

# Near Misses in the Emergency Department

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## Disclosures

- No relevant financial disclosures

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## Outline

- Near Misses?
- High Risk Areas
- Mimics vs. Chameleons

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## Near Misses

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## High Risk Areas

- Cardiac
- Neurologic
- Foreign Bodies
- Atypical Presentations of Conditions

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## Case 1

- 83 year old female presents to ED with sore throat
- States that “The thing that looks like a punching bag in the back of my throat” is burning
- States that “The thing that looks like a punching bag in the back of my throat” is burning
- Constant
- No shortness of breath, chest pain, or any other symptoms

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## Case 1

- PMH
  - Hypertension
  - Hyperlipidemia
  - Type 2 DM
  - A fib (on Xarelto)
  - HFpEF

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## Case 1

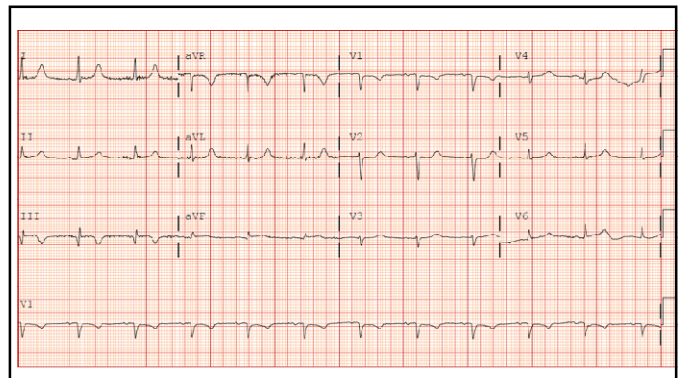
- Completely normal physical exam
  - Including oropharynx

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## Case 1

- Workup?
  - Patient suffers from a lack of history
  - Multiple comorbidities

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## Case 1

- Labs: Normal CBC, BMP
- Troponin I: **28.04** ng/mL (Upper limit 0.03ng/mL)

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## Case 1

- Cath lab: 70% mid LAD, 95% RCA
  - 2 stents placed
  - Discharged 2 weeks later

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## Acute Coronary Syndrome

- Ischemic heart disease is the leading cause of death in the US and world
- Advanced age is the strongest risk factor for ischemic heart disease
- Advanced age is the strongest independent predictor for poor outcomes

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## Acute Coronary Syndrome

- Older patients are at high risk of atypical presentations of ACS
- GRACE ACS Registry<sup>1,2</sup>:
  - Atypical Presentations: 72.9 years of age
  - Typical Presentations: 65.8 years of age
- NRM database (> 430,000 patients)<sup>3</sup>:
  - 1/3 patients with MI did not have chest pain
  - Patients <65: 77% had chest pain
  - Patients 80 or older: 40% had chest pain

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## Other Conditions?



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Articles

### Acute Appendicitis in the Octogenarians and Beyond: A Comparison With Younger Geriatric Patients

Yui-Rwei Young MD, Te-Fa Chiu MD, Jih-Chang Chen MD, Meng-Sheng Tung MD, Meng-Wei Chang MD, Jung-Hsiang Chen MD, Bor-Fuh Sheu MD <sup>1, 2, 3</sup>

Conclusions

The clinical presentation of AA in octogenarian patients is atypical and the outcomes are worse than young old patients.

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## Presenting Symptoms<sup>4,5</sup>

- Dyspnea (49%)
- Diaphoresis (26%)
- Nausea/Vomiting (24%)
- Syncope (19%)

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## Outcomes

- No chest pain<sup>5-7</sup>:
  - Longer delay before hospital presentation
  - Less likely to be diagnosed with MI at time of admission
  - Less likely to receive thrombolysis or angioplasty
  - Less likely to receive ASA
  - Threefold risk of in-hospital mortality

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## Outcomes

- Those with MI without chest pain<sup>5-7</sup>:
  - 23.3% in-hospital mortality rate
  - WITH chest pain: 9.3% mortality rate

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## Outcomes

- Less Aggressively Managed<sup>8</sup>
  - Fewer receive ASA, Heparin, PCI/thrombolysis

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## Case Resolution

- Sore throat?<sup>9,10</sup>
  - Not a terribly uncommon presenting symptom
  - Autonomic dysfunction of the pharyngeal branch of vagus nerve that innervates pharyngeal constrictors

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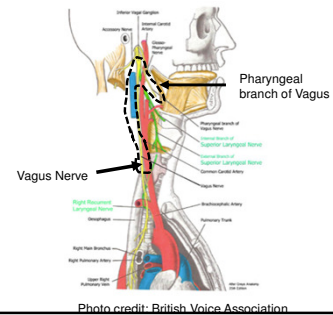


Photo credit: British Voice Association

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## Case Resolution

- Occlusion of RCA has been hypothesized to damage parasympathetic fibers of vagus<sup>9,10</sup>

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## Case 2

- 86-year-old male presents with L arm pain
- Began in morning, but worsening throughout the day
- Similar pain prior, but never this severe
- No cardiopulmonary symptoms

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## Case 2

- Normal Vital Signs
- ECG normal
- Labs normal (including troponin)
- Kept in observation until second troponin (3 hours later)

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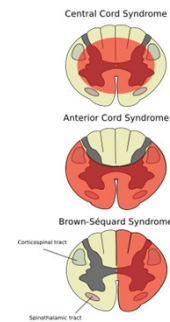
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## Central Cord Syndrome<sup>11-13</sup>

- First described in 1954
- Most common form of incomplete spinal cord injury
  - 11,000 cases/year in US
- Motor deficits > Sensory deficits
- Upper extremities > lower extremities
- Bladder dysfunction (retention)
- "Man in a barrel" Syndrome

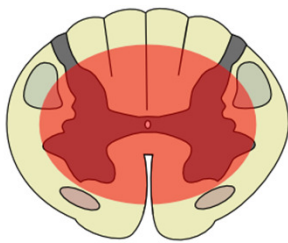
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### Incomplete lesions of the spinal cord



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## Central Cord Syndrome



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## Central Cord Syndrome<sup>11-13</sup>

- Often occurs after a hyperextension mechanism
- More common in older patients due to less room in spinal canal, spondylosis, bone spurs, calcified ligamentum flavum, and DJD
- Exam findings due to compression of spinothalamic and corticospinal tracts (UE are more lateral in corticospinal tract)

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## Central Cord Syndrome

- A clinical diagnosis

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## Central Cord Syndrome<sup>12</sup>

- Can be atraumatic (or minimally traumatic)
- CT typically first line for imaging (can show impingement of canal)
- MRI is gold standard

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## Treatment<sup>12</sup>

- Without instability, conservative vs. surgical management is highly debatable with no clearly established guidelines

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## Outcomes<sup>12</sup>

- Variable
- Most have good recovery
- Younger do better
- MRI and initial exam are good prognostic indicators

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## Case Resolution

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### Case 3

- 72-year-old female who presents after head trauma
- Fell after tripping on a rug
- Presented with family who was concerned for headache

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### Case 3

- Head and neck CT negative

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### Case 3

- RN notices patient can't wash hands

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### Case Resolution

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### Pearls

- Physical exam and History > Imaging
- Elderly patients need C-spine imaging after falls
- Good Culture = Patient Safety
- Good RN =

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### Pearls

- Physical exam and History > Imaging
- Elderly patients need C-spine imaging after falls
- Good Culture = Patient Safety
- Good RN = **PRICELESS**

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## Foreign Bodies

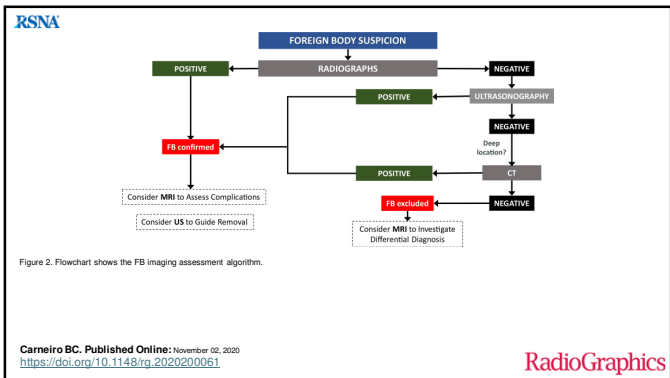
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- ## Foreign Bodies
- 11 million lacerations seen in EDs annually
  - 7-15% have retained foreign bodies<sup>14-16</sup>
  - Most common in finger, hand, or wrist
  - Most common foreign bodies are<sup>17</sup>
    - Wood
    - Glass
    - Metal

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- ## Foreign Bodies
- Conventional Radiology can detect up to 80% of all foreign bodies and 98% of radiopaque foreign bodies<sup>18,19</sup>
    - Glass: Radiopaque
    - Metal: Radiopaque
    - Stones: Radiopaque
    - Wood: Radiodense
    - Plastic: variable radiodensities, best if surrounded by air or low soft-tissue thickness

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- ## Foreign Bodies
- XR: First line
  - US: Second Line
  - CT: Third Line
  - MR: Fourth Line

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- ## Foreign Bodies
- XR: First line
  - US: Second Line
    - Sensitivity 72%<sup>16</sup>
    - Specificity 92%<sup>16</sup>
  - CT: Third Line
    - Best at plastic, glass, and stone
    - Excellent at deep foreign bodies
    - Less sensitive than US for small superficial FBs<sup>20</sup>
  - MR: Fourth Line
    - In some cases, not as good as CT (plastic)
    - Excellent for determining extent of soft tissue damage

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## Foreign Bodies

- Clinical history important
- An infected wound is a foreign body until proven otherwise
- Have a low threshold to image
- Talk to your radiologist if you suspect a foreign body

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## Atypical Presentations of Conditions

- Atypical presentations of common conditions
  - The art of medicine
- Atypical presentations of uncommon conditions
  - When it's "better to be lucky than good"

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## Atypical Presentations of Conditions

- High Risk Areas
- Medical Decision-Making Risks

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## Atypical Presentations of Conditions

- High Risk Areas
  - Extremes of Age
  - Infection
  - Medications
  - Limited History
  - Unlimited History
  - Limited Examination Ability

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## Atypical Presentations of Conditions

- Medical Decision-Making Risks
  - Availability heuristic
  - Commission heuristic
  - Confirmation heuristic
  - Diagnostic heuristic
  - Framing Effect
  - Gambler's Fallacy
  - Anchoring
  - Satisficing

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## Atypical Presentations of Uncommon Conditions

- Repeat Visits
- Atypical Pain
- Negative Imaging

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### Atypical Presentations of Uncommon Conditions

- Case
  - 62 year old male with Left shoulder pain
  - States it has been hurting “for months” and “no one is listening to me”
  - Normal vitals, normal exam
  - ECG and troponin negative

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### Atypical Presentations of Uncommon Conditions

- Visit 2
  - D-dimer, ECG, troponin obtained
  - D-dimer positive
  - CT scan shows fluid collection around sternoclavicular joint
  - Started on antibiotics (no risk factors for bacteremia)

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### Atypical Presentations of Uncommon Conditions

- Visit 3
  - Ongoing Pain
  - Orthopedic consultation obtained
  - Recommends continuation of antibiotics

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### Atypical Presentations of Uncommon Conditions

- Visit 4
  - Redness, pain, swelling around sternoclavicular joint
  - MRI obtained and reveals osteomyelitis and abscess formation
  - Taken to surgery with thoracic surgery

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### Atypical Presentations of Uncommon Conditions

- Case Resolution

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### Mimics vs. Chameleons

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### Stroke Mimics<sup>21</sup>

- 30-45% of strokes
- Often receive thrombolytics (0.5% hemorrhage risk)

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### Stroke Mimics<sup>21</sup>

- Migraines
- Seizures
- Post-ictal State
- Toxic/Metabolic causes (hyperglycemia, hypocalcemia, etc)
- Demyelinating disease
- Psychogenic
- Functional (Incarceritis)

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### Stroke Chameleons<sup>21,22</sup>

- False negatives
- 13-14% rate in one study<sup>22</sup>

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### Stroke Chameleons

- Posterior Circulation Strokes

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### Stroke Chameleons<sup>21,22</sup>

- Presenting Symptoms:
  - Aphasia
  - Subtle deficit (isolated visual field deficit)
  - Altered mental status
  - Dizziness

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### Stroke Chameleons

- Posterior Circulation Strokes “The 5 D’s”
  - Dizziness
  - Dysarthria
  - Diplopia
  - Dysphagia
  - Dystaxia

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## Stroke Chameleons<sup>21,22</sup>

- Dizziness
  - Quality may not be that important<sup>21,23</sup>
  - Ask questions similar to chest pain<sup>21,24</sup>
    - Onset
    - Duration
    - Episodic vs. Constant
    - Triggers
    - Associated Symptoms
- HINTS exam can be helpful

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## Stroke Chameleon

- Case

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### Visual Diagnosis in Emergency Medicine

**HEMBALLISMUS: AN ACTIVATING LESION**

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Nahapiet M. Mohr, MD, is Assistant Professor of Emergency Medicine, Nashville, Tennessee; Tracy C. Alexander, MD, is Assistant Professor of Emergency Medicine, Nashville, Tennessee; Austin T. Smith, MD, is Assistant Professor of Emergency Medicine, Nashville, Tennessee.

**INTRODUCTION**

Hemiballismus is a rare hyperkinetic syndrome of acute onset characterized by involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on one side of the body. It is most commonly associated with a unilateral subcortical lesion of the contralateral basal ganglia, most commonly the subthalamic nucleus. The pathophysiology of hemiballismus is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements. The pathophysiology of hemiballismus is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements.

**CASE REPORT**

A 72-year-old male presented to the emergency department with a 2-week history of involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on the right side of his body. The patient had no history of trauma, stroke, or other neurological conditions. He had no family history of similar symptoms. The patient's symptoms were most prominent during the day and were exacerbated by stress and fatigue. He had no other neurological symptoms, including weakness, sensory changes, or cognitive impairment. The patient's symptoms were most prominent during the day and were exacerbated by stress and fatigue. He had no other neurological symptoms, including weakness, sensory changes, or cognitive impairment.

**DISCUSSION**

Hemiballismus is a rare hyperkinetic syndrome of acute onset characterized by involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on one side of the body. It is most commonly associated with a unilateral subcortical lesion of the contralateral basal ganglia, most commonly the subthalamic nucleus. The pathophysiology of hemiballismus is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements.

**CONCLUSION**

Hemiballismus is a rare hyperkinetic syndrome of acute onset characterized by involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on one side of the body. It is most commonly associated with a unilateral subcortical lesion of the contralateral basal ganglia, most commonly the subthalamic nucleus. The pathophysiology of hemiballismus is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements.

**KEYWORDS**

Hemiballismus; Stroke; Basal ganglia; Subthalamic nucleus; Hyperkinetic syndrome.

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## Stroke Chameleons<sup>21,22</sup>

- Basilar Artery Occlusions

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Available online at ScienceDirect  
www.elsevier.com/locate/ajem

**American Journal of Emergency Medicine**

journal homepage: www.elsevier.com/locate/ajem

**Locked-in syndrome responding to thrombolytic therapy<sup>a</sup>**

Thomas M. Johnson M.D., Cynthia S. Romano M.D., Austin T. Smith, M.D.  
Department of Emergency Medicine, Vanderbilt University Medical Center, Nashville, Tennessee, TN 37232, USA

**ARTICLE INFO**

**ABSTRACT**

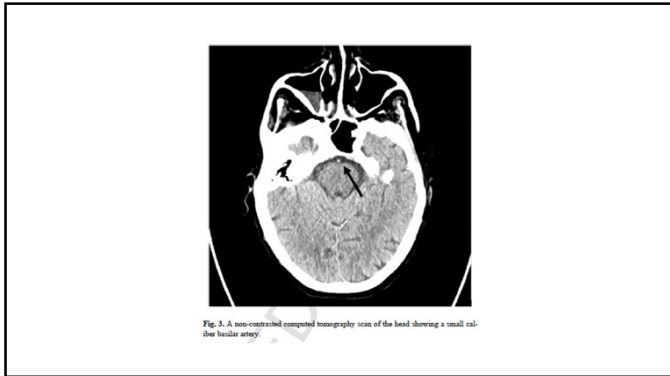
**Introduction:** Locked-in syndrome (LIS) is a neurologic condition that has been described as a state where the brain is intact, but the patient is unable to move or communicate. LIS is most commonly caused by a unilateral subcortical lesion of the contralateral basal ganglia, most commonly the subthalamic nucleus. The pathophysiology of LIS is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements.

**Case report:** A 72-year-old male presented to the emergency department with a 2-week history of involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on the right side of his body. The patient had no history of trauma, stroke, or other neurological conditions. He had no family history of similar symptoms. The patient's symptoms were most prominent during the day and were exacerbated by stress and fatigue. He had no other neurological symptoms, including weakness, sensory changes, or cognitive impairment.

**Conclusion:** Hemiballismus is a rare hyperkinetic syndrome of acute onset characterized by involuntary, forceful, repetitive, and sustained contractions of the muscles of the face, arm, and leg on one side of the body. It is most commonly associated with a unilateral subcortical lesion of the contralateral basal ganglia, most commonly the subthalamic nucleus. The pathophysiology of hemiballismus is thought to be related to the disruption of the basal ganglia circuitry, specifically the subthalamic nucleus, which is thought to be involved in the control of voluntary movements.

**Keywords:** Hemiballismus; Stroke; Basal ganglia; Subthalamic nucleus; Hyperkinetic syndrome.

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### Stroke Chameleons

- Basilar Artery Occlusions
  - NIH Stroke Scale poor at detecting posterior circulation strokes<sup>25,26</sup>
  - FAST score poorly sensitive for posterior strokes<sup>25,26</sup>
  - 40% present comatose<sup>27</sup>
  - In a study comparing BAO and left middle cerebral artery (MCA) occlusions, only 38% of patients were clinically diagnosed accurately in the BAO group as compared to 90% in the left MCA occlusion group<sup>28</sup>

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### Stroke Chameleons

- Basilar Artery Occlusions
  - Consider this in all patients with sudden onset unresponsiveness
  - Associated with high morbidity and mortality (up to 90%)<sup>29</sup>
  - May respond to thrombolytics

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### Final Thoughts

- Be Nice
- Be Humble
- Be Careful
- Be Collaborative

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### Images

- <https://upload.wikimedia.org/wikipedia/commons/b/b8/Cord-en.png>
- <https://www.pexels.com/photo/shaking-hands-14796591/>
- <https://www.pickpick.com/running-water-outside-mud-muddy-splash-61170>

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