference, New Orleans, LA*, February 2, 2012.
193. **Levy, EI.** Faculty. Complex Aneurysms: Creative Solutions to Daunting Problems *2012 CNS Education Committee, CNS Webinar*, November 13, 2012.
194. **Levy, EI.** Invited to serve as faculty member to the Congress of Neurological Surgeons (CNS) *CNS SANS MOC Board Review Course, Phoenix Arizona*, March 9, 2013.
195. **Levy, EI.** Presenter The Role of Neurosurgeon In Management of Ischemic Stroke, *Texas Association of Neurological Surgeons (TANS) 2014 Annual Meeting, San Antonio, Texas*, March 2014.
196. **Levy, EI.** Presenter, Update on Multi-modality Aneurysm Technologies. *Texas Association of Neurological Surgeons (TANS) 2014 Annual Meeting, San Antonio, Texas*, March 2014.
197. **Levy, EI.** Presenter “Technological Advancements In Stroke: On The Cutting Edge” *Meridian International Neuroscience Symposium, New Jersey*, October 2014
198. **Levy, EI** Presenter “AVMS: Open or Closed Approach” *TriStar Neuroscience Symposium, Nashville TE*, October 2014
199. **Levy, EI** Presenter “Vascular Open Surgery vs Pipeline Flow Diversion” *Congress of Neurosurgeons 2014 Annual Meeting, Boston MA* October 2014

200. **Levy, EI** Presenter “The Future of Vascular Neurosurgery” *Congress of Neurosurgeons 2014 Annual Meeting*, Boston MA October 2014
201. **Levy, EI** Presenter “The Role of Stenting In The Era Of Stent Retrievers” *Congress of Neurosurgeons 2014 Annual Meeting*, Boston MA October 2014
202. **Levy, EI** Presenter “Controversies in Cerebrovascular and Endovascular Neurosurgery” *2015 AANS Annual Scientific Meeting*, Washington DC May 2015
203. **Levy, EI** Presenter “SWIFT PRIME: A Legacy Begins” *Medtronic Neurovascular National Sales Meeting*, Huntington, CA May 30, 2015
204. **Levy, EI** Presenter “Stroke Neurosurgery, New Evidence Ushers In A New Standard of Care” *New York State Neurosurgical Society 2015 Annual Meeting*, New York, NY June 5, 2015
205. **Levy, EI** Presenter “Stroke: A Neurosurgical Disease” *2016 Neurosurgery Update Course*, Napa Valley, CA August 2016
206. **Levy, EI** Presenter “Cutting Edge Technologies for Novel Treatment of Aneurysms” *2016 Neurosurgery Update Course*, Napa Valley, CA August 2016
207. **Levy, EI** Presenter “CAS For Extracranial Atherosclerotic Disease” *2017 Congress of Neurosurgeons 2017 Annual Meeting*, Boston MA October 2017
208. **Levy, EI** Presenter “Leadership In Healthcare” *2017 Congress of Neurosurgeons 2017 Annual Meeting*, Boston MA October 2017
209. **Levy, EI** Presenter “Surgery, Research, and Innovation: Lessons Learned from my Mentor” *2017 Congress of Neurosurgeons Annual Meeting*, Boston MA October 2017
210. **Levy, EI** Presenter Drake Lecture *2018 Congress of Neurosurgeons Annual Meeting “Cerebrovascular Neurosurgery: Lessons Learned Around the Boathouse”* Houston, Texas October 2018
211. **Levy, EI** Presenter for the Evandro de Oliveira Symposium “*Novel Endovascular Reconstruction Techniques For Surgically Challenging Aneurysms*”, San Diego, CA April 2019

#### **LOCAL PRESENTATIONS, ORAL POSTERS, AND INVITED LECTURES**

1. **Levy EI.** Modern Stroke Therapy and Intervention. Presented for *Nursing Grand Rounds Teleconference. Millard Fillmore Hospital JCAHO Stroke Education Program Buffalo, NY.* January 17, 2005.
2. Hanel RA, **Levy EI**, Guterman, LR, Hopkins LN. Updated on Carotid Stenting. *19th Annual Cardiology Update, Olean, NY* Apr 30, 2005.
3. **Levy EI.** Minimally Invasive Spine Surgery Techniques. Oral Presenter. *Buffalo Medical Group Meeting. Double Tree Hotel, Buffalo, NY.* May 5, 2005.
4. **Levy EI**, Hanel RA, Ecker RD. “Carotid Revascularization”. Oral Presentation. *Kaleida Health Alumni Weekend, Webster Hall, Millard Fillmore Gates Hospital.* October 15, 2005.

5. **Levy, EI.** EMS program Presentation and Live Case Demonstration. *Webster Hall, Millard Fillmore Gates Circle Hospital.* May 31, 2007.
6. **Levy, EI.** Advances in Stroke Intervention: The Battlefield and beyond. *Medina Memorial, Hospital, Medina, NY.* June 12, 2007.
7. Morrison AM, Samuelson RM, Tummala RP, Atwal GS, Jahromi BS, Yamamoto J, **Levy EI**, Siddiqui AH, Guidot CA, Hopkins LN: Age-Related Changes in Human Aortic Arch Anatomy. *4th Annual University at Buffalo Honors Program Research Poster Showcase, Spring Open House, Buffalo NY,* March 29, 2008. Awarded Second Place
8. **Levy EI.** Complication Avoidance (Atherosclerotic Disease & Stroke). Oral Presentation. *Cerebrovascular Complications Conference. Jackson Hole, WY.* July 9-12, 2008.
9. **Levy EI.** Stenting for Acute Stroke; pros and cons. Oral Presentation. *Society of NeuroInterventional Surgery 5<sup>th</sup> Annual Meeting. Olympic Valley, CA.* July 28 – August 1, 2008.
10. **Levy EI.** Ischemic and Hemorrhagic Stroke. Oral Presentation. *Grand Rounds. Kenmore Mercy Hospital. Buffalo, NY.* August 5, 2008.
11. **Levy EI.** Acute (Ischemic and Hemorrhagic) Stroke Intervention and Prevention. Oral Presentation. *Grand Rounds. Kenmore Mercy Hospital. Buffalo, NY.* August 5, 2008.
12. Tremmel M, **Levy EI**, Xiang J, Dhar S, Hopkins LN, Meng H. Aneurysm Treatment through Hemodynamic Alteration by Multiple Stents. Poster Presentation. *Neuroscience Day, The Annual Meeting of the Society for Neuroscience (Buffalo Chapter),* September 13, 2008, Buffalo, NY.
13. Ogilvy CS, Yang X, Natarajan SK, Hauck EF, SunL, Lewis-Mason L, Hopkins LN, Siddiqui AH, **Levy EI:** Restenosis Rates following vertebral artery origin stenting: does stent type make a difference?" Accepted for Presentation, *Neurological Society of America (NSA) Meeting,* Pebble Beach (CA) April 14, 2010.
14. **Levy, EI,** "The Future of Stroke". Oral Presentation, 2<sup>nd</sup> Annual Comprehensive Care of the *Neurovascular Patient Conference in Atlantic City, New Jersey,* April, 2010.
15. **Levy, EI,** "Self Expanding Stents in Acute Ischemia". Live Oral Presentation, *LINC Houston and ICS Conference, Houston, Texas,* September 13-16, 2010.
16. **Levy, EI,** "Current Stenting Trials for ICAD". Live Oral Presentation, *LINC Houston and ICS Conference, Houston, Texas,* September 13-16, 2010.
17. **Levy, EI,** "Approved and Cutting Edge Stroke Therapy". Oral Presentation, *Neuroscience Symposium, Seneca Niagara Casino, Niagara Falls, NY.* October 1, 2010.
18. Ionita CN, Natarajan SK (co-first author), Wang W, Hopkins LN, **Levy EI**, Siddiqui AH, Bednarek DR, Rudin S: Evaluation of a New Self-expanding Variable Porosity Flow-diverter (V-POD) in a Rabbit Elastase Aneurysm Model (abstract 1942). 10/14/10 Accepted for Oral Presentation at the *2011 International Stroke Conference, Los Angeles CA,* February 9-11, 2011 (abstract to be published in the February 2011 issue of *Stroke*).

19. **Levy, EI**, Oral Presentation, “Aquilion ONE and Toshiba BiPlane Angio systems to the Physicians at *Souther Tier Imaging , Binghamton Country Club, Endwell, New York*, September 2011
20. **Levy, EI**. Live Case Transmission via Telemedicine Technology, Unyielding Progress: Carotid Stenting (Findings and Practice) *Transmitted live from Buffalo to CNS Annual Meeting, Washington, DC.* October 4, 2011
21. **Levy, EI**. Live Case Transmission, via Telemedicine Technology, Aneurysm Reconstruction with Flow Diversion, *Transmitted live from Buffalo to CNS Annual Meeting, Chicago, Illinois*, October 9, 2012.
22. **Levy, EI**, Oral Presentation, “Stroke Intervention...The Future is Now”. *12<sup>th</sup> Annual Current Concepts in Cardiovascular Management., Millennium Hotel, Buffalo, NY.* November 16, 2012.
23. **Levy, EI**, Oral Presentation, “Program For Understanding Childhood Concussions and Stroke” (PUCCS). *First Annual 2012 Concussion Symposium, Ralph Wilson Stadium, Orchard Park, New York.*
24. **Levy, EI**, Two Live Case Transmissions, Aneurysm Treatment with Flow Diversion: via Telemedicine Technology, *Broadcast live from the Gates Vascular Institute, Buffalo, NY to the LINC Conference in Houston, TX*, December 11, 2012.
25. Dumont TM, Eller JL, Sorkin GC, Mokin M, Lo TP Jr, Snyder KV, Hopkins LN, Siddiqui AH, **Levy EI**: Aneurysm Treatment with Flow Diversion: Two Live Cases from **the** Gates Vascular Institute. *Clin Neurosurg* 60:48-56, August 2013 (epub July 9, 2013 DOI: 10.1227/01.neu.0000430317.01821.8b).
26. Dumont TM, Mokin M, Eller JL, Sorkin GC, Snyder KV, Hopkins LN, Siddiqui AH, **Levy EI**: Submaximal Angioplasty Prospective Registry: Preliminary Report (oral presentation abstract). *Neurosurgery* 60 Suppl 1:156, August 2013. PMID 23839376 [not peer reviewed]
27. Siddiqui, AH, **Levy EI**: Broadcasting Live Cases from the Gates Vascular Institute (GVI) to the 2014 World Live Neurovascular Conference (WLNC) in Buenos Aires, Argentina. June 11, 2014
28. **Levy, EI** Presenter “Acute Ischemic Stroke: New Trials and Standards” 2015 Gates Vascular Institute Symposium: Updates in Cardica, Vascular & Neuroendovascular Medicine, Buffalo, New York, May 2015
29. Siddiqui, AH, **Levy EI**: Broadcasting Live Cases from the Gates Vascular Institute (GVI) to the 2015 World Live Neurovascular Conference (WLNC) in Chicago, IL June 11, 2015
30. **Levy, EI**: Broadcasting Live Cases from Boston MA 2017 CNS Annual Meeting to the Gates Vascular Institute (GVI), Buffalo, New York, October 2017.

## RESEARCH INTERESTS:



**Basic Science:**

Molecular biology of stent-induced restenosis

**Clinical:**

- Drug coated stents
- Novel techniques in endoluminal revascularization
- Treatment of acute stroke
- Stenting of aneurysms

**OTHER RESEARCH RELATED ACTIVITIES:**

**Editorships:**

Surgical Neurology Ad Hoc Reviewer	2003-present
Neurology Ad Hoc Reviewer	2003-present
Neurology India Ad Hoc Reviewer	2003-present
The NeuroReport Editor-in-Chief	2005-present
Neurosurgery Ad Hoc Reviewer	2005 – present
American Journal of NeuroRadiology Ad Hoc Reviewer	2005 - present
Interventional Radiology Section, STROKE Co-editor	2006 - 2008
STROKE Editorial Board Member	2006 - present
Circulation Ad Hoc Reviewer	2006 – present
ENRG Cerebrovascular Travel Group Research Member	2006 – present
Journal of Neuroimaging Ad Hoc Reviewer	2009 - present
Journal of Neurointerventional Surgery Ad Hoc Reviewer	2009 – present
Curriculum Vitae 01-05-21	

Elad Levy, MD

Clinical Neurology and Neurosurgery Ad Hoc Reviewer	2009- present
The Lancet Neurology Ad Hoc Reviewer	2012
New England Journal of Medicine Ad Hoc Peer Reviewer	2012 – present
Integrated Diagnostics Magazine Magazine Physician Editor for Toshiba American Medical Systems	2013
International Journal of Stroke Ad Hoc Reviewer/Referee	2013 – present
The Lancet Ad Hoc Reviewer	2014
Brain Injuries in Football Content Consultant	2014
Editorial Review Board of Neurosurgery Journal Endovascular Section Editor	2014-2017
Endovascular Section Editor	2015
Cerebrovascular Diseases Journal Ad Hoc Reviewer/Referee	2015

### **SERVICE**

#### **UNIVERSITY AND MEDICAL SCHOOL:**

1994-1997	Beaumont Society for Medical Research
1995-1996	Neuroanatomy tutor to first-year medical students at George Washington University School of Medicine
1996-1997	George Washington University School of Medicine Honor Code Council

#### **COMMUNITY SERVICE:**

1993-1997	Stroke screening and health awareness program, National Stroke Association and George Washington University Medical Center
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2001-2003 Education for underprivileged high school students about opportunities in Neurosurgery, Neurology, and Neuroscience

2007 - Present Grammar School Presentation Series on Brain Injury and Helmet Safety

2009 – 2011 Kadimah School Board

2010 – Present Founder and President of “Program for Understanding Childhood Concussion & Stroke” (PUCCS) As of 2013 raised 300k for this charity

**CORPORATE:**

2002 - Present Cordis Neurovascular , Consultant

2003 - Present Boston Scientific, Target Therapeutics, Grant Funding

2008 – Present Micrus Advisory Board

2009 – Present Case review for Department of Health

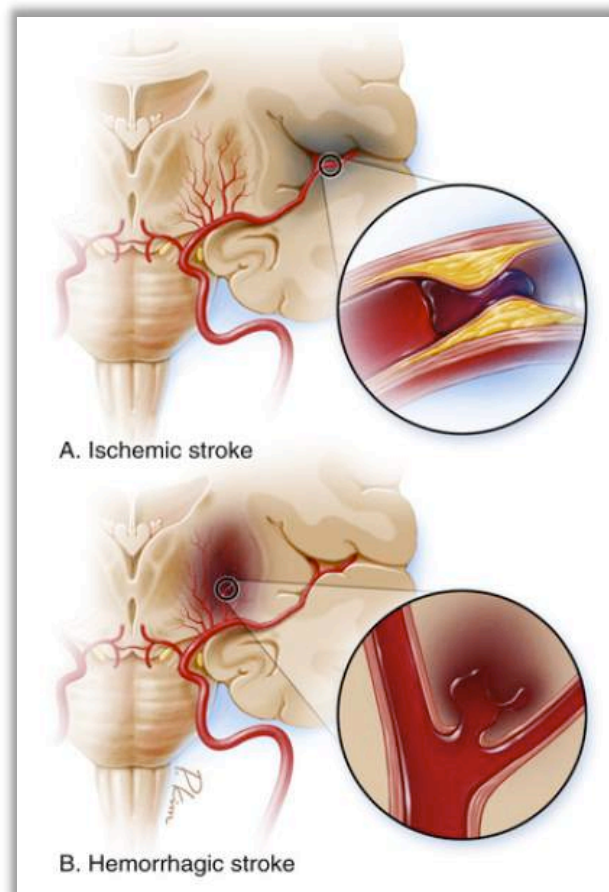
2009- Present Medtronic Navigation Technology Advisory Board

# **Medical Principles**

## General Principles

### *Stroke*

1. Stroke is the sudden death of brain cells due to a lack of oxygen.
2. The lack of oxygen is caused by either a blockage of blood flow to the brain or by the rupture of an artery that supplies the brain.
3. When a stroke is caused by blocked blood flow, it is called an ischemic stroke.
4. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.



5. A stroke may result in permanent brain-damage, long-term disability, and even death.

6. Signs and symptoms<sup>1</sup> of stroke generally include:

- Sudden numbness or weakness in the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking, or difficulty understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance, or lack of coordination.
- Sudden severe headache with no known cause.

### *Stroke Causes: Ischemia*

7. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.

8. Ischemia occurs when a blood clot reduces or blocks blood flow, preventing the organ or tissue from receiving enough oxygen-rich blood.

9. If not treated promptly, the cells in the part of the organ or the tissue supplied by the blocked artery will be deprived of oxygen and, with time, may be damaged or infarct (die).

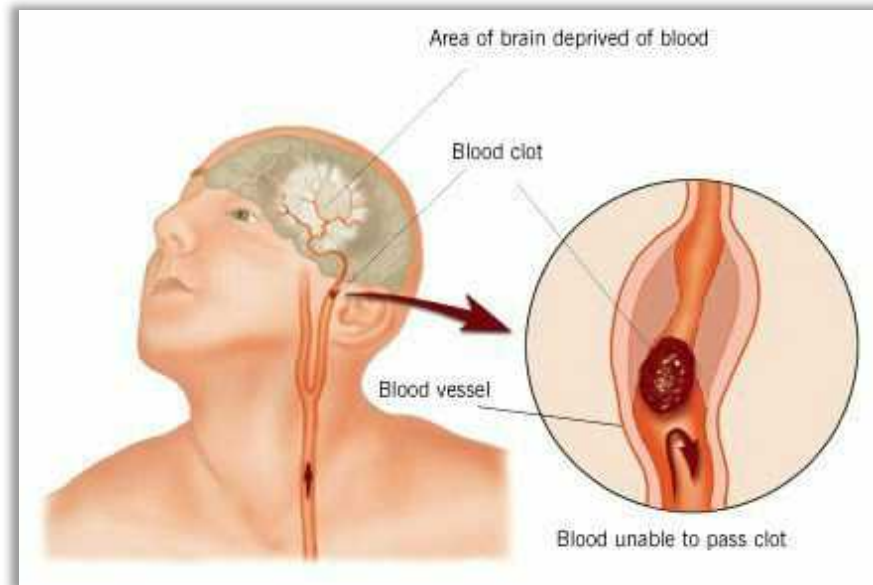
### *Ischemic stroke*

10. If something blocks blood flow to the brain, brain cells start to die because they cannot get oxygen. That is a stroke.

11. An ischemic stroke occurs when a blood clot interferes with blood flow through an artery that supplies the brain.

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<sup>1</sup> A sign is a manifestation of medical condition that the physician perceives, objectively. In contrast, a symptom is a manifestation apparent to patient, subjectively.

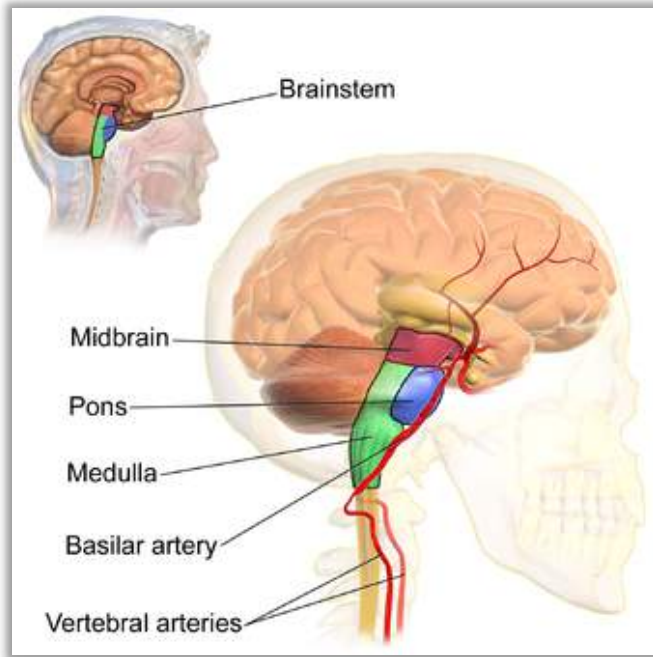


12. A thrombus is a blood clot that forms within a blood vessel.
13. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.
14. Arterial dissection—a tear inside an artery—often causes an embolus.
15. Trauma is a common cause of arterial dissection.

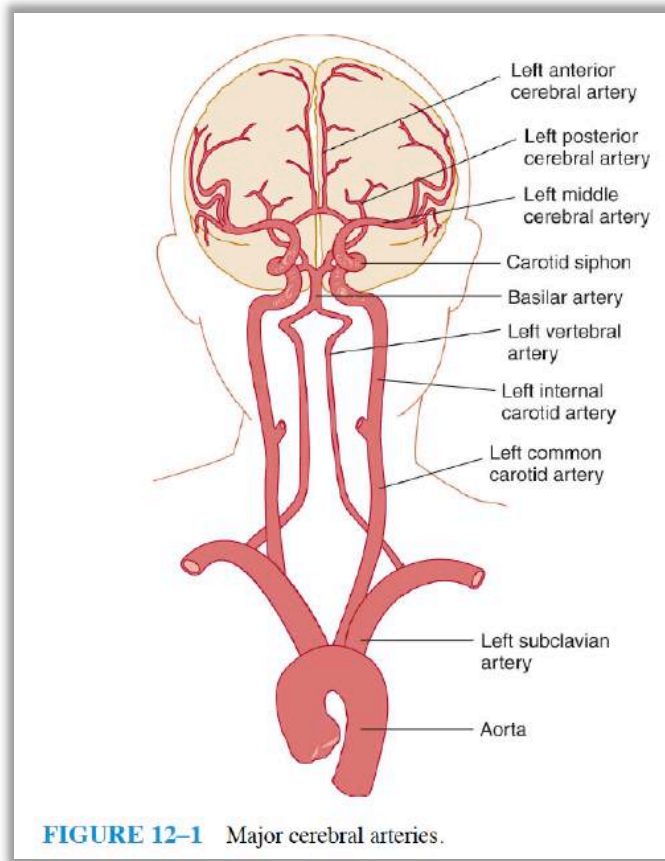
### *The Basilar Artery*

16. The basilar artery lies at the front of the brainstem in the midline.



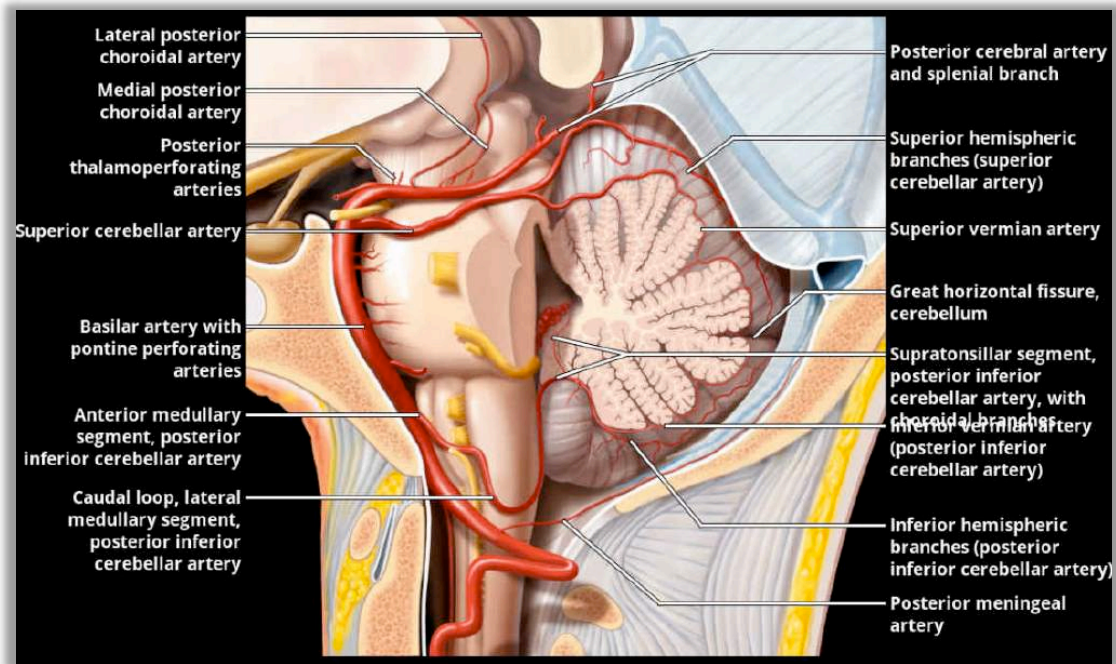
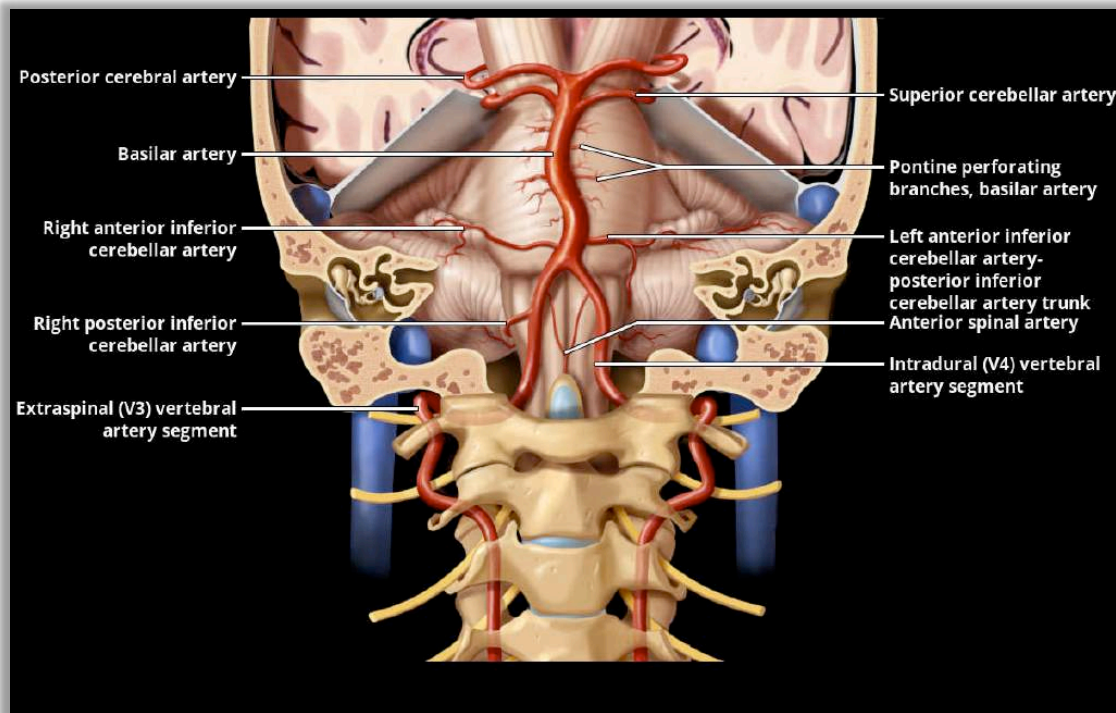


17. The basilar artery is formed by the union of the two vertebral arteries.



**FIGURE 12-1** Major cerebral arteries.

18. The basilar artery carries oxygenated blood up through the brainstem to the posterior (back) part of the brain.



## *Basilar Artery Occlusion (BAO)*

19. Basilar Artery Occlusion (BAO) is the name for an acute stroke originating in the basilar artery.
20. A BAO is a type of posterior-circulation stroke. It affects the circulation of blood in the back part of the brain.
21. A BAO occurs when a blood clot in the basilar artery impedes blood flow, resulting in ischemia in the posterior part of the brain.







22. If not treated quickly, a BAO can lead to severe brain damage, organ malfunction, catastrophic disability, and even death.
23. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

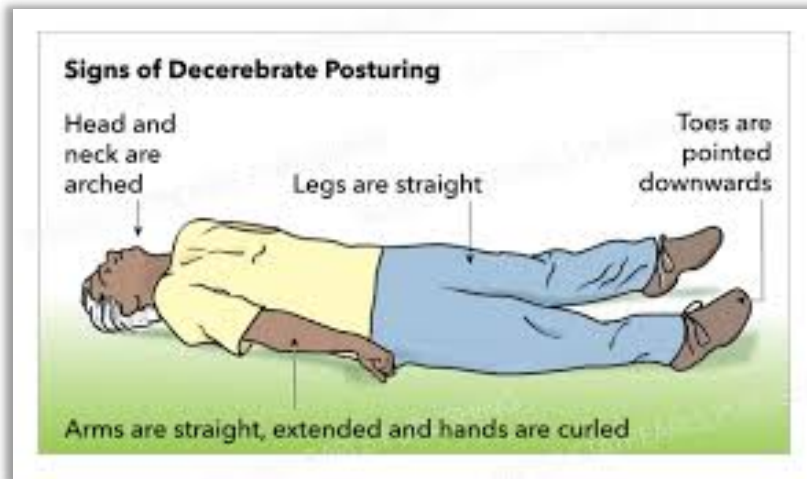
## *BAO Signs and Symptoms*

24. Because the cerebral vessels each tends to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion.
25. The signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
26. The hallmarks of a BAO include:

- Decreased or altered consciousness
- Quadriplegia (loss of voluntary movement in all four limbs)
- Various combinations of limb ataxia (impaired balance or coordination)
- Oculomotor (eye movement) abnormalities
- Pupillary abnormalities (pupils do not react normally to light)
- Dysarthria (inability to articulate speech)
- Dysphagia (inability to swallow)

Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

27. Such signs and symptom can present in various combinations.
28. Decerebrate posturing is a classic sign of BAO and other posterior strokes.
29. Decerebrate posturing is an abnormal posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.



30. Decerebrate posturing is also known as extensor posturing.
31. Other signs and symptoms of BAO include:
- Overactive or overresponsive reflexes (hyperreflexia).
  - Impaired balance or coordination (ataxia);
  - Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking.
  - Loss of the ability to speak (dysphonia).
  - Abnormalities of alertness and behavior, including hallucinations.
  - Dizziness, vomiting.
32. In rare BAO cases, patients suffer locked-in syndrome.
33. Patients with locked-in syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware and conscious of their “locked in” condition.

*Stroke diagnosis: history and presentation*

34. The most characteristic historical aspect of stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.
35. After the onset, stroke symptoms most often stay the same or improve over the few hours that follow.

36. The symptoms may also worsen in a smooth or stuttering course.
37. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
38. A second most characteristic historical aspect of stroke is that the patient's symptoms usually fit the distribution of a single vascular territory.
39. That is to say, patients with brain infarct will present with signs and symptoms in the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
40. The signs and symptoms thus provide an important clue as to the likely location of the possible stroke.
41. The most characteristic aspect of a stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.

*Stroke diagnosis: MEND exam*

42. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.
43. The MEND exam was developed to facilitate communication between healthcare providers throughout the continuum of care for stroke patients.
44. The MEND exam incorporates the posterior circulation elements missing in the Cincinnati Prehospital Stroke Scale (CPSS).
45. The MEND exam has all three elements of the CPSS, plus six elements from the NHISS (consciousness, orientation, commands, visual fields, gaze, leg motor, limb ataxia, and sensation).



<b>MEND EXAMINATION - PREHOSPITAL</b> Green Boxes Contain Basic Exam (CPSS)	
<b><u>MENTAL STATUS</u></b>	
●	Level of Consciousness (AVPU)
●	Speech: "You can't teach an old dog new tricks"
●	Questions (age, month)
●	Commands (close, open eyes)
<b><u>CRANIAL NERVES</u></b>	
●	Facial Droop (show teeth or smile)
●	Visual Fields (four quadrants)
●	Horizontal Gaze (side to side)
<b><u>LIMBS</u></b>	
●	Motor – Arm Drift (close eyes-hold out arms) Leg Drift (open eyes-lift each leg separately)
●	Sensory – Arm, Leg (close eyes & touch, pinch)
●	Coordination – Arm, Leg (finger-nose, heel-shin)

46. The MEND exam takes under two minutes to perform, and requires no tools, making it ideal as a screening tool.

### *Stroke Diagnosis: Stroke Score*

47. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
48. The Scale (also known as Score) looks at 11 different elements that evaluate specific abilities in the patient.



NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
	CATEGORY	SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

49. A patient's score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
50. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.
51. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
52. In fact, the initial severity of the stroke according the Score is the most important predictor of outcome.

### *Stroke diagnosis: CT scan and MRI*

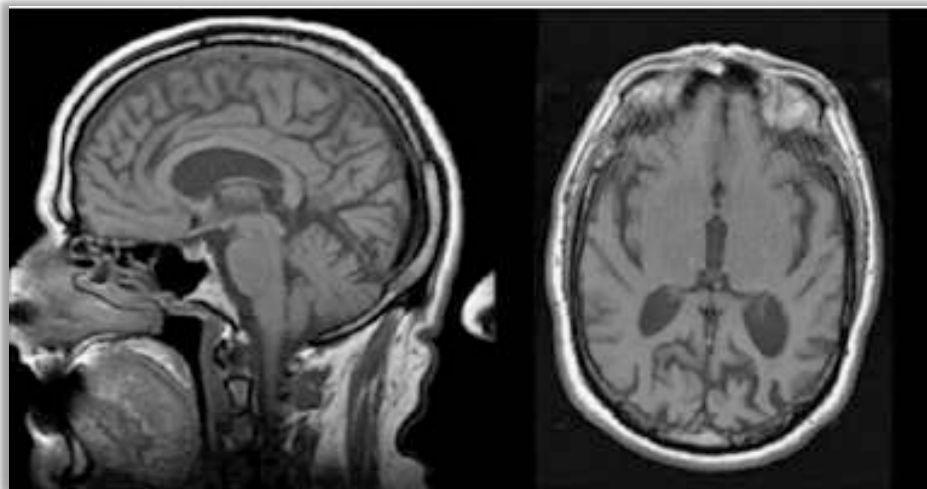
53. An CT scan and MRI are noninvasive diagnostic tests.
54. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.
55. A non-contrast CT of the head remains the standard procedure for the initial evaluation of stroke.

56. In the emergent initial evaluation of an acute stroke patient in the emergency department, a non-contrast CT of the head remains the imaging test utilized in most hospitals worldwide, with the exception of a few centers that have dedicated MRI capabilities for stroke.
57. A non-contrast CT scan has the advantages of being widely available, relatively inexpensive, and fast to perform.
58. A CT scan takes less than 1 minute.
59. A non-contrast CT should be performed within 20 minutes of the patient's arrival at the emergency department in order to speed up potential treatment with thrombectomy and/or TPA for ischemic-stroke patients.
60. All patients with a suspected acute ischemic stroke should undergo a non-contrast brain CT scan or brain MRI.



61. A CT scan is one of the vital first steps in the management of a stroke patient. It helps to exclude hemorrhagic stroke.
62. The CT scan will immediately rule out hemorrhage, as blood is bright on a CT.

63. A CT scan can quickly differentiate an ischemic stroke from intracranial hemorrhaging and other mass lesions— information crucial to the subsequent therapeutic decisions that will be rapidly made.
64. A CT scan generally must be performed within 30 minutes of the patient’s arrival at the hospital.
65. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. But, in contrast to a CT or CTA, an MRI requires that the patient be cooperative to hold still for several minutes.
66. A brain MRI can visualize ischemic infarcts earlier, and identify acute posterior circulation strokes more accurately, than a CT scan.
67. An MRI’s diffusion-weighted sequence (“DWI”) can show any restricted diffusion consistent with infarct.
68. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
69. An MRI’s DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury



70. Radiologists interpret CT and MRI images and communicates their findings to other doctors in radiology reports.

### *Stroke diagnosis: CTA and MRA*

71. A CTA and an MRA are vascular-imaging tests.
72. Vascular imaging specifically focuses on the blood vessels.
73. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.
74. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
75. Vascular imaging specifically helps doctors find blood clots.
76. Vascular imaging thus helps doctors diagnose and treat ischemic strokes, including BAO.
77. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
78. A CTA takes minutes to complete—a few minutes to inject the contrast dye and less a minute to run the scan.
79. A CTA can quickly provide a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.
80. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
81. Most patients with a suspected acute ischemic stroke (like a BAO) should undergo a CTA or MRA.
82. An MRA provides the same information as a CTA.
83. But, in contrast to a CT or CTA, an MRA requires that the patient be cooperative to hold still for several minutes.



84. A doctor must promptly order vascular imaging when there is reason to suspect that the patient has an occlusion in a major blood vessel.
85. This is particularly true if there is reason to suspect that the occlusion is in an artery supplying the brain, like the basilar artery.
86. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.

### *Radiology reports*

87. A radiologist interprets imaging studies (including a CT, CTA, MRI, MRA) and communicates his or her findings and conclusions to other doctors on written radiology reports.
88. A radiologist must interpret imaging studies reasonably, correctly, and accurately.
89. A radiologist must also provide prompt and accurate radiology reports.
90. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call “critical values”—that is, immediately call the attending physician to inform him or her of the findings.
91. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.

### *Stroke treatment: medical emergency*

92. Stroke is the most common neurological emergency.
93. During a stroke, every minute counts. Time lost is brain lost.
94. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
95. When a patient presents with signs or symptoms of stroke, a physician must act quickly to confirm or rule out stroke.
96. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
97. Acute therapies for an ischemic stroke (thrombectomy, TPA) are best implemented as fast as possible, so the steps needed to stabilize and assess the patient must be taken as quickly as possible.
98. In practice, to speed up the process, these steps are often taken simultaneously.
99. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke.
100. If the stroke is an ischemic stroke, medical providers must act quickly to clear the occlusion (blood clot) causing the stroke.
101. In some cases, medical providers must act quickly to order and perform a thrombectomy to remove the blood clot causing the stroke.
102. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.
103. Fast treatment can lessen the brain damage that stroke can cause.
104. The National Institute of Neurological Disorders recommends time-frames for completing the basic, widely-accepted procedures that hospitals follow to evaluate potential ischemic-stroke patients.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

\*By phone or in person.

105. Emergency-medicine physicians and neurologists must generally perform procedures within these time-frames.
106. With a focus on rapid recognition, evaluation, and treatment of stroke, many hospitals have streamlined care to meet recommended time-goals.
107. That has led to the development of stroke protocols, critical pathways, and acute interventional stroke teams that may be deployed in the field before the patient arrives at the emergency department.

*Stroke treatment: thrombectomy*

108. A blood clot causing a stroke can be removed through a medical procedure called a thrombectomy.
109. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery, which is located in the groin.
110. The catheter is guided through the blood system towards the blood clot.
111. Once the catheter reaches the blood clot, the surgeon can attempt to suction, dissolve, or retrieve the clot.
112. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
113. The main goal of these therapies is to get the artery open and re-establish blood flow.



114. Thus, a doctor should always ask whether he or she is doing everything possible to optimize blood flow to regions of cerebral ischemia.
115. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in probability of good outcome.
116. Every twenty minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
117. It is the responsibility of the practitioner initially evaluating the patient to facilitate the patient's transfer to a thrombectomy suite, whether located at the same or another hospital.

## Supporting Literature

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# **Medical Chronology**

## Treatment of Michaela Smith

### *Prologue: Michaela Suffers a Kick to the Right Side of Her Head*

1. On or about June 21, 2019, Michaela was kicked on the right side of the head. HMC 30, HMC 71.
2. The accident occurred during physical training for her job as a detention officer for the sheriff's department. HMC 30, HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

3. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own shortly thereafter. HMC 30, HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216  
H&P  
Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

June 28, 2019 – Michaela's First Visit to Hamilton

### *Onset of Symptoms*

4. On June 28, 2019, Michaela again took part in training for her job. HMC 2, HMC 6, HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

5. The training involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

6. After the training, Michaela drove herself home and did “well for a couple of hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETELY OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

7. Between 20:30 and 21:30 that same evening, Michaela started experiencing a constellation of symptoms, including:

- throbbing headache
- shortness of breath
- swelling throat
- slurred speech
- bilateral facial and hand numbness
- near syncope
- vomiting
- facial pain
- rhinorrhea
- nausea
- dizziness
- difficulty talking, with thick speech
- inability to open her mouth completely or swallow freely

HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244

**H&P**

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

8. Michaela had no prior history of a similar problem. HMC 71.



Initial Provider Contact 6/28/2019 2338  
 HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.  
 no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton Emergency Department ("ED")*

9. At 21:43, Michaela arrived at the Hamilton emergency department. HMC 65.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #: _____	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	GA	30721	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>		Disposition: <u>Home</u>	
Dispo Summary Printed: <u>6/29/2019 0215</u>		Condition at Dispo: <u>Stable</u>	
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmplnt: <u>Poss Allergic Reaction</u>			

HMC 65.

10. Michaela's parents were with her.

Holsonback, Shaw n D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

11. At 22:41, Michaela was admitted to the Hamilton ED, which identified headache, shortness of breath, and unspecified nausea with vomiting as the reasons for her visit. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT

Reason For Visit Diagnosis	
Code	Description
R51	Headache
R06.02	Shortness of breath
R11.2	Nausea with vomiting, unspecified

HMC 79.

12. Between 22:53 and 22:59, RN Kayla Rewis triaged Michaela. HMC 68.

13. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

14. At that time, these were Michaela’s complaints: “soreness/swelling to throat, headache, vomiting, and near syncopal [fainting] episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rewis, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259

**NURSING TRIAGE (Adult)**

**HPI:**

Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

15. At 23:38, Emergency Physician Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

16. At that time, Dr. Holsonback noted the prior kick to Michaela’s head: “Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness headache w/o syncope at the time, sx resolved.” HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

17. At that time, Michaela’s neurological condition was: “motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.” HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.  
**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.  
**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.

18. Her mental status was: “speech clear, oriented X 3, normal affect, responds appropriately to questions.” HMC 72.

19. Michaela’s general appearance was “well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort.” HMC 71.

**PHYSICAL EXAM:**

GENERAL APPEARANCE: well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

20. As part of his examination, Dr. Holsonback obtained a National Institute of Health Stroke Scale (NIHSS) score for Michaela. HMC 72.

21. Michaela scored a 0 (that is, normal) on each of the 11 elements that make up the NIHSS. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.

22. Michaela’s total score was thus also 0 (normal), on a scale of 0 to 42. HMC 72.

23. The NIHSS is a common diagnostic method for quickly assessing the severity of a stroke.

24. The Scale (also known as a Score) looks at 11 different elements that evaluate specific ability in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

25. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.

*Michaela Undergoes a Brain CT Scan*

26. Despite her NIHSS score, Dr. Holsonback moved quickly to get Michaela a CT scan. HMC 64.

27. At 23:47, Dr. Holsonback ordered a stat head CT scan, for “headache right side”—the same side where Michaela had received a kick during training at work a week earlier. HMC 64, HMC 30, HMC 71.

Order Type: Radiology  
Order Sub Type: CT

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47 06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.



Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

Holsonback, Shawn D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**


Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

28. The scan was administered by 23:54, within minutes of Dr. Holsonback's order.

HMC 61; Appendix.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
This interpretation is based upon the receipt of 32 images.			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.

29. The CT scan revealed that Michaela was having a brainstem or posterior-circulation stroke.

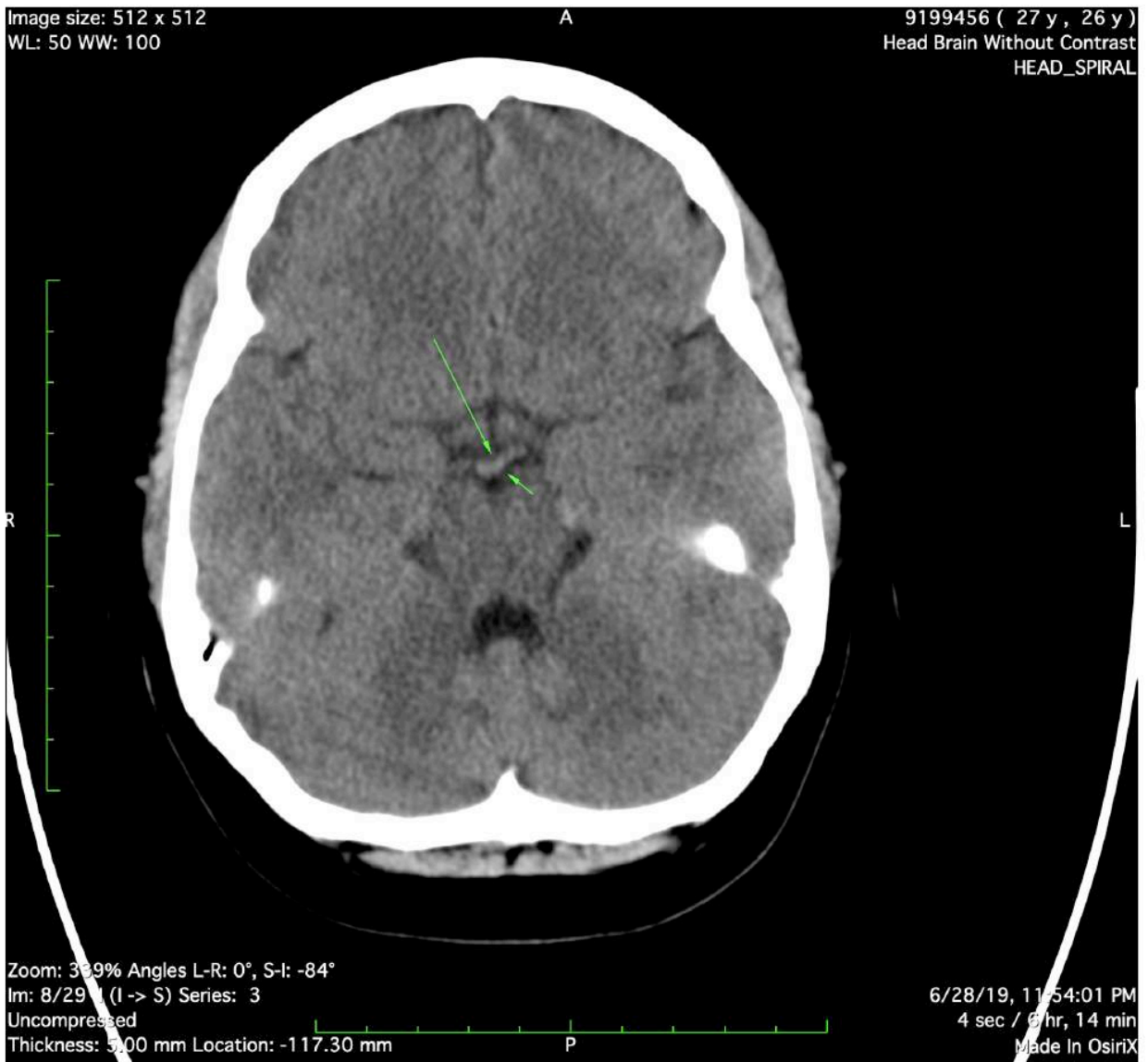
30. Image 7 of 29 of the CT scan, for example, showed a white hyperdense sign of a basilar-artery thrombosis:



See Appendix.




31. Image 8 of 29 of the CT scan revealed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:



See Appendix.

*Radiologist Cooney Fails to Identify the Signs of Stroke on the CT Scan*

32. At 00:18, acting as a vRad employee, Radiologist Michael Cooney read the 32 images associated with the study. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA		
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720		
<b>Study Type:</b>	CT HEAD WO		
<b>Ordered As:</b>	CT HEAD WO		
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Accession:</b>	3948616
<b>Date of Exam:</b>	28 Jun 2019 EDT	<b>Account Number:</b>	
<b>Patient ID:</b>	9199456	<b>Patient DOB:</b>	
<b>Patient Location:</b>	Unknown	<b>Caretaker:</b>	
<b>Account #:</b>		<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>This interpretation is based upon the receipt of 32 images.</b>			
<b>EXAM:</b> CT Head Without Contrast			
<b>EXAM DATE/TIME:</b> 6/28/2019 11:52 PM			

HMC 61.

33. Dr. Cooney found no evidence of hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

34. Dr. Cooney's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. Dr. Cooney did not even mention the sign. HMC 61.

35. Dr. Cooney's findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. Dr. Cooney did not even mention the streak. HMC 61.

36. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded that the study showed "no acute intracranial abnormality." HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

37. At 00:28, Dr. Holsonback noted Dr. Cooney's reading of the CT scan as showing "no acute intracranial abnormality." HMC 72.

Holsonback, Shaw n D.O. Created: 6/29/2019 0027 Last Entry: 0028  
MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
without Informing Her She Has a BAO*

38. At 00:57, Dr. Holsonback rechecked Michaela. HMC 72.

39. She was "resting, feeling better," with a "headache still present" and "all numbness resolved." HMC 72.

40. At 02:15, Michaela continued to feel “better,” had “no focal neurological deficits,” and agreed to a discharge. HMC 2, HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

41. At 02:15, Michaela signed her disposition summary. HMC 65-66.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: **Smith, Michaela E**  
EDM Code: ER0170  
Med Rcrd: 9199456

---

MD Electronic Sg Holsonback, Shawn D.O. 6/29/2019 0214


---

**MY SIGNATURE BELOW INDICATES:**  
> I have received and understood the oral instructions regarding my current medical problem.  
> I will arrange follow-up care as instructed above.  
> I acknowledge receipt of the written instructions as outlined on this and any previous page(s).  
I will read and review these instructions.  
> I understand that a copy of the medical record is available to the practitioner or medical organization providing follow-up care, treatment, and services.

x Michaela Smith x Ashlynn R. M. Smith  
Patient (or Legal Guardian) Signature Staff (Witness) Signature Driver

HMC 66.

42. The disposition summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” and her chief complaint as “Poss Allergic Reaction.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	101737552 05LB01 06/28/2019 OP
May return to work/school: <u>1-2 Days</u>	Smith, Michaela E EMR
Restrictions: <u>None</u>	Physician, On Duty
Critical Care Time: <u>none</u>	

HMC 65.

43. The summary instructed Michaela to follow up with Dalton Family Practice, and permitted her to return to work, in 1-2 days, without restrictions. HMC 65.

44. The summary also instructed her to return to “Return to the Emergency Department sooner if worse.” HMC 65.

45. Michaela “verbalized understanding and ability comply” with these instructions. There were no learning or communication “barriers” and she received no “medical driving restrictions.” HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

46. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.

47. Her pain was 0 of 10. HMC 70.

48. At 02:27, Michaela was discharged in “stable” condition and left for home. HMC 65, 70.

49. Neither any provider nor the discharge instructions informed Michaela or her parents of the occlusion in her basilar artery.

<b>Hamilton Medical Center - Emergency Department</b> 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary (for discharged patient; English)</b>			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
Rm (last): _____		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Triage: <u>Kayla R. R.N.</u>	MLP: _____		
RN Eval: <u>Stacey S. R.N.</u>	PMD Ph: <u>(706) 278-0138</u>		
PMD: <u>Duckett, Jennifer P.A.</u>	Chief Cmplnt: <u>Poss Allergic Reaction</u>		

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING/COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

50. Michaela was “comfortable going home.” HMC 6.



The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

51. At home, she “went to bed about 03:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

## **June 29, 2019 – Michaela Returns to Hamilton by Ambulance**

### *Michaela Wakes with Global Alteration of Consciousness*

52. As demonstrated below, Michaela awoke with altered mental status and other classic signs and symptoms of stroke. These signs and symptoms amounted to a global alteration of consciousness, reflecting the onset of a neurological emergency some time after her discharge from Hamilton.



53. At about 07:15, Michaela's mother heard her moaning in her bedroom, went to check on her, and found her "with altered mental status and poor mobility." HMC 6, HMC 30.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

54. Michaela talked "through her gritted teeth" but could not "really open her mouth" and had "problems with moving and slurred speech." HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

55. Speaking “through her teeth,” Michaela told her mother that she was “unable to get out of bed” and thus “had wet on herself.” HMC 6, HMC 2.

56. When she awoke, Michaela was also “foaming at the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 08:14 Last Entry: 08:27

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

57. Thus, “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

58. The paramedics were then called. HMC 2, HMC 6.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2, 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

59. Upon arriving, the paramedics “were not able to get the patient up to walk” and Michaela had to be “brought into the emergency room by stretcher.” HMC 6.

60. After that Michaela did not speak again. HMC 6.

*Michaela Returns to Hamilton with Classic  
Signs of Stroke—a BAO*

61. By 08:19, the ambulance arrived at the Hamilton emergency department. HCM 24, HMC 25.

62. Michaela thus returned to Hamilton as a clinically different patient, whose neurological condition had deteriorated markedly overnight.

63. From the time of her arrival, Michaela demonstrated “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, MHC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

64. These symptoms alone were major signs of massive brain injury.

65. These symptoms alone made clear that Michaela was facing a neurological emergency that required an expedited and urgent diagnostic evaluation and possible intervention.

66. Extensor posturing, for example, is typically a result of severe brain injury.

67. What’s more, the presence of “extensor posturing” by itself made clear that the emergency likely involved injury to Michaela’s brainstem.



68. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was identified as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

69. Between 08:14 and 08:27, RN Megan Martin triaged Michaela.

70. During the assessment, Michaela “was squinting her eyes and looking around, while still shaking[.]” HMC 26.

71. Nurse Martin also gave Michaela a MEND exam. HMC 26.

72. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

■ **HPI:** Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

73. Michaela also mumbled that she could not talk. HMC 26.

74. Nurse Martin noted that Michaela’s last-known-well was about “10pm 6/28/19,” per the EMS. HMC 26.

75. By 08:29, Nurse Martin ordered an “electrocardiogram with physician review.” HMC 28.

Martin, Megan R.N. Created: 6/29/2019 0838 Last Entry: 0838  
Order(s) performed by "Nurse":  
- ELECTROCARDIOGRAM WITH PHYSICIAN REVIEW  
Order Notes:  
EKG completed - at 6/29/2019 0829 by Martin, Megan R.N. and given to Hawkins David F. M.D. for review at 6/29/2019 0834.

HMC 28.

76. The EKG was completed at 08:29 and “given to Hawkins, David F. M.D. for review at 6/29/2019 0834,” HMC 28.

*Dr. Hawkins Documents but Fails to Treat the Stroke*

77. Michaela returned to Hamilton with classic and obvious signs of stroke. HMC 30-31.

78. At some point between 09:12 and 12:44, Emergency Room Physician David F. Hawkins examined Michaela. HMC 30-31.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244  
H&P  
Initial Provider Contact 6/29/2019 0912  
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

79. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.

**H&P**

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

Initial Provider Contact 6/28/2019 2338

**HPI:** approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX

nothing worsens Sx.

nothing improves Sx.

no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

80. Michaela generally appeared “unresponsive, uncooperative,” with “no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2.” HMC 31.

81. Michaela’s neurological condition was this: “extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs . . . Will not follow commands.” HMC 31.



**GENERAL APPEARANCE:** somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2

**VITALS: SEE NN,**

**PULSE OXIMETRY:** 97% on RA.

**EARS:** canals clear bilat, TMs clear, no discharge from ears.

**EYES:** PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

**NOSE:** no nasal discharge.

**MOUTH:** (-)decreased moisture. + GAG

**THROAT:** no tonsillar inflammation, no airway obstruction.

**NECK:** supple, no neck tenderness, (-)thyromegally.

**BACK:** (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

**CHEST WALL:** no chest tenderness.

**LUNGS:** no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

**HEART:** normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

**ABDOMEN:** normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

**EXTREMITIES:** good pulses in all extremities, no swelling/tenderness in the extremities, no edema. FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTURING

**SKIN:** warm, dry, good color, no rash.

**NEURO:** EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE

**ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS**

**MENTAL STATUS:** unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

82. Michaela's extremities were "flaccid" with "occ spastic tone in arms and legs as in posturing." HMC 31.

83. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

84. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including alcohol abuse, depression, drug abuse, eating disorder, and schizophrenia. HMC 31.

**DIFFERENTIAL Dx:**

**PSYCHIATRIC Dx:** adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.

**NEURO Dx:** CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

85. Dr. Hawkins's differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA: "CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor." HMC 31.

**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

86. Although he identified stroke (“CVA” and “TIA”) as a differential diagnosis, Dr. Hawkins did not order vascular imaging to confirm or rule out a stroke, and did not take any other action to treat the stroke.<sup>1</sup>

87. In fact, despite his differential diagnosis of a stroke, and despite Michaela’s deteriorated clinical presentation, Dr. Hawkins failed to order even a new CT scan of Michaela’s brain (which would have taken minutes to complete) and failed to obtain a new stroke score for Michaela.

*Dr. Johnson Also Fails to Identify the Stroke in the CT Scan*

88. At 09:15, Radiologist Kevin Johnson interpreted and submitted a final report on the same CT scan taken overnight. HMC 30.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

HMC 60.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 9:15A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 60.

89. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus

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<sup>1</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.

disease, or mastoid or middle-ear effusions. He also found that the gray-white differentiation was within normal limits. HMC 60.

90. Dr. Johnson's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. Dr. Johnson did not even mention the sign. HMC 60.

91. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. Dr. Johnson did not even mention the streak. HMC 60.

92. Instead, contrary to the plain images, Dr. Johnson *affirmatively* concluded that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat Michaela's Stroke for Hours*

93. At 10:00, RN Lindsey Andrews called the Georgia Poison Center regarding Michaela's symptoms. HMC 28.

94. The Poison Center recommended a chest x-ray, and a CT scan of the head: "the physician may consider doing a CT of the head to rule out something unrelated to the pepper spray incident." HMC 28.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

95. At 10:08, Dr. Hawkins ordered a stat chest x-ray. HMC 15.

<b>Hamilton Medical Center</b> PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180 Radiology Services	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB: <input type="text"/>	<b>MR/RAD #:</b> 09199456/09199456 <b>ADMIT #:</b> 101737594 <b>HOSP/SVC:</b> EMR <b>ORDER DATE:</b> Jun 29 2019 10:08A <b>ROOM #:</b> ECD-RM2201 <b>REF #:</b> 3948717
<b>Ordering Dr: DAVID MD HAWKINS</b> <b>Attending Dr: DAVID MD HAWKINS</b>	

HMC 15.

96. But he did not order a CT scan.

97. At 10:31, Dr. Johnson read the chest x-ray recommended by the Poison Center and concluded it was a "normal exam." HMC 15, HMC 22.

**\*\*\*Final Report\*\*\***

**REASON FOR EXAM:** per GA Poison Center

**PROCEDURE:** DIA 1030 - CHEST SINGLE VIEW - Jun 29 2019 10:23AM

**RESULT:**  
Per Georgia Poison Center

**TECHNIQUE:** Single frontal view of the chest was obtained

**COMPARISON:** None

**FINDINGS:** The lungs are clear. The heart size is normal. The bones appear intact.

**IMPRESSION:**  
Normal exam.

KJ/dmc  
Job #12358370

HMC 15.

**INTERPRETED BY:** KEVIN JOHNSON MD on Jun 29 2019 10:31A  
**SIGNED BY:** KEVIN JOHNSON MD on Jun 29 2019 12:09P

HMC 15.

98. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter mental status after heavy physical activity.” HMC 23.

Order Type: Radiology				
Order Sub Type: MRI				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ? HEAT EXPOS Stat	Complete	
	06/29/19 11:22			06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

99. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

100. At 12:45, Dr. Hawkins discussed Michaela's case with Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1245 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

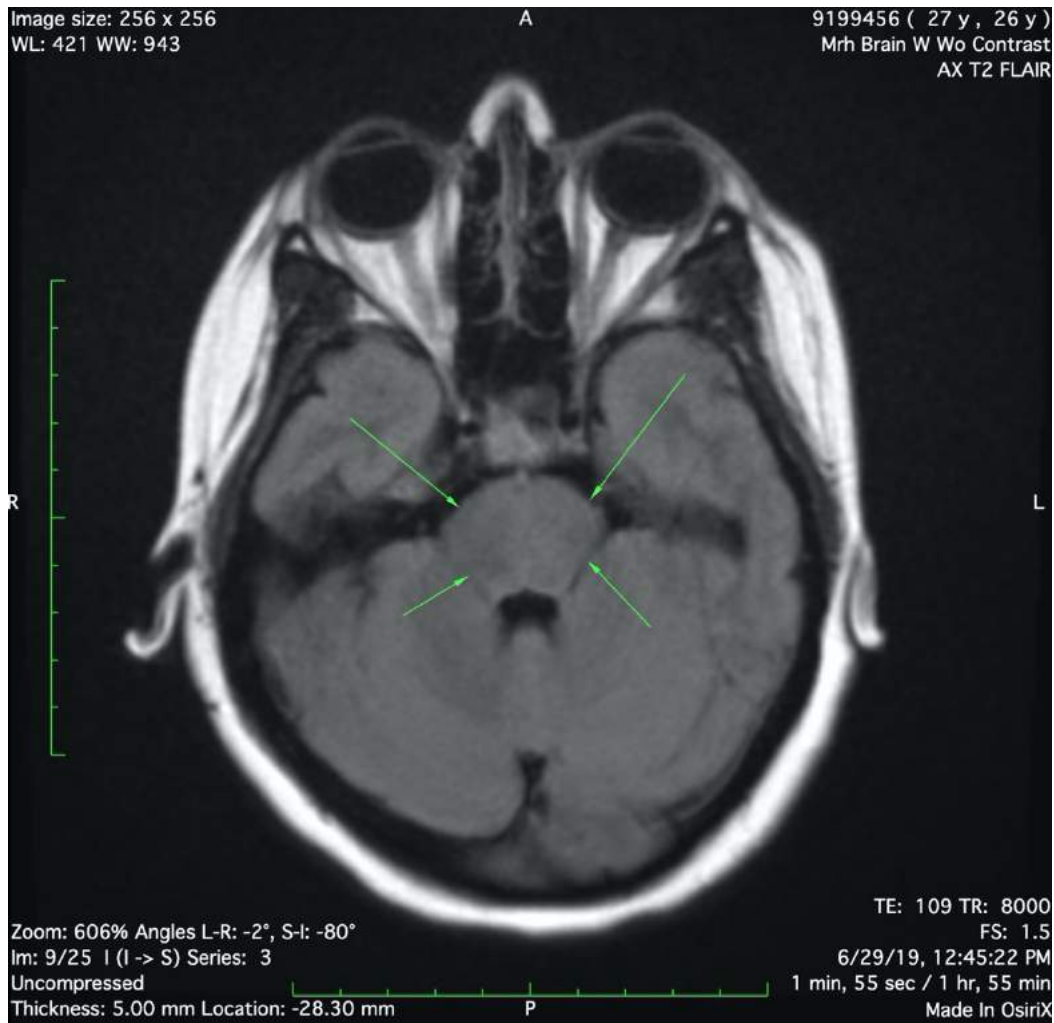
101. Dr. Glass agreed with administering the MRI, in order to distinguish "function from organ cause." HMC 32.

102. Dr. Glass also agreed to see Michaela in the ER for evaluation. HMC 32.

### *The MRI Confirms a Yet-Treatable Ischemic Stroke*

103. At 12:45, Michaela underwent the brain MRI, for "altered mental status after physical activity." HMC 16.

104. Although the MRI's DWI sequence showed that Michaela's brainstem was ischemic (thus confirming she was having a stroke), the MRI's FLAIR sequence remained normal—that is, Michaela's brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.



*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

105. At 12:54, Dr. Hawkins admitted Michaela to the hospital floor for observation. HMC 32.
106. At that time, Michaela continued to exhibit classic stroke signs and symptoms. See HMC 32.
107. Michaela, for example, had a decreased level of consciousness, had a bizarre affect with no interaction, showed general weakness, was not speaking, was tearful, was hyperventilating, had spasticity to her extremities, had no laterizing signs, and was urinating on herself. HMC 32.



Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEIZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

108. Despite her clinical presentation, Dr. Hawkins admitted Michaela for “observation,” noting that the CT scan of “last night” was negative. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEIZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

109. The reason for her admission was; “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

110. At 13:29, Dr. Johnson interpreted Michaela’s MRI. At 13:30, Dr. Johnson discussed his findings with Dr. Hawkins. HMC 16.

IMPRESSION:  
NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.  
No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

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**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P**

HMC 16.

111. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

112. The MRI also showed: “gray-white differential within normal limits” and “normal flow voids are maintained within the major intracranial vascular pedicles,” and “no sites of pathologic contrast enhancement.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

113. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.

114. Dr. Johnson failed to include the brainstem ischemia visible in the DWI sequence. HMC 16. (In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.)

115. Instead, contrary to the DWI imaging, Dr. Johnson concluded that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

**COMPARISON: CT head 6/28/2019; no prior MRI**

**FINDINGS:** The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

**IMPRESSION:**

**NOTE:** Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

**No definitive acute abnormalities are identified on this motion-compromised examination.**

HMC 16.

116. In addition, Dr. Johnson again reviewed Michaela’s CT scan, for “comparison” purposes. Dr. Johnson thus had a second opportunity to interpret the CT scan. HMC 16.

117. Dr. Johnson failed again to catch and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to catch and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a “normal exam.” See HMC 16, HMC 61.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat the Stroke for Additional Hours*

118. At 14:05, RN Gabe Herman performed a neuro check, including a Glasgow Common Scale (GCS) assessment. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534  
 Nurse Note:  
 NEURO CHECK - 6/29/2019 1405  
 EYE OPENING: eyes open to verbal stimuli 3  
 VERBAL RESPONSE: verbal incomprehensible sounds 2,  
 MOTOR RESPONSE: motor flexion withdrawal 4  
 GLASCOW COMA TOTAL 7

119. The GCS is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients.

120. The Scale assesses the patient according to three aspects of responsiveness: eye-opening, motor, and verbal responses.

**TABLE 38-2**  
**Glasgow Coma Scale**

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

121. At 14:18, Internist Ananka Myrie called Dr. Hawkins. Dr. Myrie informed him that she wanted neurology and psychiatry evaluations of Michaela before admitting her. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
 Results Reviewed by ED Physician:  
 MRH BRAIN W/WO CONTRAST  
 CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

122. Between 14:17 and 14:22, Dr. Hawkins called Dr. Glass again, to inform him of the negative MRI findings. HMC 32.

123. Dr. Hawkins and Dr. Glass discussed the facts that Michaela still appeared “stuporous,” interacted only “intermittently” and “primatively” with her parents, and may have suffered an “atypical seizure.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422

MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

124. Dr. Glass “did not suggest medication prior to his exam.” HMC 32.

125. At 14:51, Dr. Hawkins turned over Michaela’s care to Emergency Physician Jonathan Thompson. HMC 32.

126. At that time, the emergency department continued waiting for Dr. Glass’s evaluation. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451

Results Reviewed by ED Physician:

MRH BRAIN W/WO CONTRAST

LACTATE

MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Despite Examining Michaela, Dr. Glass Still  
Does Not Diagnose and Treat the Stroke*

127. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

128. At that time, Michaela continued to exhibit signs and symptoms of stroke:

- “Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—”
- “She can at times open her eyes and close them to command and does appear to look at me at times.”
- “At times she appears to have a deconjugate gaze but at other times not.”
- “At times she will have extensor posturing type movements of the upper extremities.”



- “She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently [sic].”
- “She has bilateral Babinski. She has bilateral Hoffmann’s in her hands.”

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann's in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman's. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

129. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” and despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with pepper spray” and then went to bed “doing fairly well,” Dr. Glass did not turn his attention to diagnosis of stroke, despite Michaela’s presentation. *See HMC 6-7.*



130. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass wondered if "a hypoxic event" or "unlikely" seizures might be the cause of her condition.

- "I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well . . ."
- "Her MRI scan did not show a structural abnormality to account for the symptoms."
- "I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here."
- "I will get an emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy."

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

131. As a result, despite Michaela's clinical presentation, Dr. Glass failed to review the CT scan or MRI for himself, failed to order a new CT scan or vascular imaging, and failed order or provide any treatment for Michaela's BAO.

132. Instead, Dr. Glass noted that the "CTA scan of the brain was normal," the "CT scan of the brain did not show any acute changes," and the "MRI scan of the brain with and without contrast showed significant motion artifact but was normal." HMC 3, HMC 6.

**Laboratories and Diagnostics:**

CT scan of the brain was normal.

MRI scan of the brain with and without contrast showed significant motion artifact but was normal.

HMC 3.

CT scan of the brain did not show any acute changes

MRI scan of the brain with and without contrast showed motion artifact but no significant abnormality

Ammonia, urine drug screen, TSH and EtOH were all okay

HMC 6.

*Dr. Glass Signs Off on Transfer to Erlanger for a  
Neuro Evaluation*

133. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time.” HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

134. Dr. Glass agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

135. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.

136. At 17:35, Michaela was transferred to Erlanger by EMS. The reason for the transfer was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.

**Appropriateness**

— Appropriate transport service equipment and personnel are requested to provide appropriate level of care  
 — Basic: \_\_\_ Advanced:  Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_  
 Agency: Hamilton EMS  
 — The receiving facility has available space for the patient.  
 — Transferring physician has discussed patient status with accepting physician — Auto accept thru transfer center  
 — the receiving facility has agreed to accept the patient and provided adequate treatment  
 Facility: Erlanger Time: \_\_\_\_\_  
 Name of Physician accepting patient: Ben Smith Phone: \_\_\_\_\_  
 Approved by: \_\_\_\_\_ Title: \_\_\_\_\_  
 — Reason for Transfer: altered mental status  
 — Risk of Transfer: transport, anxiety compromise  
 — Benefits to Transfer: Neuro evaluation  
 — It is medically necessary to transport the patient by ambulance  
 Signature of transferring physician: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Transferring facility: Hamilton Fax: \_\_\_\_\_  
 Name of Patient's primary care physician: none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother  
 Refusal to transfer signature/relationship: \_\_\_\_\_  
 Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

— Report given to: Owens RN By: Debi Adams RN Time: 1702  
 — Police notified (if applicable). Agency: \_\_\_\_\_  
 — Family notified. Name: \_\_\_\_\_  
 — Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS \_\_\_ documented. Disposition of valuables: \_\_\_\_\_  
 Signature of RN: Debi Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

137. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp Financial Class		
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger After an MRA Reveals a Brainstem and Right-Side Stroke*

138. At 18:39, Michaela arrived at Erlanger emergency department by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

139. At 01:10 overnight, June 30, 2019, Michaela was transferred from the ER to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

140. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.



<b>CONSULTATION</b>	
<b>Patients Name:</b> SMITH, MICHAELA E	
<b>Hospital Number:</b> 000101737594	<b>Date of Birth:</b>
<b>Room Number:</b> ECD RM	<b>Patient Status:</b> O
<b>To Attending Physician:</b> David F. Hawkins, MD	<b>Consulting Physician:</b> Jeffrey Glass, MD
<b>Dictated by:</b> Jeffrey Glass, MD	
<b>Date dictated:</b> 06/30/2019 12:02 P	
<b>Date transcribed:</b> 06/30/2019 12:39 P jc2	
Signed by Glass M.D., Jeffrey on 01-Jul-2019 17:45:02 -04:00	

HMC 5.

141. Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.”

HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

142. At Erlanger, Michaela’s condition “progressively worsened.”

143. On July 1, 2019, Michaela was placed on a ventilator and a feeding tube.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

144. On the afternoon of July 2, 2019, a brain CT scan produced an “urgent critical result,” including “a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation.”

BEH 310.

CT brain without IV contrast		Resulted: 07/02/19 1616, Result status: Final result	
Ordering provider: William Albert Shelton, MD 07/02/19 1516	Order status: Completed	Resulted by: Andrew J Hill, MD	Filed by: Interface, Radiology/Cardiology Results In 07/02/19 1618
Performed: 07/02/19 1527 - 07/02/19 1539	Accession number: E1142983	Resulting lab: CARESTREAM PACS/PS360	
Narrative:			
<b>**URGENT CRITICAL RESULT **</b>			
This report was faxed to BEH NNICU at 1608 hours on 07/02/2019 -- H. Andrus/Editor.			
HISTORY: Altered mental status.			
TECHNIQUE: <b>Noncontrast brain CT.</b> Automated dose control used during this exam.			
FINDINGS			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
No evidence of acute intracranial hemorrhage or extra-axial collection. No midline shift.			
Mucous retention cyst left maxillary sinus. Orbits are intact. The skull is intact.			
Impression:			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
Findings given to Dr. Tom Devlin at 1612 on 07/02/2019 by Dr. Andrew Hill.			



BEH 310.

145. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

146. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

Performed: 07/02/19 1927 - 07/02/19 2050  
Resulting lab: CARESTREAM PACS/PS360  
Narrative:

Accession number: E1143287

**\*\*URGENT UNEXPECTED FINDING\*\***

This report was faxed to BEH NNICU at 2239 hours on 7/2/2019 and received by Liz Hughes, RN, at 2242 hours on 7/2/2019 -- G. VanOstrand/Editor.

HISTORY: Stroke, follow up

EXAMINATION: MRI BRAIN WITHOUT CONTRAST, MR ANGIOGRAM NECK WITH AND WITHOUT CONTRAST, MR ANGIOGRAM BRAIN WITHOUT CONTRAST

TECHNIQUE: Multiecho multisequence imaging of the head was performed without intravenous contrast administration.

3-D time-of-flight MRA of the head was performed without intravenous contrast. MIP reconstructions of the circle of Willis were generated.

MRA of the neck was performed without and with intravenous contrast. MIP reconstructions of neck vessels were generated. 20 cc of MultiHance was administered intravenously.

Where applicable, stenosis measurements are performed per NASCET criteria; with mild (<50%), moderate (50-70%), severe (70-99%).

COMPARISON: CT head, same day.

BEH 319.

147. The studies were tagged as an "urgent unexpected finding." BEH 319.

148. The findings of the head MRI included:

- A large acute infarct involving the right cerebellar hemisphere, and brain stem
- Diffuse cerebral edema.
- Absent ICA flow voids bilaterally
- Basilar-artery flow void
- A mass effect on the brainstem
- Cerebellar tonsillar herniation at least 2 cm below the foramen magnum
- Compression of the cervicomedullary junction

HMC 319.

MRI Head:

A large acute infarct is seen involving the right cerebellar hemisphere, and brainstem. Diffuse cerebral edema is present. There is subtle increased T2 signal involving the cerebral cortex bilaterally. Bilateral thalamic acute lacunar infarcts.

Absent ICA flow voids bilaterally. Basilar artery flow void is present.

There is mass effect on the brainstem. Cerebellar tonsillar herniation noted at least 2 cm below the foramen magnum. There is compression of the cervicomedullary junction. Subcentimeter pineal cyst noted.

HMC 319.

149. The findings of the head MRA included: “No evidence of flow-related enhancement noted in the intracranial vessels.” BEH 319.

150. The findings of the neck MRA included “diffuse attenuated caliber of vertebral arteries noted on both sides.” BEH 319.

MRA head: No evidence of flow-related enhancement noted in the intracranial vessels.

MRA NECK: No evidence of flow-limiting stenosis or occlusion of cervical carotid or vertebral arteries noted. No dissection identified. However, there is diffuse attenuated caliber of vertebral arteries noted on both sides.

HMC 319.

151. In summary, the findings of the three studies were: “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the

brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels

BEH 319.

152. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

153. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

154. Michaela Smith was 26 years old. HMC 67, HMC 44.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: Smith, Michaela E  
Pt Acct: 101737552

---

ED RECORD

Patient: Smith, Michaela E Age/DOB: \_\_\_\_\_ Sex: F SS #: \_\_\_\_\_  
Age: 26yr Med Rcrd: 9199456

Mailing Address: 1452 Piedmont Dr Arrival (HIS): 6/28/2019 2243  
Mailing Other: \_\_\_\_\_ Dispo Summary Printed 6/29/2019 0215  
City: Dalton ED Record Printed: \_\_\_\_\_  
State: GA Zip: 30721 Initial Provider Contact: 6/28/2019 2327  
Mode of Arrival: Car

MD ED: Holsonback, Shawn D.O. RN Eval: Stacey S. R.N.  
MLP: \_\_\_\_\_ PMD: Duckett, Jennifer P.A.

HMC 67.

# APPENDIX

# CT Scan Imaging



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y, 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 339% Angles L-R: 0°, S-I: -84°  
Im: 7/29 (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -122.30 mm

6/28/19, 11:54:01 PM  
4 sec / 6 hr, 14 min  
Made In OsiriX



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 374% Angles L-R: 0°, S-I: -84°  
Im: 8/29 | (I -> S) Series: 3  
Uncompressed  
Thickness: 5.00 mm Location: -117.30 mm

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4 sec / 6 fr, 14 min  
Made In OsiriX

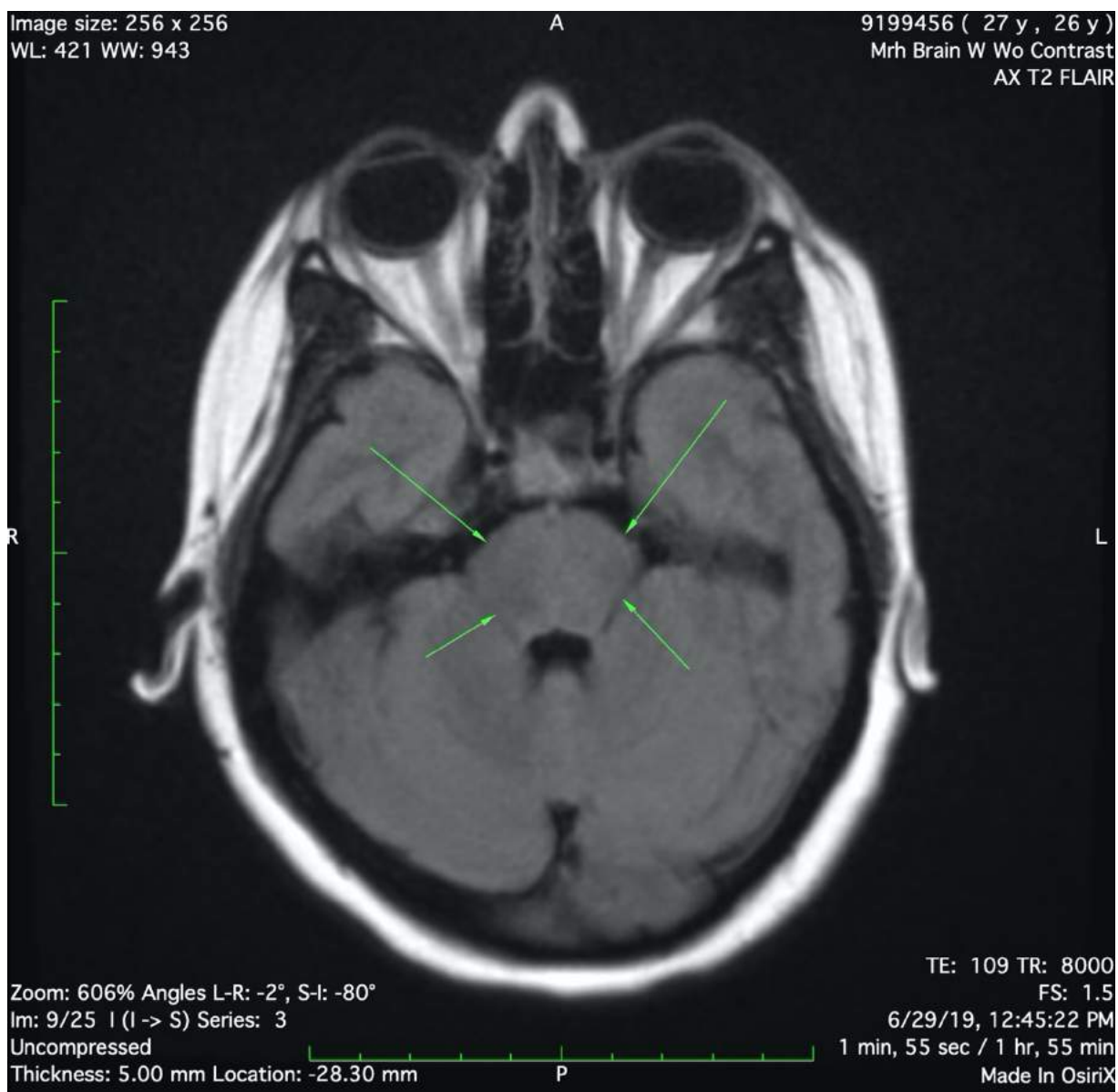
Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



# MRI Imaging



**AFFIDAVIT OF LYNNE CESARINI, R.N., REGARDING  
MICHAELA ELIZABETH SMITH**

PERSONALLY APPEARS before the undersigned authority, duly authorized to administer oaths, comes Lynne Cesarini, R.N., who after first being duly sworn, states as follows.

**Introduction**

1. This affidavit addresses medical negligence that occurred during Michaela Elizabeth Smith's visit to Hamilton Medical Center ("Hamilton") in Dalton, Georgia, on June 29, 2019.
2. I have been asked to provide this affidavit for the limited purpose of Georgia statute OCGA § 9-11-9.1.
3. This affidavit addresses matters that Plaintiffs' counsel have asked me to address. I have not attempted to identify all standard-of-care violations. I have not attempted to state every causation opinion I have. I have not attempted to anticipate or address issues that the Defense might raise or that might otherwise arise as the case unfolds.
4. I use the term "standard of care" to refer to that degree of care and skill ordinarily exercised by members of the medical profession generally under the same or similar circumstances and like surrounding conditions as pertained to the medical providers I discuss here.
5. Plaintiffs' counsel drafted this affidavit after consulting with me. I reviewed drafts and edited them with counsel to make sure that the affidavit correctly states my views.
6. As to the matters this affidavit addresses, I have tried to give a reasonably detailed explanation, but I have not attempted an exhaustive discussion. In deposition or trial testimony, I may elaborate with additional details.
7. I hold all the opinions expressed below to a reasonable degree of medical certainty—that is, more likely than not. If additional information becomes available later, my views may change.
8. I understand that Plaintiffs' counsel will provide this affidavit to the Defendants, and that their insurance company will hire lawyers and medical experts to review this

case and to review this affidavit. If anyone on the Defense believes that I have not been given, or have overlooked or misconstrued, any relevant information, I invite the Defense to communicate with me by letter, copied to Plaintiffs' counsel. The Defense need not wait to take my deposition to communicate with me. I will consider any information the Defense wishes to bring to my attention, and, if appropriate, I will provide a supplemental affidavit.

### **Evidence Considered**

9. I have reviewed medical records from Hamilton pertaining to Michaela Smith's visits on June 28 and 29, 2019.

### **Principal Opinions**

10. My principal opinions are summarized here. In deposition or trial testimony, I may elaborate upon these principal opinions, and in doing so, I may offer related, subsidiary, or incidental opinions.

i. **Task & Requirement:** Providing emergent care to stroke patient.

*Standard of care requirement:* When there is reason to suspect a stroke, the standard of care requires an emergency-room nurse to:

- (1) notify the attending ER physician immediately,
- (2) provide emergent stroke care to the patient, and
- (3) call a code stroke or initiate a stroke protocol insofar as the nurse has the authority to do so under hospital policy.

*Violations:* On June 29, 2019, upon Michaela Smith's return to the Hamilton ER, Nurse Megan Martin violated these requirements by:

- (1) failing immediately to notify Dr. Hawkins of Michaela's serious neurological deficits;
- (2) failing to provide Michaela emergent care; and
- (3) failing immediately to call a code stroke or initiate a stroke protocol insofar as Nurse Martin had the authority to do so under Hamilton policy.

*Causation:* Because time is brain, a delay in the recognition, diagnosis, or treatment of a stroke causes harm to the patient. As a result of these violations of the standard of care by Nurse Martin, Michaela did not receive a rapid

evaluation, rapid radiology-imaging to diagnose the stroke, or emergent treatment for the stroke. These delays thus harmed Michaela.

I understand, moreover, that, between 12:45 and 13:22 on June 29, 2019, an MRI demonstrated that Michaela's brainstem, although ischemic, had not yet suffered permanent stroke changes.

*Damages:* These violations of the standard of care thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.

**ii. Task & Requirement:** Triaging patient with neurological deficits.

*Standard of care requirement:* The standard of care requires an emergency-room nurse to assign, document, and report accurate triage scores. The standard of care also requires an emergency-room nurse to perform, document, and report a comprehensive neurological assessment when a patient first presents with significant neurological deficits.

*Violations:* When Michaela returned to the Hamilton ER on June 29, 2019, Nurse Martin violated these requirements by:

- (1) assigning and documenting an acuity level of 3 for Michaela, where her neurological deficits indicated a level 2; and
- (2) failing to perform, document, and report a full neurological assessment of Michaela.

*Causation:* These violations delayed the recognition, diagnosis, and treatment of Michaela's stroke, by setting a baseline for Michaela's condition that did not reflect its true urgency and severity. As a result, Michaela:

- (1) was not evaluated by a physician for about an hour,
- (2) did not undergo rapid radiology-imaging to confirm the stroke, and
- (3) did not receive a neurological assessment for additional hours.

Because time is brain, a delay in the recognition, diagnosis, or treatment of a stroke causes harm to the patient. These delays thus harmed Michaela.

I understand, moreover, that, between 12:45 and 13:22 on June 29, 2019, an MRI demonstrated that Michaela's brainstem, although ischemic, had not yet suffered permanent stroke changes.

*Damages:* These violations of the standard of care thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.

**iii. Task & Requirement:** Assessing patient with neurological deficits.

**Standard of care requirement:** When an emergency-room nurse is caring for a patient with significant neurological deficits concerning for stroke, the standard of care requires the nurse to perform, document, and report neurological assessments at least once every hour.

**Violations:** On June 29, 2019, Nurse Victoria Brock and Nurse Gabe Herman each violated these requirements.

During the hours she cared for Michaela, Nurse Brock did not perform a neurological assessment of Michaela.

During the hours he cared for Michaela, Nurse Herman conducted one, incomplete neurological assessment of Michaela.

**Causation:** Because time is brain, a failure to recognize, diagnose, and treat a stroke causes harm to the patient. Especially because Michaela's condition was deteriorating, each assessment Nurse Brock and Nurse Herman missed was an opportunity to recognize and upgrade Michaela's acuity level, recognize the need for vascular imaging, and diagnose and treat the stroke. Each missed assessment thus caused harm to Michaela.

I understand, moreover, that, between 12:45 and 13:22 on June 29, 2019, an MRI demonstrated that Michaela's brainstem, although ischemic, had not yet suffered permanent stroke changes.

**Damages:** These violations of the standard of care thus caused Michaela pain, suffering, and brain-injury, and likely contributed to her death.

## **Qualifications**

11. I am more than 18 years old, suffer from no legal disabilities, and give this affidavit based on my own personal knowledge and belief.
12. I do not recite my full qualifications here. I recite them only to the extent necessary to establish my qualifications for purposes of expert testimony under OCGA 24-7-702.
13. My Curriculum Vita, which is attached as Exhibit A, provides further detail about my qualifications. I incorporate and rely on that information here.
14. The events at issue here occurred in June 2019.
15. I am qualified to provide expert testimony pursuant to OCGA 24-7-702.



- a. In June 2019, I was licensed by an appropriate regulatory agency to practice my profession in the state in which I was practicing or teaching in the profession.

Specifically, I was licensed by the State of Georgia to practice as a registered nurse. That is where I was practicing in June 2019.

- b. In June 2019, I had actual professional knowledge and experience in the area of practice or specialty which my opinions relate to — specifically, the tasks identified above on which I offer standard-of-care opinions.

I had this knowledge and experience as the result of having been regularly engaged in the active practice of the foregoing areas of specialty of my profession for at least three of the five years prior to June 2019, with sufficient frequency to establish an appropriate level of knowledge of the matter my opinions address.

Specifically, I am a registered nurse specializing in emergency nursing in the settings of hospitals and other long-term care facilities, and for many years I have had great familiarity with each of the tasks on which I offer standard-of-care opinions here.

### **Attached Documents**


16. The documents identified below are attached to this affidavit largely for the benefit of the insurance adjustors responsible for evaluating this case on behalf of the Defendants, and for the lawyers provided by the insurance company.

17. Attached to this affidavit is a document that recites medical principles that generally apply here. The Defendants themselves will not need that recitation of basic medical information. Plaintiff's counsel created the medical-principles document for the benefit of the Defense. I have reviewed the document without editing it. The medical principles it contains on nursing are generally stated correctly.

18. Also attached to this affidavit is a chronology of facts pertaining to this case. In forming my substantive view of the case, I have relied on the medical records themselves, not that chronology. The chronology, however, provides a useful reference for relevant facts contained in the records in less-organized fashion. Plaintiff's counsel created the chronology. I have not edited it.

## Supporting Literature

19. The general points discussed above are elementary, are likely well known to the Defendants, and should not require a literature search. Insofar as any Defendant consulted or should have consulted reliable authorities on these points in treating Michaela Smith, the literature cited in the attached medical-principles document represents such authorities, which here may also prove helpful to adjustors and lawyers in their evaluation of this case.

  
\_\_\_\_\_  
Lynne Cesarini, R.N.

SWORN TO AND SUBSCRIBED before me

4-16- \_\_\_\_\_, 2021

  
\_\_\_\_\_  
NOTARY PUBLIC

My Commission Expires:



# LYNNE CESARINI

PAGE 1

## OBJECTIVE

---

Highly motivated R.N. looking to provide compassionate and skilled care to the ill and injured in an acute care setting with an emphasis on quality of care and exceptional customer service.

## FUNCTIONAL SUMMARY

---

Actively practicing Registered Nurse with 35 years in an Emergency Department setting with a broad knowledge of medical conditions and treatments. More than 20 years of Charge nurse duties which required a high degree of multi-tasking and situational review with knowledge of current practice standards. Also expanded knowledge of multiple other areas of nursing as noted below to include ICU and Medical Surgical floor nursing.

## EMPLOYMENT

---

### 2010-Present University Hospital

Augusta, GA

*Staff Nurse*

- 2/3/2014 moved to Charge Nurse position at University Hospital McDuffie which is a 14 bed Emergency Department that cares for all ages and medical conditions that was acquired by the University Health System in Thomson Ga.
- Clinical Decision Unit 13 bed observation unit connected to the Emergency Department and provided support staff to the main Emergency Department.
- Experienced Triage Nurse in a 52 bed Emergency Department as well as all other areas of the emergency department.
- Experienced Staff nurse in the pediatric emergency department with current Pediatric Advanced Life Support Certification
- Experienced Staff nurse in the cardiac area of the emergency department with Advanced Cardiac Life Support and Basic Life Support Certifications, and Basic Life Support AHA Instructor Certification.
- Experienced in stabilization of respiratory, dialysis, precipitous deliveries, workman's compensation, stroke, surgical, gastrointestinal, trauma, diabetic, psychiatric and many other emergencies.

### 2012-2013

Augusta, GA

*Staff Nurse Part Time*

Emergency Department Trinity Hospital, Augusta, GA

# LYNNE CESARINI

PAGE 2

## **2010-2013 Critical Solutions Agency**

**Augusta, GA**

*Staff Nurse Part Time*

- Emergency Department Doctor's Hospital, Augusta, GA
- Burn Step Down, Medical Surgical floor, Telemetry and Intensive Care Unit Doctor's Hospital, Augusta, Ga (Including some knowledge of wound and burn care)
- Medical Surgical floor at Will's Memorial Hospital, Washington, GA
- Select Specialty Hospital medical floor to include the care of ventilator dependent patients as well as those with extensive wound treatments and those patients on isolation and telemetry.

## **1986–2010 University Hospital**

**Augusta, GA**

*Assistant Nurse Manger in Emergency Department*

- Highly skilled Charge Nurse in the one of busiest Emergency Departments in the state of Georgia
- Interviewed new employees to recommend hire
- Managed 20-25 employees a shift in 52 bed emergency department to include personnel evaluations
- Involved in quality assurance with some basic knowledge of JCAHO standards, OSHA regulations, and COBRA laws
- Scheduling for all night shift employees both individual and unit staffing
- Coordination of patient care with a multidisciplinary team to maximize the improved health of our patients and the people of our community.

## **1987-1989 Doctor's Hospital**

**Augusta, GA**

*Staff Nurse PRN pool*

- Burn Unit
- Emergency department
- Surgical Intensive Care Unit (SICU)
- Medical Intensive Care Unit (MICU)

# LYNNE CESARINI

PAGE 3

**1986-1989 Medical College Of Georgia Hospital Augusta, GA**

*Staff Nurse Shock Trauma ICU (Intensive Care Unit), Part time*

- Shock Trauma
- Floor nursing
- Coronary Care Unit (CCU)

## EDUCATION

---

1984-1986	Medical College Of Georgia Bachelor of Science in Nursing Graduated 1986	Augusta, GA
1983-1984	Georgia College	Milledgeville, GA
1982-1983	Georgia Baptist School of Nursing	Atlanta, GA
1981-1982	Abraham Baldwin Agricultural College	Tifton, GA

## SUMMARY OF QUALIFICATIONS

---

- Thirty five years emergency nursing experience in the Emergency Department with some part time experience on ICU/CCU and Burns, Telemetry, and Medical – Surgical floor nursing.
- 1 Year in Clinical Decision Unit caring for psychiatric, cardiac and other patients in holding for 23 hours or greater. Managing cardiac drips, patients in DT's, and infusions/transfusions to name of few duties with responsibility to perform charge duties as well on intermittent basis.
- More than twenty years Charge Nurse experience working out staffing patterns and assisting the department in developing assignments to best utilize available staff while keeping down the nurse to patient ratio
- Experience in every aspect of Emergency Medicine to include triage, cardiac, stoke, diabetic, GI, pediatric, geriatric, psychiatric and trauma specialties to name a few. Crisis Prevention Intervention certified.

# LYNNE CESARINI

## PAGE 4

- Experience in situational review to include sentinel events and deviations from the current Nursing Standards of Care.
- Adept at dealing with customer service issues and de-escalation of volatile situations with customers and psychiatric patients.
- Current BLS instructor certification
- Knowledge of forensic evidence collection in the case of sexual and physical abuse / assault
- Training in Disaster Management to include past certification in Basic and Advanced Disaster Life Support and Decontamination Procedures, Radiological Disasters and Pediatric Emergency Management.
- Documentation reviews for Standard of Care and participation in developing a Pandemic Flu process and modified Triage form to facilitate rapid movement through the department in this event as well as developing an education form on Chicken Pox discharge instruction.
- Chaired the Disaster Committee in the Emergency Department of University Hospital.
- Train the Trainer for new procedures such as Arterial Line setup and Restraints, etc., as well as McKesson and EPIC Documentation systems.
- Member of American Nurses Association (ANA) and Emergency Nurses Association (ENA)

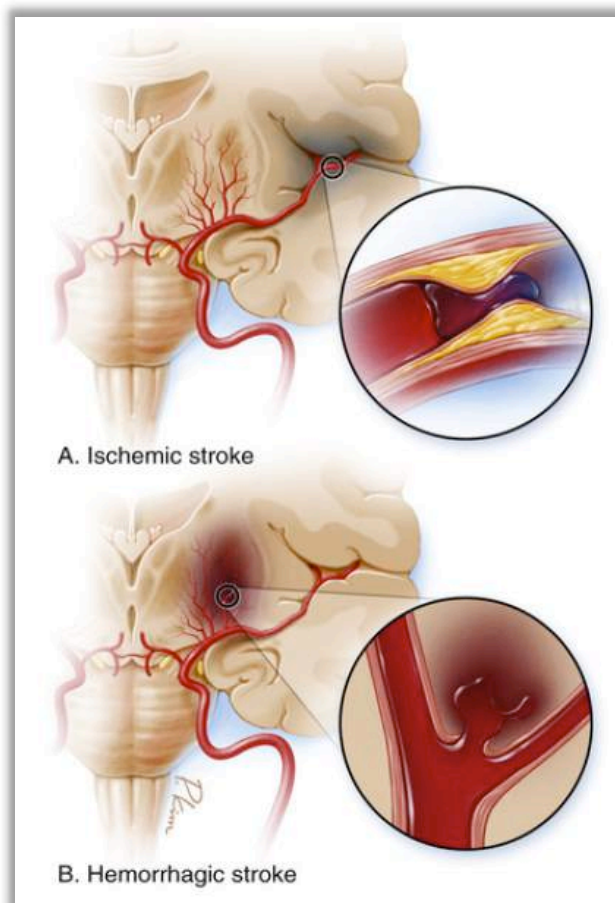
# **Medical Principles**



## General Medical Principles

### *Stroke*

1. Stroke is the sudden death of brain cells due to a lack of oxygen.
2. The lack of oxygen is caused by either a blockage of blood flow to the brain or by the rupture of an artery that supplies the brain.
3. When a stroke is caused by blocked blood flow, it is called an ischemic stroke.
4. When a stroke is caused by the rupture of an artery, it is called a hemorrhagic (bleeding) stroke.



5. A stroke may result in brain-damage, long-term disability, and death.

6. Signs<sup>1</sup> of stroke generally include:

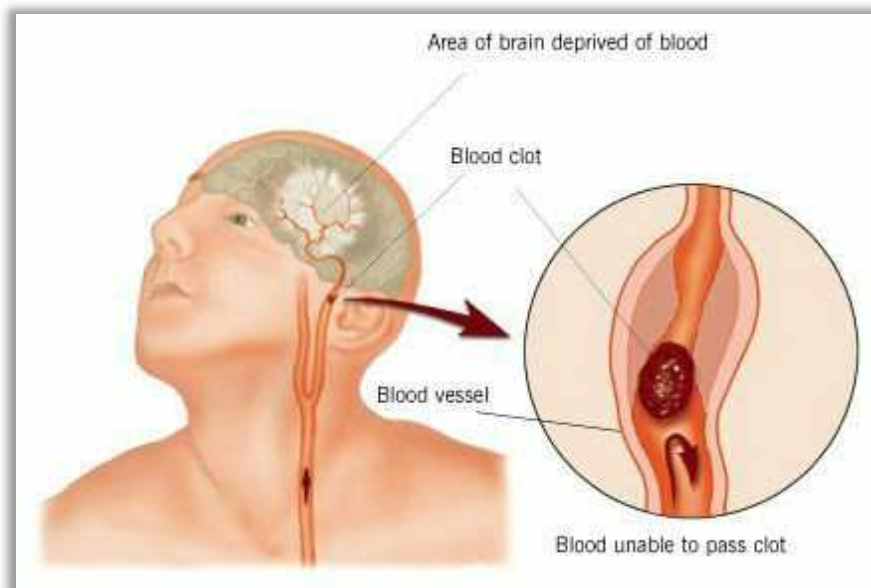
- Sudden numbness or weakness in the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking, or difficulty understanding speech.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance, or lack of coordination.
- Sudden severe headache with no known cause.

### *Ischemic stroke*

7. Ischemia is a condition in which a person does not get enough oxygen to an organ or tissue to maintain its health.

8. If something blocks blood flow to the brain, brain cells start to die because they cannot get oxygen. That is a stroke.

9. An ischemic stroke occurs when a blood clot interferes with blood flow through an artery that supplies the brain.



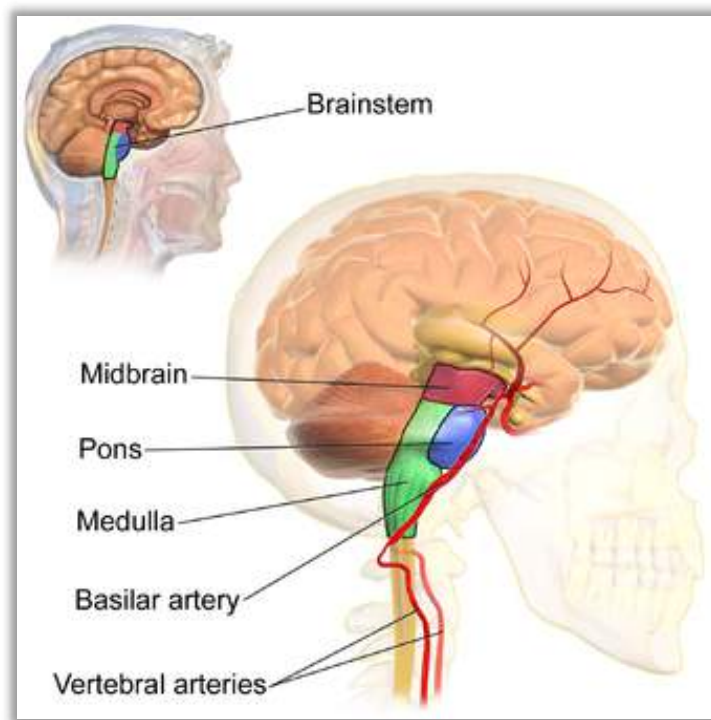
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<sup>1</sup> A sign is a manifestation of medical condition that the physician perceives, objectively. In contrast, a symptom is a manifestation apparent to patient, subjectively.

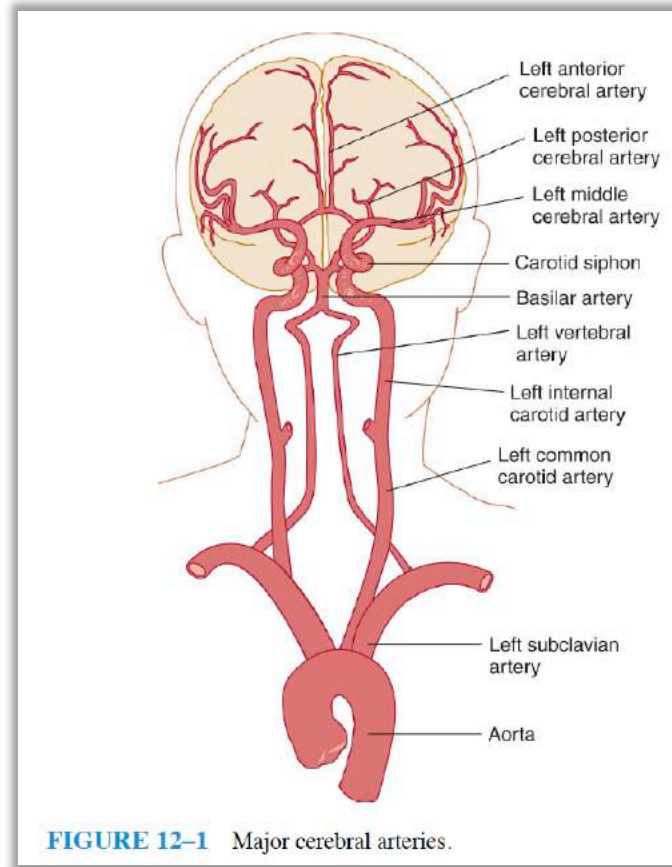
10. A thrombus is a blood clot that forms within a blood vessel.
11. An embolus is a blood clot that breaks off and travels through the bloodstream until it lodges into a blood vessel that is too small for the clot to pass through.
12. Arterial dissection—a tear inside an artery—often causes an embolus.
13. Trauma is a common cause of arterial dissection.

### *The Basilar Artery*

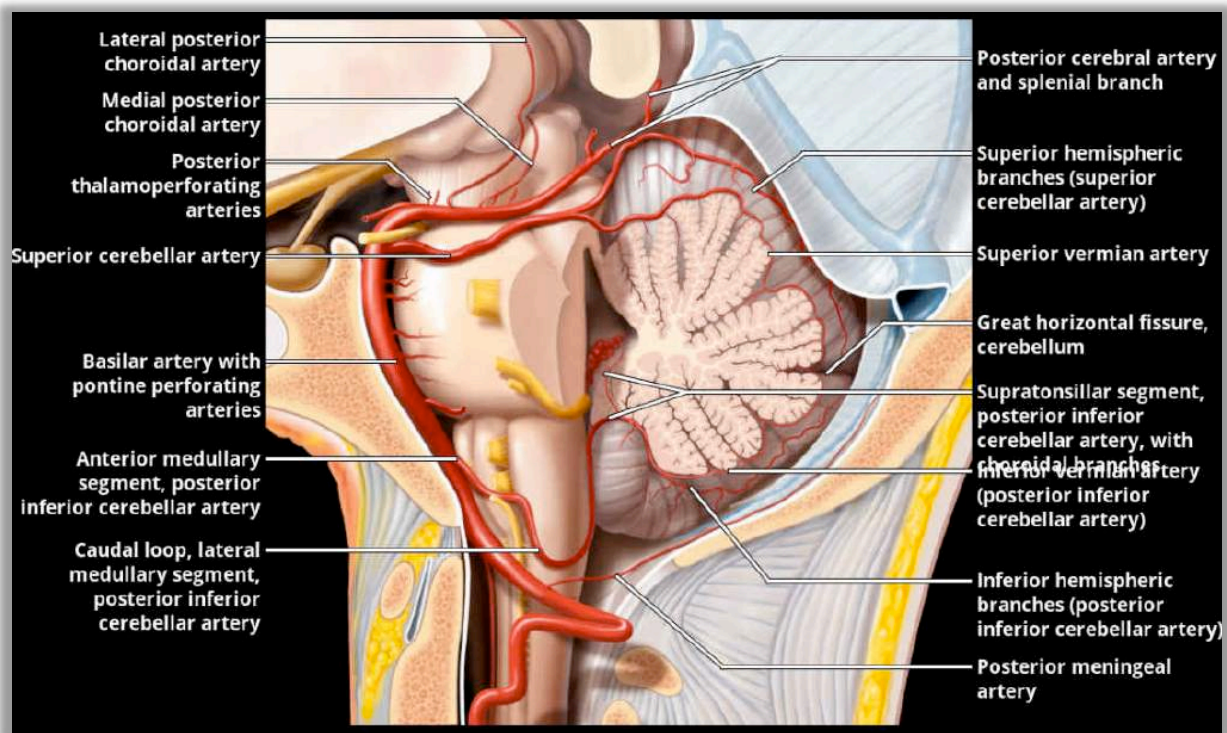
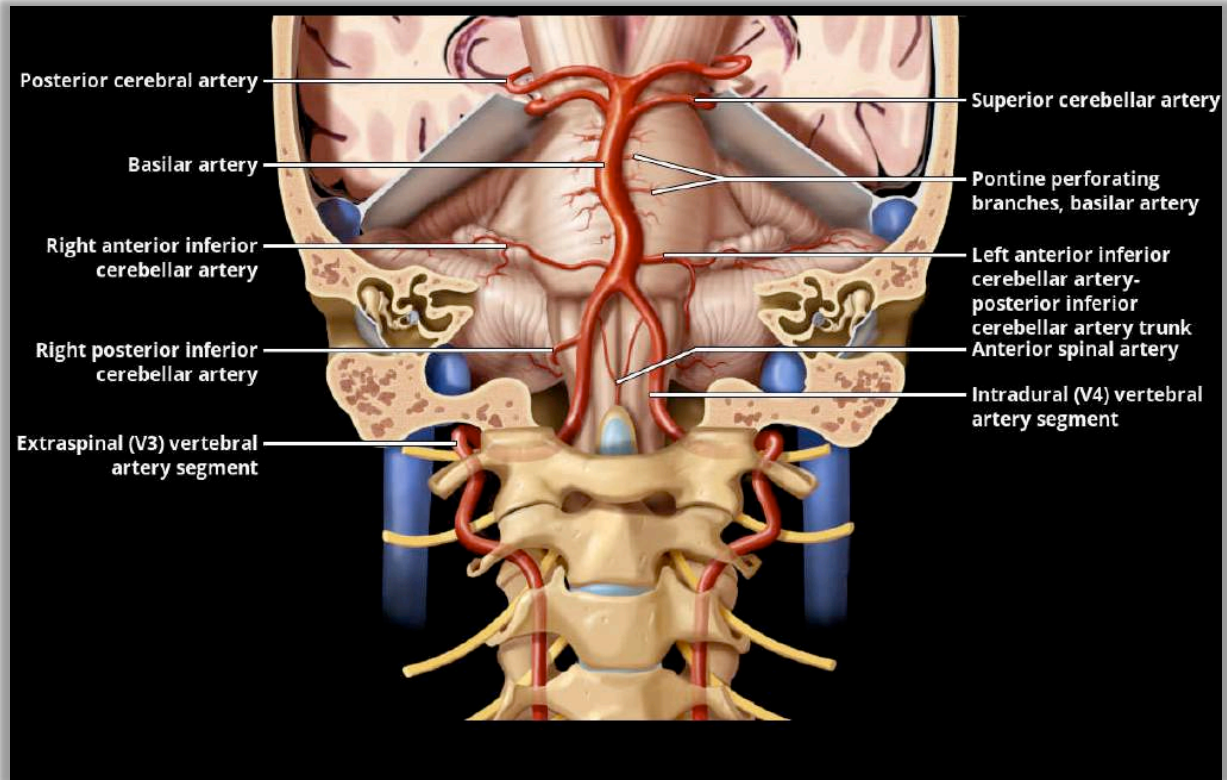
14. The basilar artery lies at the front of the brainstem in the midline.



15. The basilar artery is formed by the union of the two vertebral arteries.



16. The basilar artery carries oxygenated blood up through the brainstem to the posterior (back) part of the brain.





## *Basilar Artery Occlusion (BAO)*

17. Basilar Artery Occlusion (BAO) is the name for an acute stroke originating in the basilar artery.
18. A BAO is a type of posterior-circulation stroke. It affects the circulation of blood in the back part of the brain.
19. A BAO occurs when a blood clot in the basilar artery impedes blood flow, resulting in ischemia in the posterior part of the brain.







20. If not treated quickly, a BAO can lead to severe brain damage, organ malfunction, catastrophic disability, and even death.
21. A BAO occurring at the uppermost part of the basilar artery is known by two names: top-of-the-basilar syndrome and rostral brainstem infarction.

## *BAO Signs and Symptoms*

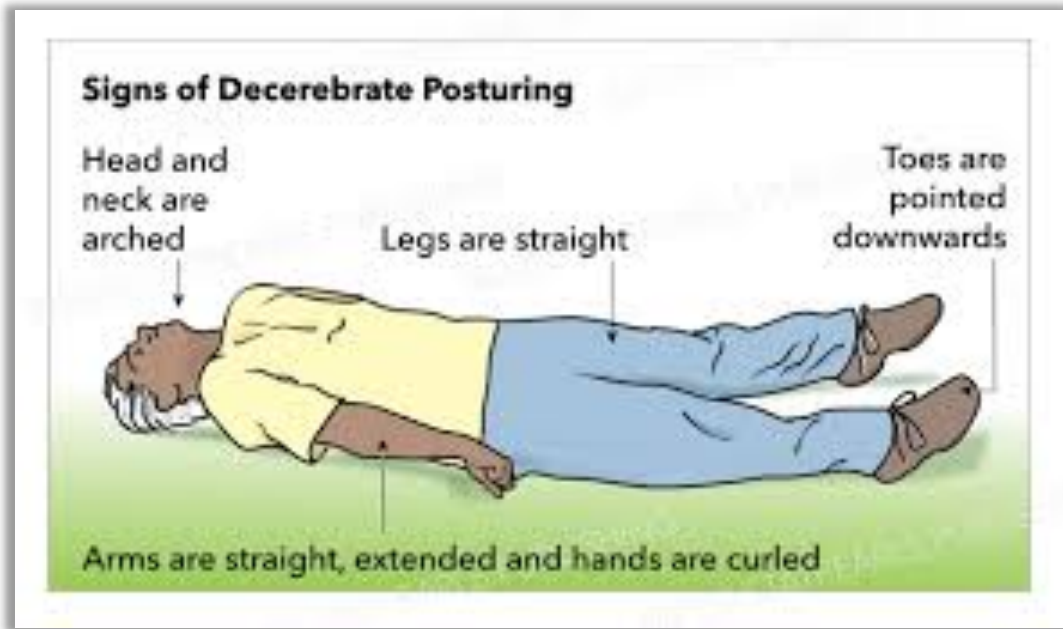
22. Because the cerebral vessels each tends to irrigate specific territories in the brain, their occlusion results in highly stereotyped syndromes that, even prior to imaging studies, can suggest the site of the vascular lesion.

23. The signs and symptoms of a BAO may vary depending on where the occlusion is located along the basilar artery.
24. The hallmarks of a BAO include:
- Decreased or altered consciousness
  - Quadriplegia (loss of voluntary movement in all four limbs)
  - Various combinations of limb ataxia (impaired balance or coordination)
  - Oculomotor (eye movement) abnormalities
  - Pupillary abnormalities (pupils do not react normally to light)
  - Dysarthria (inability to articulate speech)
  - Dysphagia (inability to swallow)

Oculomotor Abnormalities	Visual Dysfunction
	<b>Esotropia condition</b> - Eyeball moves inner direction.
	<b>Hypertropia condition</b> - Eyeball moves upper direction.
	<b>Exotropia condition</b> - Eyeball moves outer direction.
	<b>Hypotropia condition</b> - Eyeball moves down direction.

25. Such signs and symptom can present in various combinations.
26. Decerebrate posturing is a classic sign of BAO and other posterior strokes.
27. Decerebrate posturing is an abnormal posture that involves the arms and legs being held straight out, the toes being pointed downward, and the head and neck being arched backward.





28. Decerebrate posturing is also known as extensor posturing.
29. Other signs and symptoms of BAO include:
- Overactive or overresponsive reflexes (hyperreflexia).
  - Abnormal spontaneous movements such as shivering, twitching, shuddering, jerking, or tremulous shaking.
  - Loss of the ability to speak (dysphonia).
  - Abnormalities of alertness and behavior, including hallucinations.
  - Dizziness, vomiting.
30. In rare BAO cases, patients suffer locked-in syndrome. Patients with this syndrome are alert and conscious but lose all voluntary movement except vertical eye movement. They are aware of their “locked in” condition.

*Stroke diagnosis: history and presentation*

31. The most characteristic historical aspect of stroke is its abrupt onset. This is the case whether the stroke is ischemic or hemorrhagic.
32. After the onset, stroke symptoms most often stay the same or improve over the few hours that follow.

33. The symptoms may also worsen in a smooth or stuttering course.
34. Ischemic strokes may rapidly resolve, but even if they resolve completely, they may recur after minutes to hours.
35. A second most characteristic historical aspect of stroke is that the patient's symptoms usually fit the distribution of a single vascular territory.
36. That is to say, patients with brain infarct will present with signs and symptoms in the middle, anterior, or posterior cerebral arteries; a penetrating artery; or the basilar or vertebral arteries.
37. The signs and symptoms thus provide an important clue as to the likely location of the possible stroke.

### *Stroke triage*

38. Triage refers to the process of sorting and prioritizing patients for care.
39. When a patient arrives at a hospital's emergency room with serious neurological deficits concerning for stroke, the triage nurse must (a) notify the attending physician immediately; (b) provide emergent care to the patient; and (c) call a code stroke or initiate a stroke protocol insofar as the nurse has the authority to do so under the hospital's policies.
40. An emergency-department nurse must assign, document, and report an accurate triage score (also known as "acuity level") for a patient.
41. When a patient presents to the emergency room with neurological deficits concerning for stroke, an emergency-room nurse must assign, document, and report an accurate triage score for the patient.
42. The accuracy of the acuity level is critical because it determines the care the patient subsequently receives and the urgency with which it is provided.

### *Neurological assessments*

43. When a patient presents to the emergency room with significant neurological deficits concerning for stroke, an emergency-room nurse must perform, document, and report a full neurological assessment of the patient.

44. A comprehensive neurological assessment determines the care the patient receives downstream and the urgency with which it is provided.
45. A full neurological assessment covers, at minimum, the patient's mental status, motor function, sensory function, and pupillary response.
46. The obligation to perform a comprehensive neurological assessment applies with even more force at a designated stroke center.
47. When a patient manifests significant neurological deficits concerning for stroke, an emergency-room nurse caring for the patient must perform, document, and report hourly neurological assessments of the patient.
48. These obligations apply with special force if the patient deteriorates.

#### *Stroke diagnosis: Glasgow Coma Scale*

49. A full neurological assessment includes an assessment of the patient's mental status.
50. The assessment of mental status, in turn, includes an assessment of the patient's level of consciousness.
51. The Glasgow Coma Scale (GCS) is the most common scoring system for describing a patient's level of consciousness.
52. The GCS is an objective and reliable way of recording the initial and subsequent level of consciousness.
53. The GCS tests three categories of functioning to gauge level of consciousness: eye opening response, verbal response, and motor response.

Glasgow Coma Scale		
Response	Scale	Score
<b>Eye Opening Response</b>	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
<b>Verbal Response</b>	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
<b>Motor Response</b>	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
<b>Minor Brain Injury</b> = 13-15 points; <b>Moderate Brain Injury</b> = 9-12 points; <b>Severe Brain Injury</b> = 3-8 points		

54. A GCS score ranges from 3 (for a totally unresponsive patient) to 15 (for a normal patient).
55. A GCS score of 9-12 means that the patient has suffered moderate brain injury.
56. A GCS score of 3-8 means that the patient is comatose and has suffered severe brain injury.
57. The GCS is not a substitute for a full neurological assessment.

TABLE 38-2		
Glasgow Coma Scale		
BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

58. Motor response is the most powerful predictor of a patient's outcome.

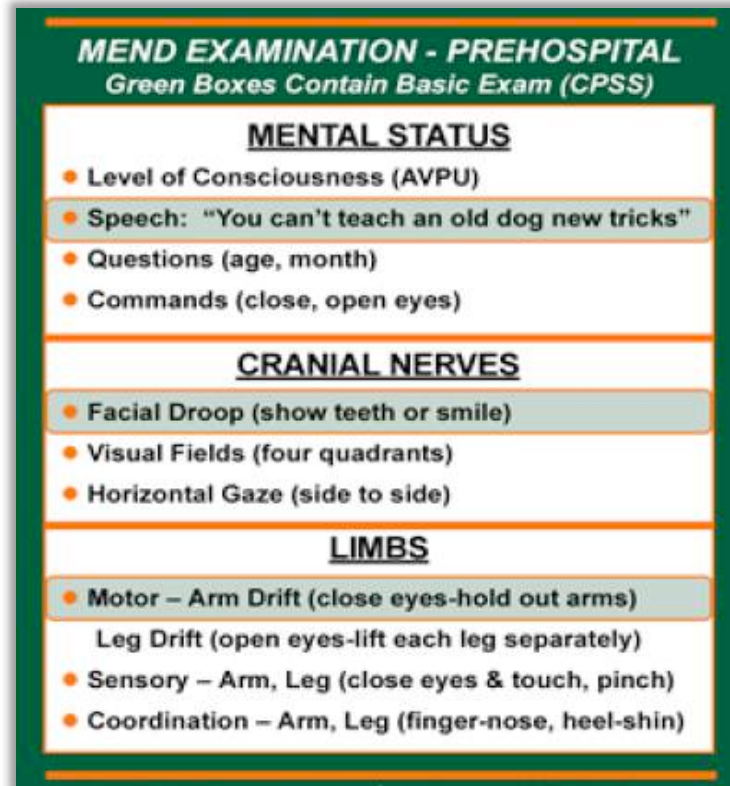
*Stroke diagnosis: MEND exam*

59. The Miami Emergency Neurologic Deficit ("MEND") exam is an effective screening tool for detecting stroke.

60. The MEND exam was developed to facilitate communication between healthcare providers throughout the continuum of care.

61. The MEND exam incorporates the posterior-circulation elements missing in the Cincinnati Prehospital Stroke Scale (CPSS).

62. The MEND exam has all three elements of the CPSS, plus six elements from the NHISS (consciousness, orientation, commands, visual fields, gaze, leg motor, limb ataxia, and sensation).



63. The MEND exam is an ideal screening tool in emergency situations because it can be performed in two minutes without any instruments.

*Stroke diagnosis: NIHSS score*

64. The National Institute of Health Stroke Scale (NIHSS) is a common diagnostic method for quickly assessing the severity of a stroke.
65. The NIHSS is considered the only valid tool to assess stroke-deficit severity.
66. The NIHSS is the gold standard in clinical trials and clinical practice in the United States.
67. The NIHSS (also known as the Scale or the Score) looks at 11 different elements that evaluate specific abilities in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
	CATEGORY	SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

68. A patient's score on each element can range from 0 (normal) to 2, 3, or 4. The highest total score possible is 42.
69. A total score of 1-4 indicates a minor stroke; 5-15, a moderate stroke; 16-20, a moderate-to-severe stroke; and 21-42, a severe stroke.
70. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.
71. In fact, the initial severity of a stroke according the NIHSS is the most important predictor of outcome.

*Stroke diagnosis: CT scan and MRI*

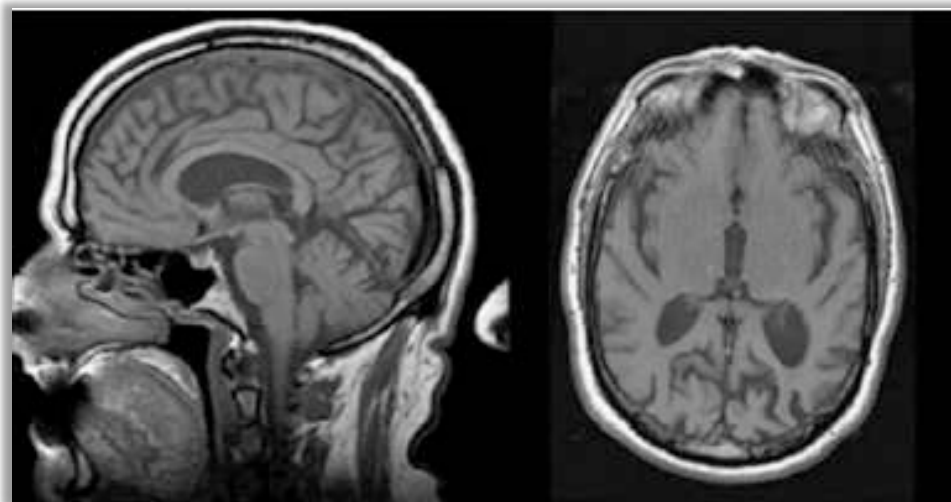
72. A CT scan and MRI are noninvasive diagnostic tests.
73. They enable doctors to view a patient's body in cross-sectional slices, as if the body were sliced layer-by-layer and an image were taken of each slice.



74. A non-contrast CT of the head remains the standard procedure for the initial evaluation of stroke.
75. In the emergent initial evaluation of an acute-stroke patient in the emergency department, a non-contrast CT of the head remains the imaging test utilized in most hospitals worldwide, with the exception of a few centers that have dedicated MRI capabilities for stroke.
76. A non-contrast CT scan has the advantages of being widely available, relatively inexpensive, and fast to perform.
77. A CT scan takes less than 1 minute.
78. A non-contrast CT should be performed within 20 minutes of the patient's arrival at the emergency department, in order to speed up potential treatment with thrombectomy and/or TPA for ischemic-stroke patients.
79. All patients with a suspected acute ischemic stroke should undergo a non-contrast brain CT scan or brain MRI.



80. A CT scan is one of the vital first steps in the management of a stroke patient. It helps to exclude hemorrhagic stroke.
81. The CT scan will immediately rule out hemorrhage, as blood is bright on a CT.
82. A CT scan can quickly differentiate an ischemic stroke from intracranial hemorrhaging and other mass lesions—information crucial to the subsequent therapeutic decisions that will be rapidly made.
83. A CT scan generally must be performed within 30 minutes of the patient’s arrival at the hospital.
84. A brain MRI can provide substantial information on stroke localization, age, bleeding, and tissue status. But, unlike a CT or CTA, an MRI requires the patient to hold still for several minutes
85. A brain MRI can visualize ischemic infarcts earlier, and identify acute posterior-circulation strokes more accurately, than a CT scan.
86. An MRI’s diffusion-weighted sequence (“DWI”) can show any restricted diffusion consistent with infarct.
87. By showing such restriction, a DWI sequence helps exclude conditions that mimic a stroke, such as peripheral vertigo and migraine with aura.
88. An MRI’s DWI sequence and perfusion-weighted imaging (“PWI”) allow differentiation between reversible and irreversible neuronal injury



## *Stroke diagnosis: CTA and MRA*

89. A CTA and an MRA are vascular-imaging tests.
90. Vascular imaging specifically focuses on the blood vessels.
91. Vascular imaging produces images of the blood vessels that are more detailed than the images of the surrounding organs and tissues.



92. Vascular imaging thus enables doctors to look at blood vessels more thoroughly.
93. Vascular imaging specifically helps doctors find blood clots.
94. Vascular imaging thus helps doctors diagnose and treat ischemic strokes, including BAO.
95. A CTA is the test most commonly used to diagnose vascular problems, including blood clots.
96. A CTA takes minutes to complete—a few minutes to inject the contrast dye and less a minute to run the scan.
97. A CTA can quickly provide a snapshot of the entire cerebral arterial anatomy, and can diagnose intracranial and extracranial stenosis, aneurysms, and dissections.

98. A CTA is the most frequently used test for detecting whether a patient is eligible for a thrombectomy.
99. An MRA provides the same information as a CTA.
100. But, in contrast to a CT or CTA, an MRA requires the patient to hold still for several minutes.
101. A doctor must promptly order vascular imaging when there is reason to suspect that the patient has an occlusion in a major blood vessel.
102. This is particularly true if there is reason to suspect that the occlusion is in an artery supplying the brain, like the basilar artery.
103. Most patients with a suspected acute ischemic stroke (like a BAO) should undergo a CTA or MRA.
104. When there is reason to suspect a BAO, the most rapid and cost-effective approach is to evaluate the patient's vessels outright with a CTA or MRA.

### *Radiology reports*

105. Radiologists interpret imaging studies (including a CT, CTA, MRI, MRA) and communicate findings and conclusions on written radiology reports.
106. A radiologist must interpret imaging studies reasonably and accurately.
107. A radiologist must also provide prompt and accurate radiology reports.
108. Critical values are results that vary so much from normal that they suggest a condition that is life-threatening unless appropriate action is taken quickly.
109. When an imaging study suggests that a patient is at risk of stroke, or may be having a stroke, a radiologist must call critical values—that is, immediately call the attending physician to inform him or her of the findings.

### *Stroke treatment: medical emergency*

110. Stroke is the most common neurological emergency.
111. During a stroke, every minute counts. Time lost is brain lost.

112. Because effective treatments are available that must be started within minutes, most acute neurological presentations should be assumed to be a stroke until proven otherwise by history, exam, or radiographic testing.
113. When a patient presents to a hospital's emergency room with significant neurological deficits concerning for stroke, a physician must act quickly to confirm or rule out stroke.
114. When a physician includes stroke among the differential diagnoses for a patient, the physician must act quickly to confirm or rule out stroke.
115. Acute therapies for an ischemic stroke (thrombectomy, TPA) are best implemented as fast as possible, so the steps needed to stabilize and assess the patient must be taken as quickly as possible.
116. In practice, to speed up the process, these steps are often taken simultaneously.
117. When a patient is diagnosed with stroke, medical providers must act quickly to treat the stroke.
118. If the stroke is an ischemic stroke, medical providers must act quickly to clear the occlusion (blood clot) causing the stroke.
119. In some cases, medical providers must act quickly to order and perform a thrombectomy to remove the blood clot causing the stroke.
120. The death rate and level of disability resulting from a stroke can be dramatically reduced by immediate and appropriate medical care.
121. Fast treatment can lessen the brain damage that stroke can cause.
122. The National Institute of Neurological Disorders recommends time-frames for completing the basic, widely-accepted procedures that hospitals follow to evaluate potential ischemic-stroke patients.

**National Institute of Neurological Disorders and Stroke Recommended Stroke Evaluation Targets for Potential Thrombolytic Candidates**

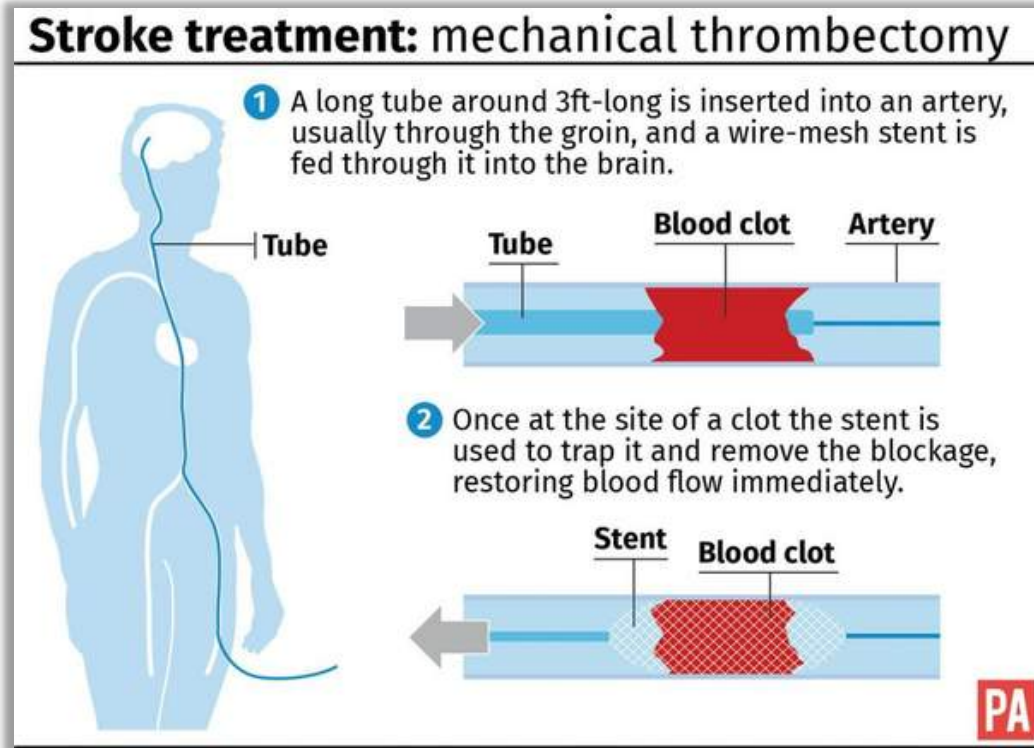
MANAGEMENT COMPONENT	TARGET TIME FRAME
Door to doctor	10 minutes
Door to CT completion	25 minutes
Door to CT scan reading	45 minutes
Door to treatment	60 minutes
Access to neurologic expertise*	15 minutes
Access to neurosurgical expertise*	2 hours

\*By phone or in person.

123. Emergency-medicine physicians and neurologists must generally perform procedures within these time-frames.
124. With a focus on rapid recognition, evaluation, and treatment of stroke, many hospitals have streamlined care to meet recommended time-goals.
125. That has led to the development of stroke protocols, critical pathways, and acute interventional stroke teams that may be deployed in the field before the patient arrives at the emergency department.

*Stroke treatment: thrombectomy*

126. A blood clot causing a stroke can be removed through a medical procedure called a thrombectomy.
127. In a thrombectomy, a neurosurgeon inserts a catheter into the body through an incision in the femoral artery, which is located in the groin.
128. The catheter is guided through the blood system towards the blood clot.
129. Once the catheter reaches the blood clot, the surgeon can attempt to suction, dissolve, or retrieve the clot.



- 130. The only FDA-approved treatments for ischemic stroke are thrombectomy and intravenous TPA.
- 131. The goal of these therapies is to get the artery open and re-establish blood flow.
- 132. A doctor should always ask whether he or she is doing everything possible to optimize blood flow to regions of cerebral ischemia.
- 133. Every hour's delay in achieving recanalization by a thrombectomy results in 8% decrease in probability of good outcome.
- 134. Every twenty minutes saved leads to an average equivalent to 3 months of disability-free life for the patient.
- 135. It is the responsibility of the practitioner initially evaluating the patient to facilitate the patient's transfer to a thrombectomy suite, whether located at the same hospital or at another facility.



## Supporting Literature

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# Medical Chronology

## Treatment of Michaela Smith

### *Prologue: Michaela Suffers a Kick to the Right Side of Her Head*

1. On or about June 21, 2019, Michaela was kicked on the right side of the head. HMC 30, HMC 71.
2. The accident occurred during physical training for her job as a detention officer for the sheriff's department. HMC 30, HMC 71.

Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

3. At that time, Michaela experienced dizziness and headache, but these symptoms resolved on their own shortly thereafter. HMC 30, HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216  
H&P  
Initial Provider Contact 6/28/2019 2338  
HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

June 28, 2019 – Michaela's First Visit to Hamilton

### *Onset of Symptoms*

4. On June 28, 2019, Michaela again took part in training for her job. HMC 2, HMC 6, HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

5. The training involved physical activity and tests, including being sprayed in the face with pepper spray at about 17:00. HMC 30, HMC 2, HMC 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

6. After the training, Michaela drove herself home and did “well for a couple of hours.” HMC 30, HMC 2, HMC 6.

Initial Provider Contact 6/29/2019 0912

**HPI:** PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

7. Between 20:30 and 21:30 that same evening, Michaela started experiencing a constellation of symptoms, including:

- throbbing headache
- shortness of breath
- swelling throat
- slurred speech
- bilateral facial and hand numbness
- near syncope
- vomiting
- facial pain
- rhinorrhea
- nausea
- dizziness
- difficulty talking, with thick speech
- inability to open her mouth completely or swallow freely

HMC 71, HMC 30, HMC 2.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

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HMC 71.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244

**H&P**

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

8. Michaela had no prior history of a similar problem. HMC 71.



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 no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

*Initial Examination at the Hamilton Emergency Department ("ED")*

9. At 21:43, Michaela arrived at the Hamilton emergency department. HMC 65.

Hamilton Medical Center - Emergency Department 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: ER0170	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary</b> (for discharged patient; English)			
Patient: <u>Smith, Michaela E</u>		SS #:	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB:	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>		Disposition: <u>Home</u>	
Dispo Summary Printed: <u>6/29/2019 0215</u>		Condition at Dispo: <u>Stable</u>	
RN Triage: <u>Kayla R. R.N.</u>		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Eval: <u>Stacey S. R.N.</u>		MLP: _____	
PMD: <u>Duckett, Jennifer P.A.</u>		PMD Ph: <u>(706) 278-0138</u>	
Chief Cmpnt: <u>Poss Allergic Reaction</u>			

HMC 65.

10. Michaela's parents were with her.

Holsonback, Shaw n D.O. Created: 6/29/2019 0215 Last Entry: 0215  
 MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.



11. At 22:41, Michaela was admitted to the Hamilton ED, which identified headache, shortness of breath, and unspecified nausea with vomiting as the reasons for her visit. HMC 79.

Patient	Smith,Michaela	Date of Birth	T00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-28T22:41:00	Discharge Date	2019-06-29T02:27:00
Visit Type	EmergencyDepartment	LOS	0.2
Discharge Disposition	AHR Routine Discharge/home	Financial Class	
Attending Physician	Holsonback, Shawn DO	Coder	BDURRETT

Reason For Visit Diagnosis	
Code	Description
R51	Headache
R06.02	Shortness of breath
R11.2	Nausea with vomiting, unspecified

HMC 79.

12. Between 22:53 and 22:59, RN Kayla Rewis triaged Michaela. HMC 68.

13. Nurse Rewis entered the history of the present illness as: “Allergic Reaction - Onset 30 mins ago. Exposed to pepper spray.” HMC 68.

14. At that time, these were Michaela’s complaints: “soreness/swelling to throat, headache, vomiting, and near syncopal [fainting] episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.” HMC 68.

Rew is, Kayla R.N. Created: 6/28/2019 2253 Last Entry: 2259
<b>NURSING TRIAGE (Adult)</b>
<b>HPI:</b>
Allergic Reaction - Onset 30min ago. Exposed to pepper spray. (-) rash, (-)facial edema, (-)itching, (-) shortness of breath, (-) stridor, (-)dysphgia, (-)hoarseness, (-)epinephrine prior to arrival, (+)benadryl prior to arrival. Patient was sprayed with pepper spray today around 5pm for "jail school". Patient complaining soreness/swelling to throat, headache, vomiting, and near syncopal episode, numbness to left side of face and slurred speech after being sprayed with pepper spray.

HMC 68.

15. At 23:38, Emergency Physician Shawn Holsonback examined Michaela. HMC 71-72.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

16. At that time, Dr. Holsonback noted the prior kick to Michaela's head: "Approx 1 week ago, while in jail school, was struck in the right side of the head with kick, developed dizziness headache w/o syncope at the time, sx resolved." HMC 71.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**

Initial Provider Contact 6/28/2019 2338

HPI:approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness,headache w/o syncope at the time, sx resolved. Denies acute neck or back pain. no prior hx of similar problem. LMP 3wks ago, on BC

HMC 71.

17. At that time, Michaela's neurological condition was: "motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside." HMC 72.

**NEURO:** motor intact, sensory intact. CN2-12 intact, grip and BLE strength symmetric. finger to nose intact, neg pronator drift. Tongue midline, no facial asymmetry. BLE slight tremor-chronic per pt and family at bedside.

**MENTAL STATUS:** speech clear, oriented X3, normal affect, responds appropriately to questions.

**HEAD:** mild tenderness right temporal parietal w/o swelling or deformity

HMC 72.

18. Her mental status was: "speech clear, oriented X 3, normal affect, responds appropriately to questions." HMC 72.

19. Michaela's general appearance was "well nourished, alert, cooperative, [with] no acute distress, no obvious discomfort." HMC 71.

**PHYSICAL EXAM:**  
GENERAL APPEARANCE: well nourished, alert, cooperative, no acute distress, no obvious discomfort.

HMC 71.

20. As part of his examination, Dr. Holsonback obtained a National Institute of Health Stroke Scale (NIHSS) score for Michaela. HMC 72.

21. Michaela scored a 0 (that is, normal) on each of the 11 elements that make up the NIHSS. HMC 72.

**DATA REVIEWED:**  
**NIH STROKE SCALE**  
LOC: alert=0.  
LOC QUESTIONS: both correct=0.  
LOC COMMANDS: obeys both correctly=0.  
BEST GAZE: normal gaze=0.  
VISUAL: no loss=0.  
FACIAL PALSY: normal facial movement=0  
MOTOR ARM(Left): no drift=0  
MOTOR AR                   no drift=0  
MOTOR LEG(Left): No drift 5sec left leg=0.  
MOTOR LEG(Right): No drift 5sec right leg=0.  
LIMB ATAXIA: absent=0.  
SENSORY: normal response=0.  
BEST LANGUAGE: no aphasia=0.  
DYSARTHIA: normal articulation=0.  
EXTINCTION AND INATTENTION: no neglect=0.  
**NIHSS Total: 0**

HMC 72.

22. Michaela's total score was thus also 0 (normal), on a scale of 0 to 42. HMC 72.

23. The NIHSS is a common diagnostic method for quickly assessing the severity of a stroke.

24. The Scale (also known as a Score) looks at 11 different elements that evaluate specific ability in the patient.

NATIONAL INSTITUTES OF HEALTH STROKE SCALE		
CATEGORY		SCORE
1A	Level Of Consciousness	0 – 3
1B	Level Of Consciousness Questions	0 – 2
1C	Level Of Consciousness Commands	0 – 2
2	Best Gaze	0 – 2
3	Visual fields	0 – 3
4	Facial palsy (paresis)	0 – 3
5A	Motor–Left arm	0 – 4, UN
5B	Motor–Right arm	0 – 4, UN
6A	Motor–Left leg	0 – 4, UN
6B	Motor–Right leg	0 – 4, UN
7	Limb Ataxia	0 – 2, UN
8	Sensory	0 – 2
9	Best Language	0 – 3
10	Dysarthria (articulation of words)	0 – 2, UN
11	Extinction	0 – 2

25. The score is generally accurate, helps determine appropriate treatment, and tends to predict outcomes.

*Michaela Undergoes a Brain CT Scan*

26. Despite her NIHSS score, Dr. Holsonback moved quickly to get Michaela a CT scan. HMC 64.

27. At 23:47, Dr. Holsonback ordered a stat head CT scan, for “headache right side”—the same side where Michaela had received a kick during training at work a week earlier. HMC 64, HMC 30, HMC 71.

Order Type: Radiology  
Order Sub Type: CT

Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24152851	06/28/19 23:47 06/28/19 23:47	CT Head WO Contrast for headache right side Stat	Complete	06/28/2019 23:47
Ordered By: Shawn M Holsonback,MD				

HMC 64.

Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HMC 30.

Holsonback, Shaw n D.O. Created: 6/28/2019 2338 Last Entry: 6/29/2019 0216

**H&P**


Initial Provider Contact 6/28/2019 2338

**HPI:**approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling, slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or back pain.

HMC 71.

28. The scan was administered by 23:54, within minutes of Dr. Holsonback's order.

HMC 61; Appendix.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		247/365	Call: 866.941.5695
		assistance	Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
This interpretation is based upon the receipt of 32 images.			
<b>EXAM:</b>			
CT Head Without Contrast			
<b>EXAM DATE/TIME:</b>			
6/28/2019 11:52 PM			

HMC 61.



29. The CT scan revealed that Michaela was having a brainstem or posterior-circulation stroke.

30. Image 7 of 29 of the CT scan, for example, showed a white hyperdense sign of a basilar-artery thrombosis:



See Appendix.

31. Image 8 of 29 of the CT scan revealed a white streak, consistent with thrombus, where the basilar artery branches into the posterior cerebral arteries at its termination:




See Appendix.



*Radiologist Cooney Fails to Identify the Signs of Stroke on the CT Scan*

32. At 00:18, acting as a vRad employee, Radiologist Michael Cooney read the 32 images associated with the study. HMC 61-62.

<b>Hamilton Medical Center</b>			
<b>Preliminary Radiology Report</b>		24/7/365 assistance	Call: 866.941.5695 Online chat: <a href="https://access.vrad.com">https://access.vrad.com</a>
<b>Patient Name:</b>	SMITH, MICHAELA	<b>Accession:</b>	3948616
<b>Institution Name:</b>	HAMILTON MEDICAL CENTER DALTON, GA 30720	<b>Account Number:</b>	
<b>Study Type:</b>	CT HEAD WO	<b>Patient DOB:</b>	
<b>Ordered As:</b>	CT HEAD WO	<b>Caretaker:</b>	
<b>Date of Dictation:</b>	29 Jun 2019 EDT	<b>Referring Physician:</b>	HOLSONBACK, SHAWN
<b>Date of Exam:</b>	28 Jun 2019 EDT		
<b>Patient ID:</b>	9199456		
<b>Patient Location:</b>	Unknown		
<b>Account #:</b>			
<b>This interpretation is based upon the receipt of 32 images.</b>			
<b>EXAM:</b> CT Head Without Contrast			
<b>EXAM DATE/TIME:</b> 6/28/2019 11:52 PM			

HMC 61.

33. Dr. Cooney found no evidence of hemorrhage, mass-effect, midline shift, abnormal ventriculomegaly, acute fracture, acute sinusitis, or mastoid effusion. HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

34. Dr. Cooney’s findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29 of the study. Dr. Cooney did not even mention the sign. HMC 61.

35. Dr. Cooney’s findings also failed to include the white streak consistent with thrombus visible in image 8/29 of the study. Dr. Cooney did not even mention the streak. HMC 61.

36. Instead, contrary to the plain images, Dr. Cooney affirmatively concluded that the study showed “no acute intracranial abnormality.” HMC 61.

**FINDINGS:**  
**Brain:** No hemorrhage. No mass effect or midline shift.  
**Ventricles:** No abnormal ventriculomegaly.  
**Bones/joints:** No acute fracture.  
**Sinuses:** No acute sinusitis.  
**Mastoid air cells:** No mastoid effusion.  
**Soft tissues:** Unremarkable.

**IMPRESSION:**  
No acute intracranial abnormality.

HMC 61.

37. At 00:28, Dr. Holsonback noted Dr. Cooney’s reading of the CT scan as showing “no acute intracranial abnormality.” HMC 72.

Holsonback, Shaw n D.O. Created: 6/29/2019 0027 Last Entry: 0028  
MD Note: CT head/Vrad/Cooney: no acute intracranial abnormality

HMC 72.

*Hamilton Discharges Michaela Prematurely,  
without Informing Her She Has a BAO*

38. At 00:57, Dr. Holsonback rechecked Michaela. HMC 72.

39. She was “resting, feeling better,” with a “headache still present” and “all numbness resolved.” HMC 72.

40. At 02:15, Michaela continued to feel “better,” had “no focal neurological deficits,” and agreed to a discharge. HMC 2, HMC 72.

Holsonback, Shawn D.O. Created: 6/29/2019 0215 Last Entry: 0215  
MD Note: pt resting, parents at bedside. Pt feels better, HA improved. No focal neuro deficits. Agreeable with discharge and outpt f/u. Warnings for RTER discussed with pt and parents.

HMC 72.

41. At 02:15, Michaela signed her disposition summary. HMC 65-66.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: **Smith, Michaela E**  
EDM Code: ER0170  
Med Rcrd: 9199456

---

MD Electronic Sg Holsonback, Shawn D.O. 6/29/2019 0214


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**MY SIGNATURE BELOW INDICATES:**  
> I have received and understood the oral instructions regarding my current medical problem.  
> I will arrange follow-up care as instructed above.  
> I acknowledge receipt of the written instructions as outlined on this and any previous page(s).  
I will read and review these instructions.  
> I understand that a copy of the medical record is available to the practitioner or medical organization providing follow-up care, treatment, and services.

x Michaela Smith x Ashlynn R. M. Smith  
Patient (or Legal Guardian) Signature Staff (Witness) Signature Driver

HMC 66.

42. The disposition summary identified her diagnoses as “Headache” and “Exposure to pepper spray,” and her chief complaint as “Poss Allergic Reaction.” HMC 65.

Dx 1: <u>Headache</u>	Engl Dx 1: _____
Dx 2: <u>Exposure to pepper spray</u>	Engl Dx 2: _____
<b>Disposition</b>	
Follow-up 1: <u>Duckett, Jennifer P.A.</u>	F/U MD Ph: <u>(706) 278-0138</u>
<u>Dalton Family Practice</u>	F/U MD Fax: <u>(706) 278-0347</u>
<u>1114 Professional Blvd</u>	
<u>Dalton Ga 30720</u>	
Follow-up 1 Date: <u>1-2 Days</u>	
Other Instr: <u>Return to Emergency Department sooner if worse.</u>	101737552 05LB01 06/28/2019 OP
May return to work/school: <u>1-2 Days</u>	Smith, Michaela E EMR
Restrictions: <u>None</u>	Physician, On Duty
Critical Care Time: <u>none</u>	

HMC 65.

43. The summary instructed Michaela to follow up with Dalton Family Practice, and permitted her to return to work, in 1-2 days, without restrictions. HMC 65.

44. The summary also instructed her to return to “Return to the Emergency Department sooner if worse.” HMC 65.

45. Michaela “verbalized understanding and ability comply” with these instructions. There were no learning or communication “barriers” and she received no “medical driving restrictions.” HMC 70.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge.
DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply.
Pain Scale: 0/10
LEARNING\COMMUNICATION BARRIERS: None.
MEDICAL DRIVING RESTRICTIONS: None.
Patient Left ED at 6/29/2019 0227.

HMC 70.

46. Michaela had a “strong ambulatory gait at time of discharge.” HMC 70.

47. Her pain was 0 of 10. HMC 70.

48. At 02:27, Michaela was discharged in “stable” condition and left for home. HMC 65, 70.

49. Neither any provider nor the discharge instructions informed Michaela or her parents of the occlusion in her basilar artery.

<b>Hamilton Medical Center - Emergency Department</b> 1200 Memorial Dr   PO Box 1168 Dalton, Georgia 30722-1168 - (706) 278-2105		EDM Code: <u>ER0170</u>	Patient: <u>Smith, Michaela E</u> Med Rcrd: <u>9199456</u>
<b>Disposition Summary (for discharged patient; English)</b>			
Patient: <u>Smith, Michaela E</u>		SS #: _____	
Mailing Address: <u>1452 Piedmont Dr</u>		Age/DOB: _____	
City: <u>Dalton</u>	<u>GA</u>	<u>30721</u>	Home Ph: <u>7062597708</u>
Arrival: <u>6/28/2019 2243</u>	Disposition: <u>Home</u>		
Dispo Summary Printed: <u>6/29/2019 0215</u>	Condition at Dispo: <u>Stable</u>		
Rm (last): _____		MD ED: <u>Holsonback, Shawn D.O.</u>	
RN Triage: <u>Kayla R. R.N.</u>	MLP: _____		
RN Eval: <u>Stacey S. R.N.</u>	PMD Ph: <u>(706) 278-0138</u>		
PMD: <u>Duckett, Jennifer P.A.</u>	Chief Cmpnt: <u>Poss Allergic Reaction</u>		

HMC 65.

Gonthier, Abigail R.N. Created: 6/29/2019 0227 Last Entry: 0227
Nurse Note: patient with father as driver. Patient with strong ambulatory gait at time of discharge. DISCHARGE - Plan of care discussed with patient and family. Patient discharged with printed instructions. patient and family verbalized understanding and ability to comply. Pain Scale: 0/10 LEARNING/COMMUNICATION BARRIERS: None. MEDICAL DRIVING RESTRICTIONS: None. Patient Left ED at 6/29/2019 0227.

HMC 70.

50. Michaela was “comfortable going home.” HMC 6.



The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

51. At home, she “went to bed about 03:45 a.m. doing fairly well.” HMC 4, HMC 6.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

## **June 29, 2019 – Michaela Returns to Hamilton by Ambulance**

### *Michaela Wakes with Global Alteration of Consciousness*

52. As demonstrated below, Michaela awoke with altered mental status and other classic signs and symptoms of stroke. These signs and symptoms amounted to a global alteration of consciousness, reflecting the onset of a neurological emergency some time after her discharge from Hamilton.

53. At about 07:15, Michaela's mother heard her moaning in her bedroom, went to check on her, and found her "with altered mental status and poor mobility." HMC 6, HMC 30.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

54. Michaela talked "through her gritted teeth" but could not "really open her mouth" and had "problems with moving and slurred speech." HMC 2.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.



55. Speaking “through her teeth,” Michaela told her mother that she was “unable to get out of bed” and thus “had wet on herself.” HMC 6, HMC 2.

56. When she awoke, Michaela was also “foaming at the mouth and shaking.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

HPI: Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

HMC 26.

57. Thus, “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then.” HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

58. The paramedics were then called. HMC 2, HMC 6.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2, 6.

The patient is a 26-year-old female who as part of her job working for the jail had to go to a physical training and test which included being pepper sprayed in the face. She was also physically active and this all occurred yesterday on the 28th. Afterwards the patient had been able to drive herself home. She complained of headache and some shortness of breath and did come to the emergency room. Was noted to have nausea and vomiting but received some fluids and Benadryl and felt better and according to her parents felt comfortable going home. She did not get home until late and probably went to bed about 3:45. At about 7:30 this morning her mother heard her making a noise in the bedroom and went in to find the patient with altered mental status and poor mobility. The patient at that point was able to talk through her teeth and had told her mother that she was unable to get out of bed and had wet on herself. The paramedics were called and they were not able to get the patient up to walk and she was brought into the emergency room by stretcher. She has not talked since she left the house. Her parents do feel that she hears them because she will react sometimes whining or crying depending on what they say and who is in the room. The patient also has a history of dystonia which started when she was about 6 but was not diagnosed until many years later. She was diagnosed at Emory. She still has occasional episodes of dystonia of her lower legs. It can occur in one leg or the other. It has always been below the knees. She has never had any symptoms more proximal or in her arms or cognitive issues from this.

HMC 6.

59. Upon arriving, the paramedics “were not able to get the patient up to walk” and Michaela had to be “brought into the emergency room by stretcher.” HMC 6.

60. After that Michaela did not speak again. HMC 6.

*Michaela Returns to Hamilton with Classic  
Signs of Stroke—a BAO*

61. By 08:19, the ambulance arrived at the Hamilton emergency department. HCM 24, HMC 25.

62. Michaela thus returned to Hamilton as a clinically different patient, whose neurological condition had deteriorated markedly overnight.

63. From the time of her arrival, Michaela demonstrated “fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions.” HMC 2, HMC 5, MHC 7.

The patient has been working at the jail for the last several weeks and as part of that job she is going through a training program. She carries pepper spray at the job so as part of the training program she was going through a physical test which included physical activity and being sprayed in the face with pepper spray. This was done on Friday. Afterward, she was able to drive herself home but once she got home she felt sick. She had shortness of breath, headache, nausea and vomiting and was having some dystonia of her feet. She had some slurring of her words and felt like her throat was getting swollen and this was at 9:30 p.m. and she went to the emergency room. They gave her fluids and Benadryl and some other medication and she did better and according to her parents she wanted to go home and was discharged in the early morning hours. She made it to bed about 3:45 a.m. and appeared to be doing well at that time. At about 7:15 a.m., her mother heard her moan and went in to check on her and the patient was able to talk at that time some through her gritted teeth but could not really open her mouth and was having problems with moving and slurred speech and she had been unable to get out of bed and told her mother she had wet herself. The ambulance was called and the patient could not get onto the stretcher and had to be physically lifted and brought to the emergency room. She has not talked since she left the house. Since being in the emergency room, she has had fluctuating symptoms of stiffness in her lower extremities and occasional extensor posturing type movements with tremors of her upper extremities but no definite convulsions. She has been responding when family members would come in and the parents think that she hears them. She would sometimes seem to open her eyes and close her eyes to command and she would cry appropriately at times.

HMC 2.

64. These symptoms alone were major signs of massive brain injury.

65. These symptoms alone made clear that Michaela was facing a neurological emergency that required an expedited and urgent diagnostic evaluation and possible intervention.

66. Extensor posturing, for example, is typically a result of severe brain injury.

67. What’s more, the presence of “extensor posturing” by itself made clear that the emergency likely involved injury to Michaela’s brainstem.

68. Nevertheless, the reasons for Michaela’s visit were noted as other speech disturbances, unspecified dysphagia, and generalized edema, and the principal diagnosis was identified as “altered mental status, unspecified.” HMC 48.

Reason For Visit Diagnosis	
Code	Description
R47.89	Other speech disturbances
R13.10	Dysphagia, unspecified
R60.1	Generalized edema

Diagnosis		
	Code	Description
Principal:	R41.82	Altered mental status, unspecified
None:	G24.8	Other dystonia
None:	Z79.3	Long term (current) use of hormonal contraceptives
None:	Z86.69	Personal history of dis of the nervous sys and sense organs

HMC 48.

69. Between 08:14 and 08:27, RN Megan Martin triaged Michaela.

70. During the assessment, Michaela “was squinting her eyes and looking around, while still shaking[.]” HMC 26.

71. Nurse Martin also gave Michaela a MEND exam. HMC 26.

72. During the exam, Michaela was “holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly.” HMC 26.

Martin, Megan R.N. Created: 6/29/2019 0814 Last Entry: 0827

**NURSING TRIAGE (Adult)**

■ **HPI:** Patient is going to "jail school", got pepper sprayed yesterday that caused eye pain, redness, swelling and coughing. Patient was given benadryl. Patient seen here yesterday and was dx home. Patient woke up this morning "foaming out the mouth" and shaking. Upon assessment patient was squinting her eyes and looking around, while still shaking. Durings MENDs exam patuient was holding her eyes closed, showing globalized weakness and mumbling when she spoke until told to speak more clearly. Per EMS, patient's LKW was approx 10pm 6/28/19. Patient stated that "she can't talk" but was able to verbalize this.

73. Michaela also mumbled that she could not talk. HMC 26.

74. Nurse Martin noted that Michaela’s last-known-well was about “10pm 6/28/19,” per the EMS. HMC 26.

75. By 08:29, Nurse Martin ordered an “electrocardiogram with physician review.” HMC 28.

Martin, Megan R.N. Created: 6/29/2019 0838 Last Entry: 0838  
Order(s) performed by "Nurse":  
- ELECTROCARDIOGRAM WITH PHYSICIAN REVIEW  
Order Notes:  
EKG completed - at 6/29/2019 0829 by Martin, Megan R.N. and given to Hawkins David F. M.D. for review at 6/29/2019 0834.

HMC 28.

76. The EKG was completed at 08:29 and “given to Hawkins, David F. M.D. for review at 6/29/2019 0834,” HMC 28.

*Dr. Hawkins Documents but Fails to Treat the Stroke*

77. Michaela returned to Hamilton with classic and obvious signs of stroke. HMC 30-31.

78. At some point between 09:12 and 12:44, Emergency Room Physician David F. Hawkins examined Michaela. HMC 30-31.

Hawkins, David F. M.D. Created: 6/29/2019 0911 Last Entry: 1244  
H&P  
Initial Provider Contact 6/29/2019 0912  
HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

HMC 30.

79. Michaela was lethargic, in an altered mental status, unresponsive to commands and conversation, and unable to open her eyes or follow commands. HMC 30.



H&P

Initial Provider Contact 6/29/2019 0912

HPI: PT INVOLVED IN SECURITY TRAINING, AROUND 6PM REQUIRED TO DO PHYSICAL ACTIVITY FOLLOWED BY SPRAY OF PEPPER SPRAY IN FACE, FOLLOWED BY MODERATE SEVERE PHYSICAL ACTIVITY, PT FELT WELL FOR COUPLE HRS AFTER GOING HOME, AROUND 830 PM DEV DIFF TALKING WITH THICK SPEECH, UNABLE TO OPEN MOUTH COMPLETED OR SWALLOW FREELY SOME BURNING TO FACE WITH REDDNESS AND EDEMA ABOUT EYES AND LIPS, NO HOARSENESS OR CHEST PAIN SOME COUGH 1 EPISODE OF VOMITING, BROUGHT TO ER FOR EVAL

Initial Provider Contact 6/28/2019 2338

HPI: approx 2100hrs tonight, developed throbbing headache, shortness of breath, felt like throat swelling. slurred speech, bilateral facial and hand numbness. Near syncope. She had showered prior. Jail school training earlier today, ran physical test, then pepper sprayed in face approx 1700hrs tonight. Washed with J&J wash post exposure. No syncope. Developed facial pain, rhinorrhea, headache and shortness of breath which improved. Hx of dystonia, tremors affecting BLE, chronic, no meds. Given benadryl 50mg PO pta. Vomited x 1 pta. Was breathing fast earlier tonight. Approx 1 wk ago, while in jail school, was struck in right side of head with kick, developed dizziness, headache w/o syncope at the time, sx resolved. Denies acute neck or

HAD STABLE LABS NEG CT HEAD DCED AT HOME THIS AM BECAME LETHERGIC ALTER MS UNRESPONSIVE TO COMMANDS AND CONVERSATION, WILL NOT OPEN EYES OR FOLLOW COMMANDS. NO HX

nothing worsens Sx.

nothing improves Sx.

no prior hx of similar problem. HX OF INTERMITTENT SPASTIC SPELLS TO LEGS

HMC 30.

80. Michaela generally appeared “unresponsive, uncooperative,” with “no attempt at spon[taneous] movement, tearful, appears crying at times, some nonspecific response to room environment, urinated in bed x 2.” HMC 31.

81. Michaela’s neurological condition was this: “extremities flaccid with occ spam and extension of arms and legs . . . DTRS arms and legs . . . Will not follow commands.” HMC 31.

**GENERAL APPEARANCE:** somewhat overweight, unresponsive, uncooperative, no acute distress, obvious moderate discomfort. **MINIMAL SALIVATION, NO CHOKING GAGGING, NO ATTEMPT AT SPONT MOVEMENT, TEARFUL APPEARS CRYING AT TIMES, SOME NONSPECIFIC RESPONSE TO ROOM ENVIRONMENT, URINATED IN BED X 2**

**VITALS: SEE NN,**

**PULSE OXIMETRY:** 97% on RA.

**EARS:** canals clear bilat, TMs clear, no discharge from ears.

**EYES:** PUPIL 2MM REACTIVE DYSCONG CAZE, EOMI

**NOSE:** no nasal discharge.

**MOUTH:** (-)decreased moisture. + GAG

**THROAT:** no tonsillar inflammation, no airway obstruction.

**NECK:** supple, no neck tenderness, (-)thyromegaly.

**BACK:** (-)vertebral point tenderness, (-)CVA tenderness bilateral, no back tenderness.

**CHEST WALL:** no chest tenderness.

**LUNGS:** no wheezing, no rales, no rhonchi, (-)accessory muscle use, good air exchange bilateral.

**HEART:** normal rate, normal rhythm, normal S1, normal S2, (-)S3, (-)S4, no murmur, no rub.

**ABDOMEN:** normal BS, soft, no abd tenderness, (-)guarding, (-)rebound, no organomegaly, no abd masses.

**EXTREMITIES:** good pulses in all extremities, no swelling/tenderness in the extremities, no edema. **FLACID WITH OCC SPASTIC TONE. IN ARMS AND LEGS AS IN POSTURING**

**SKIN:** warm, dry, good color, no rash.

**NEURO:** **EXTREMITIES FLACID WITH OCC SPASM AND EXTENSION OF ARMS AND LEGS. NO OBVIOUS SEIZURE ACTIVITY SYMT 1+ DTRS ARMS AND LEGS. WILL NOT FOLLOW COMMANDS**

**MENTAL STATUS:** unable to vocalize, confused, bizarre affect, does not respond to questions.

HMC 31.

82. Michaela's extremities were "flaccid" with "occ spastic tone in arms and legs as in posturing." HMC 31.

83. Michaela's mental status was: "unable to vocalize, confused, bizarre affect, does not respond to questions." HMC 31.

84. Dr. Hawkins's differential diagnosis led with nine psychiatric conditions, including alcohol abuse, depression, drug abuse, eating disorder, and schizophrenia. HMC 31.

**DIFFERENTIAL Dx:**

**PSYCHIATRIC Dx:** adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.

**NEURO Dx:** CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

85. Dr. Hawkins's differential diagnosis then identified nine neurological conditions, leading with stroke (CVA) and including TIA: "CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor." HMC 31.



**DIFFERENTIAL Dx:**  
PSYCHIATRIC Dx: adjustment reaction, alcohol abuse, anxiety, depression, drug abuse, eating disorder, hyperventilation syndrome, personality disorder, schizophrenia.  
NEURO Dx: CVA, intracranial bleed, meningitis, metabolic disorder, migraine, seizure, tension headache, TIA, tumor.

HMC 31.

86. Although he identified stroke (“CVA” and “TIA”) as a differential diagnosis, Dr. Hawkins did not order vascular imaging to confirm or rule out a stroke, and did not take any other action to treat the stroke.<sup>1</sup>

87. In fact, despite his differential diagnosis of a stroke, and despite Michaela’s deteriorated clinical presentation, Dr. Hawkins failed to order even a new CT scan of Michaela’s brain (which would have taken minutes to complete) and failed to obtain a new stroke score for Michaela.

*Dr. Johnson Also Fails to Identify the Stroke in the CT Scan*

88. At 09:15, Radiologist Kevin Johnson interpreted and submitted a final report on the same CT scan taken overnight. HMC 30.

**\*\*\*Final Report\*\*\***  
**REASON FOR EXAM:** headache right side  
**PROCEDURE:** CT 6001 - CT HEAD BRAIN WO CONTRAST - Jun 29 2019 12:18AM

HMC 60.

**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 9:15A**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 12:09P**

HMC 60.

89. Dr. Johnson found no evidence of acute intracranial hemorrhage, mass-effect, midline shift, hydrocephalus, abnormal extra-axial fluid collections, paranasal sinus

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<sup>1</sup> “CVA” stands for cerebrovascular accident, another name for stroke. “TIA” stands for transient ischemic attack, a brief stroke-like attack, or mini-stroke, which often precedes a full-blown stroke.

disease, or mastoid or middle-ear effusions. He also found that the gray-white differentiation was within normal limits. HMC 60.

90. Dr. Johnson's findings failed to include the white hyperdense sign of basilar-artery thrombosis seen in image 7/29. Dr. Johnson did not even mention the sign. HMC 60.

91. Dr. Johnson's findings also failed to include the white streak consistent with thrombus visible in image 8/29. Dr. Johnson did not even mention the streak. HMC 60.

92. Instead, contrary to the plain images, Dr. Johnson *affirmatively* concluded that this was a "Normal exam." HMC 60.

COMPARISON: 6/28/2019

FINDINGS: There is no evidence of acute intracranial hemorrhage. No mass-effect, mid line shift or hydrocephalus is seen. Gray-white differentiation is within normal limits. No abnormal extra-axial fluid collections are visualized. There is no paranasal sinus disease. No mastoid or middle ear effusions are identified.

IMPRESSION:

NOTE: A preliminary report was sent by Dr. Cooney of VRAD to the Emergency Department at 12:18 a.m. on 6/29/2019.

Normal exam.

HMC 60.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat Michaela's Stroke for Hours*

93. At 10:00, RN Lindsey Andrews called the Georgia Poison Center regarding Michaela's symptoms. HMC 28.

94. The Poison Center recommended a chest x-ray, and a CT scan of the head: "the physician may consider doing a CT of the head to rule out something unrelated to the pepper spray incident." HMC 28.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1000 Last Entry: 1013

Nurse Note: Called GA Poison Center and spoke with Crystal regarding patient's symptoms. Crystal relayed information to Dr. Murray (toxicologist) who stated there are some people that are exceptionally sensitive to pepper spray and the medications/fluids taken yesterday could have masked the reactions enough for patient to feel better periodically. However, if patient is exceptionally sensitive, she could have not oxygenated well over night (not uncommon), causing some of the symptoms described today. GA Poison Center recommends CXR, baseline labs, and supportive care. If patient continues to be altered, physician may consider doing a CT of head to rule out something unrelated to the pepper spray incident. It would not be unexpected for patient to need admission for observation.

HMC 28.

95. At 10:08, Dr. Hawkins ordered a stat chest x-ray. HMC 15.

<b>Hamilton Medical Center</b> PO Box 1168, Dalton, Georgia 30722-1168 (706) 272-6180 Radiology Services	
<b>SMITH, MICHAELA</b> 1452 PIEDMONT DR DALTON, GA 30721 Age: 26Y F DOB: <input type="text"/>	<b>MR/RAD #:</b> 09199456/09199456 <b>ADMIT #:</b> 101737594 <b>HOSP/SVC:</b> EMR <b>ORDER DATE:</b> Jun 29 2019 10:08A <b>ROOM #:</b> ECD-RM2201 <b>REF #:</b> 3948717
<b>Ordering Dr:</b> DAVID MD HAWKINS <b>Attending Dr:</b> DAVID MD HAWKINS	

HMC 15.

96. But he did not order a CT scan.

97. At 10:31, Dr. Johnson read the chest x-ray recommended by the Poison Center and concluded it was a "normal exam." HMC 15, HMC 22.

**\*\*\*Final Report\*\*\***

**REASON FOR EXAM:** per GA Poison Center

**PROCEDURE:** DIA 1030 - **CHEST SINGLE VIEW** - Jun 29 2019 10:23AM

**RESULT:**  
Per Georgia Poison Center

**TECHNIQUE:** Single frontal view of the chest was obtained

**COMPARISON:** None

**FINDINGS:** The lungs are clear. The heart size is normal. The bones appear intact.

**IMPRESSION:**  
**Normal exam.**

KJ/dmc  
Job #12358370

HMC 15.

**INTERPRETED BY:** KEVIN JOHNSON MD on Jun 29 2019 10:31A  
**SIGNED BY:** KEVIN JOHNSON MD on Jun 29 2019 12:09P

HMC 15.

98. At 11:22, Dr. Hawkins ordered a stat brain MRI without contrast, “for alter mental status after heavy physical activity.” HMC 23.

Order Type: Radiology				
Order Sub Type: MRI				
Ord No	Str / End DTime	Order as Written	Ord Status	Electronically Signed-By / Co-Signed By
24155823	06/29/19 11:22	MRI Brain WWO Contrast for ALTER MENTAL STATUS, AFTER HEAVY PHYSICAL ACTIVIITY ?	Complete	
	06/29/19 11:22	HEAT EXPOS Stat		06/29/2019 11:22
Ordered By: David F Hawkins,MD				

HMC 23.

99. At 12:30, Nurse Andrews provided Michaela incontinence care. HMC 29.

Andrew s, Lyndsey R.N. Created: 6/29/2019 1242 Last Entry: 1242

Nurse Note:

6/29/2019 1230 - Late note -

\*INCONTINENCE CARE - Incontinent of bladder. Dry bedding and gown provided as necessary with perineal/genital/buttocks care.

HMC 29.

100. At 12:45, Dr. Hawkins discussed Michaela's case with Neurologist Jeffrey Glass. Dr. Glass suggested admitting Michaela to the hospital. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1245 Last Entry: 1246

MD Note:

Case discussed with Glass, Jeffery T. M.D.; NEURO who WILL SEE IN ER FOR EVAL.. HE SUGGEST ADM PT TO HOSPITALIST AGREES WITH MRI OF BRAIN, WILL NEED TO DISTINGUISH, FUNCTION FROM ORGAIN CAUSE

HMC 32.

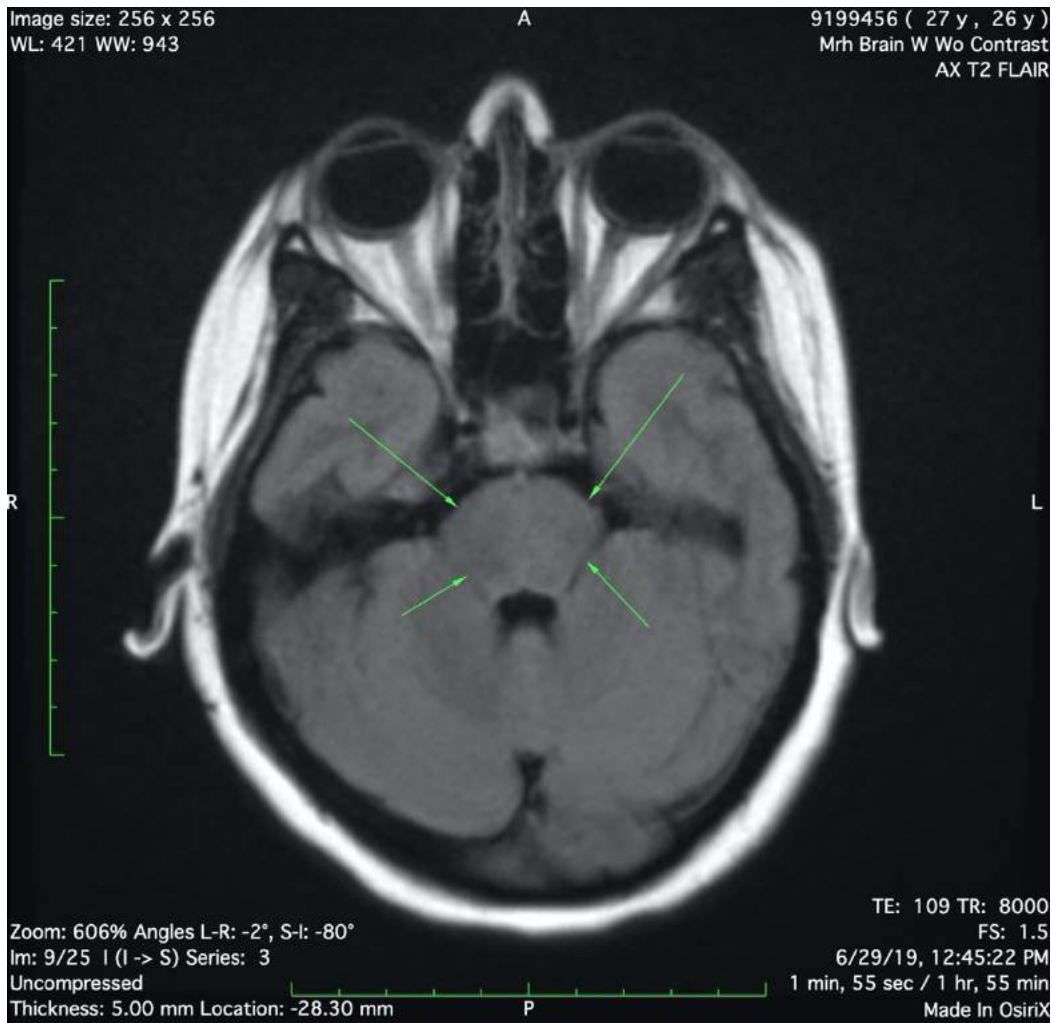
101. Dr. Glass agreed with administering the MRI, in order to distinguish "function from organ cause." HMC 32.

102. Dr. Glass also agreed to see Michaela in the ER for evaluation. HMC 32.

### *The MRI Confirms a Yet-Treatable Ischemic Stroke*

103. At 12:45, Michaela underwent the brain MRI, for "altered mental status after physical activity." HMC 16.

104. Although the MRI's DWI sequence showed that Michaela's brainstem was ischemic (thus confirming she was having a stroke), the MRI's FLAIR sequence remained normal—that is, Michaela's brainstem had not yet suffered permanent stroke changes despite the basilar occlusion.



*Instead of Treating the Stroke, Dr. Hawkins  
Admits Michaela for Observation*

105. At 12:54, Dr. Hawkins admitted Michaela to the hospital floor for observation.  
HMC 32.

106. At that time, Michaela continued to exhibit classic stroke signs and symptoms.  
*See* HMC 32.

107. Michaela, for example, had a decreased level of consciousness, had a bizarre affect with no interaction, showed general weakness, was not speaking, was tearful, was hyperventilating, had spasticity to her extremities, had no laterizing signs, and was urinating on herself. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

108. Despite her clinical presentation, Dr. Hawkins admitted Michaela for “observation,” noting that the CT scan of “last night” was negative. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1246 Last Entry: 1254  
MD Note: ADMIT SUMMARY - ED Provider: HAWKINS  
Room Number: 22, Patient Name: MICHAELA SMITH.  
Reason for Admission: PT WITH EXPOSURE TO PEPPER SPRAY DURING TRAINING COURSE DEV LOCAL INFLAMATORY REACTION, TO HENT TX WITH BENADYL THIS AM BECAME LETHERGIC, DECREASE LOC, BIZARRE AFFECT WITH NO INTERACTIONS, GEN WEAKNESS NO SPEAK, TEARFUL HYPERVENT WITH SOME SPASTICITY TO EXTREMITIES, NO LATERALIZING SXS. NO SIGN OF TRAUMA OR INFECTION URINATING ON SELF NO OBVIOUS SEZURE ACTIVITY NL EKG AND CXR CT HEAD LAST NIGHT NEG. LACTIC 2.6 TODAY  
Patient's primary care provider DUCKETT.  
(+) IV infusions, (-) BiPAP, (-) Vent NEURO CONSULT MRI, ADM OBSERVATION

HMC 32.

109. The reason for her admission was; “exposure to pepper spray during training course dev local inflammatory reaction.” HMC 32.

HMC 32.

*Dr. Johnson Again Fails to Identify the Stroke—  
in the MRI and the CT Scan*

110. At 13:29, Dr. Johnson interpreted Michaela’s MRI. At 13:30, Dr. Johnson discussed his findings with Dr. Hawkins. HMC 16.



IMPRESSION:  
NOTE: Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.  
No definitive acute abnormalities are identified on this motion-compromised examination.

KJ/dmc  
Job #12358436

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**INTERPRETED BY: KEVIN JOHNSON MD on Jun 29 2019 1:29P**  
**SIGNED BY: KEVIN JOHNSON MD on Jun 29 2019 2:41P**

HMC 16.

111. The MRI showed “no definitive sites of diffusion restriction” and “no abnormal sites of FLAIR signal.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

112. The MRI also showed: “gray-white differential within normal limits” and “normal flow voids are maintained within the major intracranial vascular pedicles,” and “no sites of pathologic contrast enhancement.” HMC 16.

FINDINGS: The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

HMC 16.

113. The MRI thus showed that Michaela’s brainstem remained generally intact despite the basilar occlusion.

114. Dr. Johnson failed to include the brainstem ischemia visible in the DWI sequence. HMC 16. (In fact, because Dr. Johnson did not even hint at the ischemia in his report, it appears that he did not view the DWI.)

115. Instead, contrary to the DWI imaging, Dr. Johnson concluded that “No definitive acute abnormalities are identified on this motion-compromised examination.” HMC 16.

**COMPARISON: CT head 6/28/2019; no prior MRI**

**FINDINGS:** The examination is compromised by patient motion. Given those limitations, no definitive sites of diffusion restriction are identified. No abnormal sites of FLAIR signal are seen. Gray-white differentiation appears within normal limits. Normal flow voids are maintained within the major intracranial vascular pedicles. Small nonspecific site of increased T2 signal seen inferiorly within the right cerebellum. Likely dilated perivascular spaces within the right lentiform nucleus. No sites of pathologic contrast enhancement are demonstrated. A large mucus retention cyst or polyp is present within the left maxillary sinus.

**IMPRESSION:**

**NOTE:** Dr. Johnson discussed findings with Dr. Hawkins of Emergency Department at 1:30 p.m. on 6/29/2019.

**No definitive acute abnormalities are identified on this motion-compromised examination.**

HMC 16.

116. In addition, Dr. Johnson again reviewed Michaela’s CT scan, for “comparison” purposes. Dr. Johnson thus had a second opportunity to interpret the CT scan. HMC 16.

117. Dr. Johnson failed again to catch and report the plain sign of basilar-artery thrombosis seen image 7/29, failed again to catch and report the white streak consistent with thrombus seen in image 8/29, and thus failed to correct his conclusion that the CT scan was a “normal exam.” See HMC 16, HMC 61.

*Dr. Hawkins and Dr. Glass Fail to Diagnose  
and Treat the Stroke for Additional Hours*

118. At 14:05, RN Gabe Herman performed a neuro check, including a Glasgow Common Scale (GCS) assessment. HMC 29.

Herman, Gabe R.N. Created: 6/29/2019 1405 Last Entry: 1534  
 Nurse Note:  
 NEURO CHECK - 6/29/2019 1405  
 EYE OPENING: eyes open to verbal stimuli 3  
 VERBAL RESPONSE: verbal incomprehensible sounds 2,  
 MOTOR RESPONSE: motor flexion withdrawal 4  
 GLASCOW COMA TOTAL 7

119. The GCS is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients.

120. The Scale assesses the patient according to three aspects of responsiveness: eye-opening, motor, and verbal responses.

**TABLE 38-2**  
**Glasgow Coma Scale**

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	<i>Best response</i>	15
	<i>Comatose client</i>	8 or less
	<i>Totally unresponsive</i>	3

Glasgow Coma Scale		
Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point
Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points		

121. At 14:18, Internist Ananka Myrie called Dr. Hawkins. Dr. Myrie informed him that she wanted neurology and psychiatry evaluations of Michaela before admitting her. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1405 Last Entry: 1418  
 Results Reviewed by ED Physician:  
 MRH BRAIN W/WO CONTRAST  
 CALL FROM MYRIE ,SHE WANT NEURO AND POSS PSYCH TO EVAL PT BEFORE SHE WILL ADM

HMC 32.

122. Between 14:17 and 14:22, Dr. Hawkins called Dr. Glass again, to inform him of the negative MRI findings. HMC 32.

123. Dr. Hawkins and Dr. Glass discussed the facts that Michaela still appeared “stuporous,” interacted only “intermittently” and “primatively” with her parents, and may have suffered an “atypical seizure.” HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1417 Last Entry: 1422

MD Note: MRI NEG, CALL GLASS AGAIN TO INFORM ABOUT MRI FINDINGS, DISCUSSED THAT PT STILL APPEARING STUPEROUS, WITH NL VITALS AND OXYGENATION NO AIRWAY OBSTRUCTION, PT INTERMITTENTLY INTERACTING PRIMATIVELY WITH PARENTS, DISCUSS WITH GLASS POSS ATYPICAL SEIZURE, HE DID NOT SUGGEST MEDICATION PRIOR TO HIS EXAM

HMC 32.

124. Dr. Glass “did not suggest medication prior to his exam.” HMC 32.

125. At 14:51, Dr. Hawkins turned over Michaela’s care to Emergency Physician Jonathan Thompson. HMC 32.

126. At that time, the emergency department continued waiting for Dr. Glass’s evaluation. HMC 32.

Hawkins, David F. M.D. Created: 6/29/2019 1451 Last Entry: 1451

Results Reviewed by ED Physician:

MRH BRAIN W/WO CONTRAST

LACTATE

MD Note: turn over to Dr Thompson waiting for neuro eval before adm planning

HMC 32.

*Despite Examining Michaela, Dr. Glass Still  
Does Not Diagnose and Treat the Stroke*

127. At 15:54, Dr. Glass finally examined Michaela. HMC 1-7.

128. At that time, Michaela continued to exhibit signs and symptoms of stroke:

- “Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—”
- “She can at times open her eyes and close them to command and does appear to look at me at times.”
- “At times she appears to have a deconjugate gaze but at other times not.”
- “At times she will have extensor posturing type movements of the upper extremities.”

- “She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently [sic].”
- “She has bilateral Babinski. She has bilateral Hoffmann’s in her hands.”

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

HMC 6.

PE:

The patient is lying in the bed with her eyes closed. She will have occasional tremors of her upper extremities and occasional extensor posturing type movements of her upper extremities. Her lower extremities have increased tone and dystonic type extension. Her upper extremities are normal tone and she has normal tone in her neck. She can at times open her eyes and close them to command and does appear to look at me at times. At times she appears to have a disconjugate gaze but at other times not. At times she will have extensor posturing type movements of the upper extremities. Her deep tendon reflexes are 3-4+. She has bilateral Babinski. She has bilateral Hoffmann’s in her hands. Neck is supple

HMC 6.

**GENERAL:** The patient was lying still when I went into the room but she did have extensor posturing of her lower extremities at the ankles and extension at the knees. She also had her upper extremities with extensor posturing and would occasionally have a tremor but her upper extremities had normal tone though her lower extremities had increased tone. **NECK:** Supple. At times she seemed to cry and moan appropriately. She would not talk or consistently follow commands but at times she did seem to open her eyes to command or blink to command and she did look at me and move her eyes to command at one time but not consistently. When I tried to open her mouth and look in her mouth her tongue was in the back of her mouth and I could not really see back behind it and I was hesitant to push a tongue blade deeper in her throat. Deep tendon reflexes were brisk with a few beats of clonus at both patella. She had positive Babinski in bilateral lower extremities. She has bilateral Hoffman’s. **CRANIAL NERVE EXAMINATION:** Difficult to assess due to her mental status but no asymmetry was noted.

HMC 3.

129. Despite “having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray,” and despite recognizing that Michaela “came to the emergency room with more typical symptoms yesterday with pepper spray” and then went to bed “doing fairly well,” Dr. Glass did not turn his attention to diagnosis of stroke, despite Michaela’s presentation. *See HMC 6-7.*



130. Instead, noting that Michaela's "MRI scan did not show a structural abnormality to account for the symptoms," Dr. Glass wondered if "a hypoxic event" or "unlikely" seizures might be the cause of her condition.

- "I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well . . ."
- "Her MRI scan did not show a structural abnormality to account for the symptoms."
- "I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here."
- "I will get an emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy."

A/P:

Altered mental status, hyperreflexia, dystonic extensor posturing of the lower extremities and extensor posturing of the upper extremities—I am having difficulty tying the patient's symptoms and together. Her MRI scan did not show a structural abnormality to account for the symptoms. She does have increased tone in her lower extremities but

she has a history of lower extremity dystonia as noted above. Her upper extremities are normal tone. I wonder if the patient could have had a hypoxic event after she went to bed around 4 AM but her O2 sats have been good since she has been here. I will get a emergent EEG though I think seizures are unlikely but this will also help evaluate for encephalopathy. I did discuss the case with the emergency room physician as well as with the intensivist team.

I will follow the patient with you

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 6-7.



1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

131. As a result, despite Michaela's clinical presentation, Dr. Glass failed to review the CT scan or MRI for himself, failed to order a new CT scan or vascular imaging, and failed order or provide any treatment for Michaela's BAO.

132. Instead, Dr. Glass noted that the "CTA scan of the brain was normal," the "CT scan of the brain did not show any acute changes," and the "MRI scan of the brain with and without contrast showed significant motion artifact but was normal." HMC 3, HMC 6.

**Laboratories and Diagnostics:**

CT scan of the brain was normal.

MRI scan of the brain with and without contrast showed significant motion artifact but was normal.

HMC 3.

CT scan of the brain did not show any acute changes

MRI scan of the brain with and without contrast showed motion artifact but no significant abnormality

Ammonia, urine drug screen, TSH and EtOH were all okay

HMC 6.

*Dr. Glass Signs Off on Transfer to Erlanger for a  
Neuro Evaluation*

133. At 16:28, Dr. Glass was “notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time.” HMC 7.

Addendum: I was just notified by the intensivist team and emergency room physician that they feel this patient needs a higher level of care and will try and arrange transfer so I will not get the EEG at this time

HMC 7.

134. Dr. Glass agreed with Michaela’s transfer to Baroness Erlanger Hospital (“Erlanger”). HMC 4, HMC 7.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

135. At 17:13, Nurse Michael Otting called “Whitfield County 911 to request a unit for code 2 transfer to Erlanger ER.” HMC 29.

Otting, Michael Created: 6/29/2019 1711 Last Entry: 1713

Nurse Note: Contacted Whitfield County 911 to request unit for code 2 transfer to Erlanger ER. Patient chart prepped for transfer. Patient demographics faxed to Erlanger TransferLink @ 423-778-7960. Request acknowledged at time of call and next available unit will be dispatched without delay. No ETA provided at time of call.

HMC 29.

136. At 17:35, Michaela was transferred to Erlanger by EMS. The reason for the transfer was “altered mental status,” and the benefit of the transfer was “neuro evaluation.” HMC 45.

**Appropriateness**

— Appropriate transport service equipment and personnel are requested to provide appropriate level of care

— Basic: \_\_\_ Advanced:  Specialty: \_\_\_ Private Vehicle: MD/RN: \_\_\_

— Agency: Hamilton EMS

— The receiving facility has available space for the patient.

— Transferring physician has discussed patient status with accepting physician — *Auto accept thru transfer center*

— The receiving facility has agreed to accept the patient and provided adequate treatment

Facility: Erlanger Time: \_\_\_\_\_

Name of Physician accepting patient: Ben Smith Phone: \_\_\_\_\_

Approved by: \_\_\_\_\_ Title: \_\_\_\_\_

— Reason for Transfer: altered mental status

— Risk of Transfer: transport, airway compromise

— Benefits to Transfer: Neuro evaluation

— It is medically necessary to transport the patient by ambulance

Signature of transferring physician: \_\_\_\_\_ Fax: \_\_\_\_\_

Transferring facility: Hamilton Fax: \_\_\_\_\_

Name of Patient's primary care physician: none Fax: \_\_\_\_\_

**Consent for Transfer**

Prior to my signing, the physician has examined me and has explained the potential benefits and risks of being transferred, the risks of not being transferred and the alternative to transfer.

Consent to transfer signature/relationship: Annette Mother

Refusal to transfer signature/relationship: \_\_\_\_\_

Refuses to sign: (witness) \_\_\_\_\_ (witness) \_\_\_\_\_

**Management of Information**

— Report given to: Owens RN By: Debi Adams RN Time: 1702

— Police notified (if applicable). Agency: \_\_\_\_\_

— Family notified. Name: \_\_\_\_\_

— Appropriate copies of medical record accompany the patient \_\_\_ Assessment/VS \_\_\_ documented. Disposition of valuables \_\_\_\_\_

Signature of RN: Debi Adams RN Date: 6-29-19 Time transferred: 1735

HMC 45.

137. At 17:46, Michaela was discharged from Hamilton. HMC 48.

Patient	Smith, Michaela	Date of Birth	00:00:00
Patient ID	9199456	Date Dispatched	
Admit Date	2019-06-29T08:16:00	Discharge Date	2019-06-29T17:46:00
Visit Type	EmergencyDepartment	LOS	0.4
Discharge Disposition	ATH Transfer to other short-term general hosp Financial Class		
Attending Physician	Hawkins, David F MD	Coder	KMCFADDEN

HMC 48.

*Epilogue: Michaela Dies at Erlanger After an MRA Reveals a Brainstem and Right-Side Stroke*

138. At 18:39, Michaela arrived at Erlanger emergency department by ambulance. BEH 7.

Admission Information					
Arrival Date/Time:		Admit Date/Time:	07/03/2019 1832	IP Adm. Date/Time:	06/30/2019 0013
Admission Type:	Emergency	Point of Origin:	Non-healthcare Facility Point Of Origin	Admit Category:	
Means of Arrival:	Ambulance	Primary Service:	Family/general Practice	Secondary Service:	
Transfer Source:		Service Area:	ERLANGER PRIMARY HEALTH SYSTEM	Unit:	BEH Diagnostic Radiology
Admit Provider:	Daniel Fisher, MD	Attending Provider:	Louis Riccardo, DO	Referring Provider:	Abdelazim Sirekhatim, MD

BEH 7.

139. At 01:10 overnight, June 30, 2019, Michaela was transferred from the ER to the Erlanger “Neuromed/Neurosurg ICU.” BEH 22.

Transfer In at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		
Admit from ED at 6/30/2019 0110		
Unit: BEH Neuromed/Neurosurg ICU	Room: NNIC11	Bed: NNIC1101
Patient class: Inpatient		

BEH 22.

140. On June 30, 2019, Dr. Glass dictated and transcribed his consultation notes, which he signed the following day. HMC 5.

<b>CONSULTATION</b>	
<b>Patients Name:</b> SMITH, MICHAELA E	
<b>Hospital Number:</b> 000101737594	<b>Date of Birth:</b>
<b>Room Number:</b> ECD RM	<b>Patient Status:</b> O
<b>To Attending Physician:</b> David F. Hawkins, MD	<b>Consulting Physician:</b> Jeffrey Glass, MD
<b>Dictated by:</b> Jeffrey Glass, MD	
<b>Date dictated:</b> 06/30/2019 12:02 P	
<b>Date transcribed:</b> 06/30/2019 12:39 P jc2	
Signed by Glass M.D., Jeffrey on 01-Jul-2019 17:45:02 -04:00	

HMC 5.

141. Dr. Glass noted that “something happened between [3:45] and [0]7:15 when the mother heard her make a noise and she [was] definitely different both physically with her motor function and with her cognition since then. I am not sure what happened.”

HMC 4.

1. Altered mental status -- abnormal tone in the lower extremities and poor motor function -- I am having difficulty tying all of this in together and in particular tying it into the exposure to pepper spray. The other curious thing is that she came to the emergency room with more typical symptoms yesterday with the pepper spray, was treated and released and seemed to be doing fairly well and went to bed about 3:45 a.m. doing fairly well but then something happened between then and 7:15 when the mother heard her make a noise and she has been definitely different both physically with her motor function and with her cognition since then. I am not sure what happened. I was in the process of calling in the electroencephalogram tech to do a stat electroencephalogram and had discussed the case with the emergency room physician, both Dr. Hawkins and his relief as well as with the intensivist team and it was decided to transfer her for a higher level of care so I did cancel the electroencephalogram here at Hamilton. I think seizure though is less likely. I do wonder if the patient could have possibly had an hypoxic event during her sleep and now be suffering with hypoxic encephalopathy. I do agree with transferring her to Erlanger.

HMC 4.

142. At Erlanger, Michaela’s condition “progressively worsened.”

143. On July 1, 2019, Michaela was placed on a ventilator and a feeding tube.



Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

144. On the afternoon of July 2, 2019, a brain CT scan produced an “urgent critical result,” including “a diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation.”

BEH 310.

<b>CT brain without IV contrast</b>		Resulted: 07/02/19 1616, Result status: Final result	
Ordering provider: William Albert Shelton, MD 07/02/19 1516	Order status: Completed	Filed by: Interface, Radiology/Cardiology Results In 07/02/19 1618	
Resulted by: Andrew J Hill, MD		Accession number: E1142983	
Performed: 07/02/19 1527 - 07/02/19 1539			
Resulting lab: CARESTREAM PACS/PS360			
Narrative:			
<b>**URGENT CRITICAL RESULT**</b>			
This report was faxed to BEH NNICU at 1608 hours on 07/02/2019 -- H. Andrus/Editor.			
HISTORY: Altered mental status.			
TECHNIQUE: <b>Noncontrast brain CT.</b> Automated dose control used during this exam.			
FINDINGS:			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
No evidence of acute intracranial hemorrhage or extra-axial collection. No midline shift.			
Mucous retention cyst left maxillary sinus. Orbits are intact. The skull is intact.			
Impression:			
Diffuse hypodensity extending through the right cerebellar hemisphere and brainstem concerning for infarct with inferior tonsillar herniation. Additionally there is effacement of the quadrigeminal plate cistern, right greater than left suspicious for early superior transtentorial herniation.			
There is diffuse sulcal effacement with mild enlargement of the ventricles, suspicious for early hydrocephalus secondary to aqueduct stenosis from mass effect in the posterior fossa.			
Findings given to Dr. Tom Devlin at 1612 on 07/02/2019 by Dr. Andrew Hill.			

BEH 310.

145. The CT findings prompted Erlanger to administer three additional studies: an MRI of the brain, an MRA of the brain, and an MRA of the neck. BEH 41-44.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

146. On the night of July 2, 2019, Erlanger performed the three studies. BEH 319.

Performed: 07/02/19 1927 - 07/02/19 2050  
Resulting lab: CARESTREAM PACS/PS360  
Narrative:

Accession number: E1143287

**\*\*URGENT UNEXPECTED FINDING\*\***

This report was faxed to BEH NNICU at 2239 hours on 7/2/2019 and received by Liz Hughes, RN, at 2242 hours on 7/2/2019 -- G. VanOstrand/Editor.

HISTORY: Stroke, follow up

EXAMINATION: MRI BRAIN WITHOUT CONTRAST, MR ANGIOGRAM NECK WITH AND WITHOUT CONTRAST, MR ANGIOGRAM BRAIN WITHOUT CONTRAST

TECHNIQUE: Multiecho multisequence imaging of the head was performed without intravenous contrast administration.

3-D time-of-flight MRA of the head was performed without intravenous contrast. MIP reconstructions of the circle of Willis were generated.

MRA of the neck was performed without and with intravenous contrast. MIP reconstructions of neck vessels were generated. 20 cc of MultiHance was administered intravenously.

Where applicable, stenosis measurements are performed per NASCET criteria; with mild (<50%), moderate (50-70%), severe (70-99%).

COMPARISON: CT head, same day.

BEH 319.

147. The studies were tagged as an "urgent unexpected finding." BEH 319.

148. The findings of the head MRI included:



- A large acute infarct involving the right cerebellar hemisphere, and brain stem
- Diffuse cerebral edema.
- Absent ICA flow voids bilaterally
- Basilar-artery flow void
- A mass effect on the brainstem
- Cerebellar tonsillar herniation at least 2 cm below the foramen magnum
- Compression of the cervicomedullary junction

HMC 319.

MRI Head:

A large acute infarct is seen involving the right cerebellar hemisphere, and brainstem. Diffuse cerebral edema is present. There is subtle increased T2 signal involving the cerebral cortex bilaterally. Bilateral thalamic acute lacunar infarcts.

Absent ICA flow voids bilaterally. Basilar artery flow void is present.

There is mass effect on the brainstem. Cerebellar tonsillar herniation noted at least 2 cm below the foramen magnum. There is compression of the cervicomedullary junction. Subcentimeter pineal cyst noted.

HMC 319.

149. The findings of the head MRA included: “No evidence of flow-related enhancement noted in the intracranial vessels.” BEH 319.

150. The findings of the neck MRA included “diffuse attenuated caliber of vertebral arteries noted on both sides.” BEH 319.

MRA head: No evidence of flow-related enhancement noted in the intracranial vessels.

MRA NECK: No evidence of flow-limiting stenosis or occlusion of cervical carotid or vertebral arteries noted. No dissection identified. However, there is diffuse attenuated caliber of vertebral arteries noted on both sides.

HMC 319.

151. In summary, the findings of the three studies were: “acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the

brainstem and cerebellar tonsillar herniation,” as well as “absent flow related enhancement of the intracranial vessels concerning for brain death.” BEH 41, BEH 319.

Patient was followed by neurology during her stay. Patient had progressively worsened and there was need for mechanical ventilation and this occurred on 7/1/2019. She remained with mechanical ventilation as well as being treated with high doses of Versed as well as Solu-Medrol for possible autoimmune process. This occurred for approximately 72 hours. At approximately 13:21 and had an acute change in status. At that point nursing staff contacted neurology however the hospitalist group was not contacted. Patient went for stat CT of her head did reveal a concern for inferior tonsillar herniation. This prompted an MRI of the brain, MR angiogram of the brain and MR angiogram of the neck. Which revealed acute infarcts in the right cerebellar hemisphere and brainstem with diffuse cerebellar edema, mass-effect on the brainstem and cerebellar tonsillar herniation. There is also absent flow related enhancement of the intracranial vessels concerning for brain death. Therefore a nuclear medicine scan was obtained that did confirm brain death. Patient's family proceeded with gift of life as this was a known request of the patient.

BEH 41.

Impression:

1. Acute infarcts involving the right cerebellar hemisphere and brainstem. Diffuse cerebral edema, mass effect on the brainstem and cerebellar tonsillar herniation of at least 2 cm below the foramen magnum.
2. Absent flow-related enhancement of intracranial vessels noted. Findings are concerning for brain death, however please correlate with laboratory findings and if warranted, nuclear scan.
3. Bilateral cervical CCAs and ICAs are patent. Attenuated caliber of bilateral cervical vertebral arteries noted. No findings to indicate dissection of neck vessels

BEH 319.

152. At 09:50 on July 3, 2019, a nuclear medicine scan confirmed “brain death.” BEH 41, BEH 328-29.

153. Michaela was pronounced dead at that time. BEH 40.

**Discharge Disposition**  
**Patient expired at 7/3/2019 at 09:50**

BEH 40.

154. Michaela Smith was 26 years old. HMC 67, HMC 44.

Hamilton Medical Center - Emergency Department  
1200 Memorial Dr | PO Box 1168  
Dalton, Georgia 30722-1168 - (706) 278-2105

Patient: Smith, Michaela E  
Pt Acct: 101737552

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ED RECORD

Patient: Smith, Michaela E Age/DOB: \_\_\_\_\_ Sex: F SS #: \_\_\_\_\_  
Age: 26yr Med Rcrd: 9199456

Mailing Address: 1452 Piedmont Dr Arrival (HIS): 6/28/2019 2243  
Mailing Other: \_\_\_\_\_ Dispo Summary Printed 6/29/2019 0215  
City: Dalton ED Record Printed: \_\_\_\_\_  
State: GA Zip: 30721 Initial Provider Contact: 6/28/2019 2327  
Mode of Arrival: Car

MD ED: Holsonback, Shawn D.O. RN Eval: Stacey S. R.N.  
MLP: \_\_\_\_\_ PMD: Duckett, Jennifer P.A.

HMC 67.

# APPENDIX

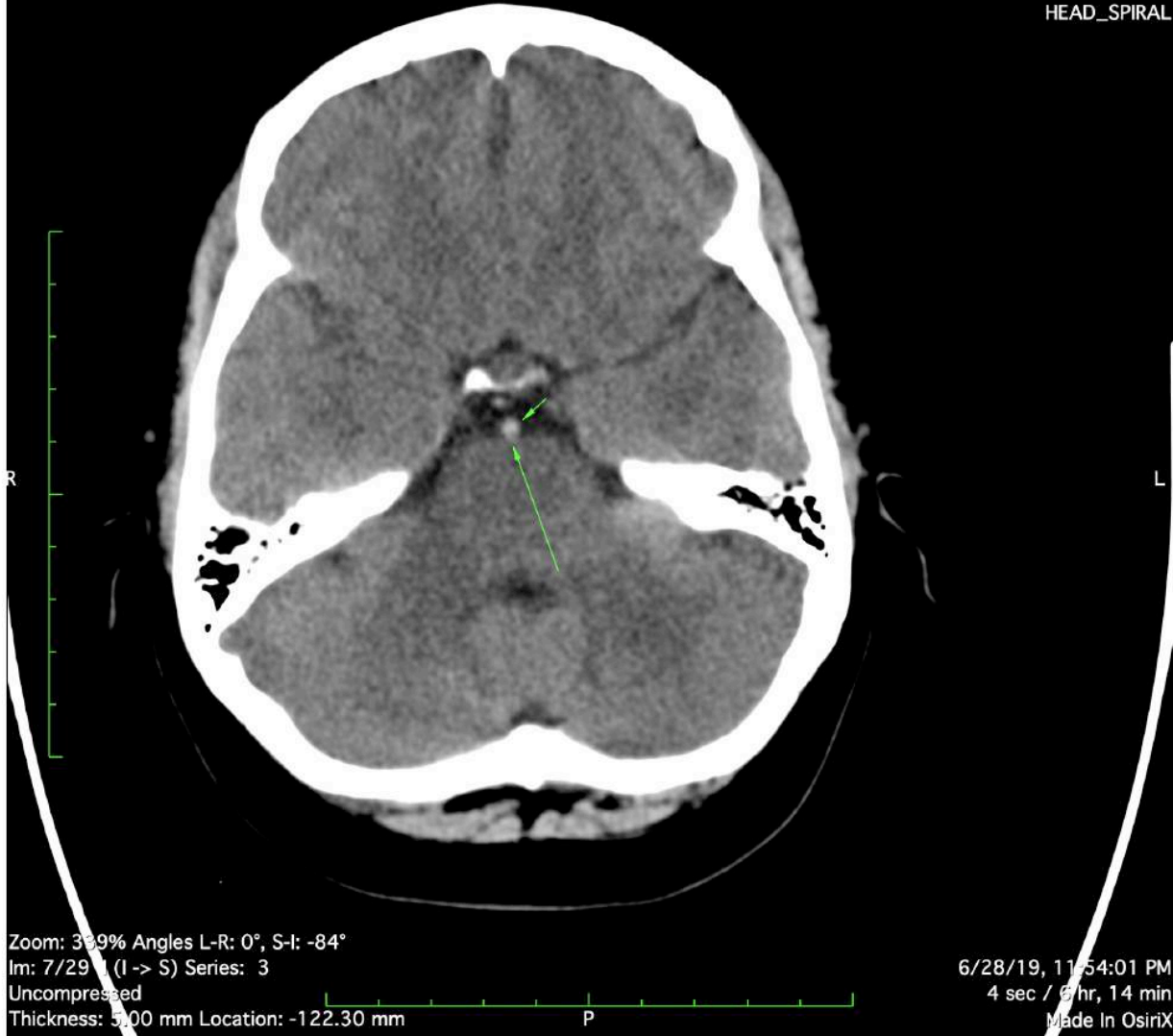
# CT Scan Imaging



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y, 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 339% Angles L-R: 0°, S-I: -84°

Im: 7/29 (I -> S) Series: 3

Uncompressed

Thickness: 5.00 mm Location: -122.30 mm

P

6/28/19, 11:54:01 PM

4 sec / 6/hr, 14 min

Made In OsiriX

Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



Zoom: 374% Angles L-R: 0°, S-I: -84°

Im: 8/29 | (I -> S) Series: 3

Uncompressed

Thickness: 5.00 mm Location: -117.30 mm

P

6/28/19, 11:54:01 PM

4 sec / 6 hr, 14 min

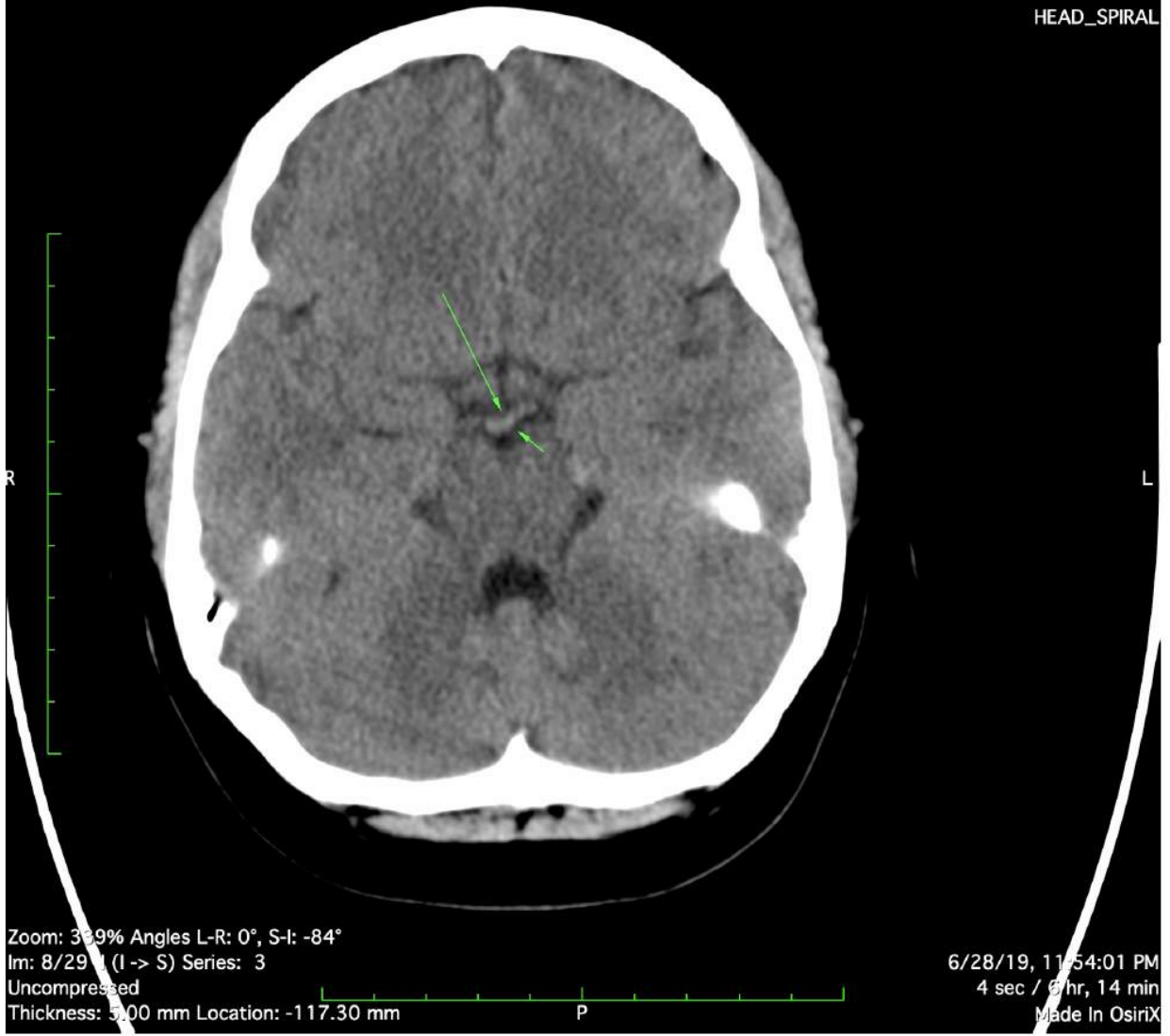
Made In OsiriX



Image size: 512 x 512  
WL: 50 WW: 100

A

9199456 ( 27 y , 26 y )  
Head Brain Without Contrast  
HEAD\_SPIRAL



MRI Imaging

