Stroke Mimics

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Objectives

- Identify common and uncommon mimics of strokes which trigger stroke alerts in the ED.
- Identify the three most common stroke mimics which are treated with thrombolysis.
- Recognize what the literature reveals about intracranial bleeding rates if a stroke mimic is given thrombolysis.

Dr. Cumbler has no relevant disclosures or conflicts of interest.
Case

- A 45 year old female patient calls 911 complaining of trouble speaking and loss of sight in the left visual field.
- Symptoms started 10 minutes ago.
- Should paramedics take this to a stroke center hospital?

Pre-hospital Assessment

F.A.S.T. screening tool for pre-hospital personnel

- FAST tool
  - Face- Does one side of the face droop
  - Arm- Is one arm weak or numb
  - Speech- Is it slurred?
  - Time to go to a stroke center
- Very sensitive but only 88% specific.

Case Continued

- The patient arrives at the Emergency room 20 minutes after onset of symptoms.
- Symptoms started with a bright light in the left peripheral vision.
  - Progression to vision loss on left side
  - 5 minutes later she began having slurred speech and difficulty finding words.
  - Now starting to develop a left sided headache and nausea.
  - Similar but less severe symptoms 4 times over last 20 years.
- No other significant medical history or medications.
- Exam confirms left visual field cut and dysarthria.
  - No motor or sensory deficits.
  - NIH Stroke Scale Score of 2.
- Should the ED call a Stroke Alert?
Neurologic
Chief Complaint
911 call
90% will not be strokes
Stroke.....or Mimic
ED Stroke Alerts
For Suspected Stroke
20% will not be strokes
ED Physician
Final Diagnosis of Stroke
9% will not be strokes
Patient Treated
With Thrombolysis

Mimics
Common >10%
- Systemic infection
- Brain tumors
- Toxic/Metabolic
  - Hypoglycemia
  - Hyponatremia
- Complex migraine
- Seizure with post-ictal phenomena

Mimics
Less Common < 10%
- Vestibular dysfunction
- Cardiac
- Hypotension/Syncope
- Trauma
- Subdural hematoma
- Herpes encephalitis
- Transient global amnesia
- Conversion disorder
- Dementia/Acute confusion
- Acute mono-neuropathy
- Demyelinating disease
- Spinal cord injury or lesion
- Myasthenia Gravis
- Parkinsonism
- Hypertensive encephalopathy
UCH Experience

- At UCH our most common stroke mimics which trigger stroke alerts from the ED are:
  - Seizure with post-ictal paresis
  - Altered mental status/confusion
  - Complex Migraine

Distinguishing Features

Stroke Mimics More Common with Low NIH Stroke Score

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However, pts with prior stroke with symptom exacerbation from systemic process still mimic acute stroke with higher NIHSS

Logistic Regression Model

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<tr>
<th>VARIABLE</th>
<th>Odds Ratio</th>
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<tr>
<td>1. Known cognitive impairment</td>
<td>0.3</td>
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<td>2. Abnormal findings in any other system</td>
<td>0.4</td>
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<td>3. Signs could be lateralized to left or right side of brain</td>
<td>2.0</td>
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<td>4. Any abnormal vascular findings: SBP &gt;150, extremity bruit, absent peripheral pulses</td>
<td>2.5</td>
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<td>5. Exact onset could be determined</td>
<td>2.6</td>
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<td>6. Likely etiology of stroke could be determined</td>
<td>5.1</td>
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<td>7. Definite history of focal neurologic symptoms</td>
<td>7.2</td>
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<tr>
<td>8. NIH Stroke Score 1-4</td>
<td>1.9</td>
</tr>
<tr>
<td>NIH Stroke Score 5-10</td>
<td>3.1</td>
</tr>
<tr>
<td>NIH Stroke Score &gt;10</td>
<td>7.2</td>
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Case Continued

- Stroke Alert was called
- Vital signs normal
- Initial labs unremarkable
  - Chem 7
  - CBC
  - Coagulation panel
- EKG normal sinus rhythm
- Non-contrast head CT negative
- Would you administer thrombolysis?

Stroke Mimics Treated with Thrombolysis?

- 3-14% of pts treated with tPA are actually stroke mimics
- Three diagnoses:
  1. Complex Migraine
  2. Seizure
  3. Conversion disorder
- Global aphasia most common symptom of mimics

Get to Know a Mimic

#1 Complex Migraine

- Transient neurologic phenomena "aura"
  - Occur in a quarter of migraineurs:
    - Visual changes "fortifications"
    - Scintillations, Scotoma, loss of vision
    - Numbness
    - Weakness (Hemiplegic migraine)
    - Aphasia or mutism
I was playing in the garden when a brilliant, shimmering light appeared to my left — dazzlingly bright, almost as bright as the sun. It expanded, becoming an enormous shimmering semicircle stretching from the ground to the sky, with sharp zigzagging borders and brilliant blue and orange colors. Then, behind the brightness, came a blindness, an emptiness in my field of vision, and soon I could see almost nothing on my left side. I was terrified — what was happening? My sight returned to normal in a few minutes, but these were the longest minutes I had ever experienced.

Oliver Sacks M.D.

Distinguishing Migraine from CVA

- History of Migraine
- Migraine neurologic deficits have a slow migratory or spreading pattern
  - CVA symptoms tend to be abrupt
- Neurologic aura deficits occur sequentially
- Biphasic pattern
  - Positive symptoms first followed by negative symptoms
- Symptoms tend to resolve over 20-60 min

Get to Know a Memic
#2 Seizure with Post-ictal Paresis

- Described by Todd in 1849
- Transient post-seizure neurologic deficits reported in 6-40% of seizure patients
- Median duration of post-ictal paresis only 3 minutes and vast majority have resolved within an hour
- Prior theory of “Neuronal Exhaustion”
- Modern theory of “Active Inhibition”
**Distinguishing Post-ictal Paresis from Stroke**
- Pre-existing epilepsy should raise suspicion of post-ictal paresis
- Distinction made difficult by shared risk factors
  - Prior stroke can be a seizure focus
  - Most common cause of epilepsy in the elderly is stroke
- Seizure prior to onset of symptoms suggests post-ictal paresis
  - Used as an exclusion criteria in original thrombolytic NINDS trial
- Early seizure can also complicate acute stroke
  - 2-5% of stroke pts have a seizure at onset of ischemia

**Get to Know a Mimic**

#3 Conversion Disorder
- Psychiatric condition manifesting with transient motor or sensory deficits
  - Hemiplegia
  - Paralysis
  - Blindness
  - Diplopia
  - Aphonia
  - Others
- Manifestation of major emotional stress
  - Not the same as factitious disorder or malingering
- Can look VERY convincingly like stroke

**Distinguishing Conversion Disorder from Stroke**
- Give-way weakness
  - May be unreliable as this is "seen" in 30% of organic neurologic disease
- "La belle indifférence"
  - Unreliable in differentiating conversion from organic disease
- "Hoover sign"
  - Involuntary extension of a pseudo-paralyzed leg when the 'good leg' is flexing against resistance
- Neurologic deficits which do not match vascular distribution
  - Can misled with multiple insults or entities such as dural venous sinus thrombosis
- Inconsistency in exam
- "Teddy Bear Sign"??

**References**
What Happens if Mimic is Treated with Thrombolysis?

- Stroke patients receiving tPA had some complication in 19% of cases
  - 5% symptomatic ICH
  - 12% asymptomatic ICH
  - 1% angioedema

- None of the stroke mimics had symptomatic ICH
  - Overall prognosis much better for stroke mimics

Does That Mean Thrombolysis Should be Given to Mimics “Just in Case”?

- Case report of ICH for glioblastoma mimicking stroke treated with tPA

- Best clinical judgment should be used
  - But recognize the risk of treating mimic may be lower than risk of not treating a stroke

Conclusions

- Patients commonly present for symptoms which could represent stroke
- Low threshold for instituting stroke evaluation is needed
- Mimics most likely to result in inappropriate use of thrombolysis
  1. Complex Migraine
  2. Post-seizure psychosis
  3. Conversion Disorder
- Risk of ICH for stroke mimics far lower than it is for true strokes
- While some features increase or decrease the chance that a patient is having a stroke...
- There is no substitute for clinical judgment