

Stroke Mimics

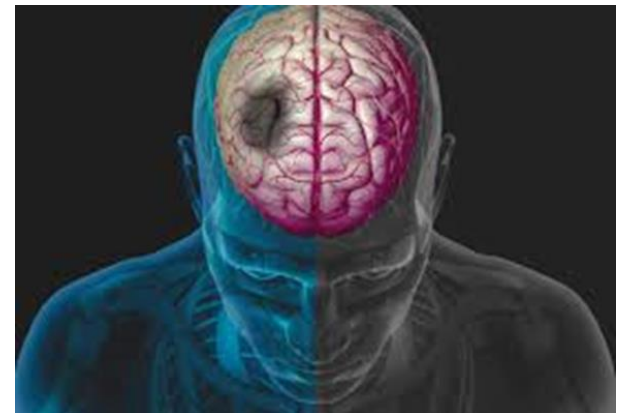
And Other Neurological Disorders

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Objectives

- General Information about Strokes
- Stroke Diagnosis/Treatments
- Stroke Mimics
- Stroke Chameleons





The Joint Commission®



American Heart Association®
American Stroke Association®

STROKE CERTIFICATION

KNOWING THIS COULD SAVE A LIFE.



FACE

Drooping



ARM

Weakness



SPEECH

Difficulty



TIME

to Call 911



Together to End Stroke®

 GET WITH THE GUIDELINES.®



STROKE STATISTICS/INFORMATION



BON SECOURS NEUROSCIENCE INSTITUTE

Good Help to Those in Need®

General Stroke Statistics

- 795,000 Americans have a stroke each year
 - A stroke every 40 seconds
 - 610,000 1st and 185,000 recurrent
- 133,000 Americans die yearly
 - 1 person every 4 minutes
- Leading cause of adult disability
- 5th leading cause of death in the U.S.
- 80% preventable



2018 report on American Stroke Statistics

- 7.2 million Americans 20 yrs. or older self-report having had a stroke
 - About 2.7% of the population
 - Lowest in Minnesota and highest in Alabama 1.9% vs 4.3%
- By 2030, it is projected that:
 - An additional 3.4 million will have a stroke
 - About 3.9% of adult US population
 - 20% increase in prevalence from 2012
 - 29% increase in Hispanic males expected



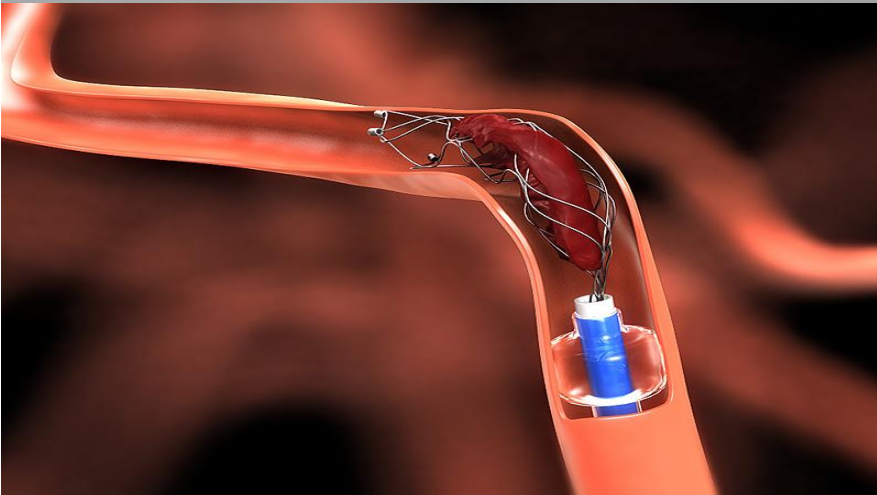
Bottom Line

- Stroke is Bad
- Deal with your modifiable risk factors
 - Hypertension, Diabetes, Smoking, High Cholesterol, Obesity, Inactivity, Stress
- Educate others



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STROKE DIAGNOSIS/TREATMENTS



4 pathways to Stroke Treatment

- Alteplase (0-4.5 hours)
 - Still first line treatment
- Thrombectomy (0-24+ hours)
- Alteplase with Thrombectomy
- Medical Management




Move FAST, Time is Brain!



Strokes Kill Brain Cells

Time is Brain!!

	Neurons Lost	Synapses Lost	Myelinated Fibers Lost	Accelerated Aging
Per Stroke	1.2 billion	8.3 trillion	4470 miles	36 years
Per Hour	120 million	830 billion	447 miles	3.6 years
Per Minute	1.9 million	14 billion	7.5 miles	3.1 weeks
Per Second	32,000	230 million	218 yards	8.7 hours



Stroke January, 2006; 37: 263-266.



Treatment Decisions

- Clinical presentation
- Patient's History
- Blood glucose/Lab results
- CT imaging
- Advanced Imaging?
 - CTA, CTP, MRI, MRA, MRP
- Current medications



Lower those Door To...Times

- **Door to Needle**

- 60 minutes?
- 45 minutes?
- Faster???

- **Door to Groin**

- Door to 90 min?
- Door to 60 min?

- **Door to Transfer**

- 120 minutes?
- 90 minutes?
- 60 minutes?

- **Or just bypass?**



CAN WE ALWAYS GET IT RIGHT?

“The emergency department approach to a possible acute stroke used to be easy: ensure the blood pressure and glucose were not too high or low, CT scan to exclude ICH, and admit to hospital. Accuracy and rapidity of diagnosis in the ED were not necessarily priorities—alternatives and complications could be sorted out upstairs.

Then, tissue plasminogen activator (tPA) came along. Now, both rapidity and accuracy of diagnosis are expected”

J. Stephan Stapczynski (2015)





STROKE MIMICS....



“The drive for early diagnosis of stroke through organized stroke care has created an important cohort of patients with non-stroke diagnoses (stroke mimics).”

Diagnosis of mimics is arguably as important as the diagnosis of stroke.”

Dawson, Cloud, Pereira & Moynihan (2016)



Stroke Mimics

9% - 30% of all patients with suspected stroke

14 - 17% of all patients treated with alteplase

WHY??

- Need to move quickly to save brain tissue in AIS
- Clinical Diagnosis of Stroke made after MRI imaging
- Diagnosis of exclusion



Major Types of Stroke Mimics

- **Seizures**
- **Migraines**
- **Tumors**
- **Metabolic Disorders**
 - Hypo/hyperglycemia
 - Sepsis
- **Functional DO**
 - Conversion DO
 - Factitious DO



5 Most Common Discharge Diagnoses

- **Transient Global Amnesia**
- **Dementia**
- **Drugs**
- **Vertigo**
- **Syncope**
- **Bell's Palsy**



Even MORE types of stroke Mimics!!

- Radial Nerve Palsy
- Spinal Cord Disorders
- Guillain-Barre
- Rocky Mountain Spotted Fever
- Subdural hematoma
- Epidural hematoma
- Vertebral artery dissection
- Carotid artery dissection
- Meningitis
- Hepatic encephalopathy
- Heat stroke
- Sickle Cell Crisis
- Malaria
- Brain Abscess
- Paralytic shellfish poisoning
- Botulism



Stroke Mimics

- Often present with minor deficits (NIHSS<5)
 - Dysarthria
 - Facial palsy
 - One-sided weakness
 - Cognitive impairment
 - Gaze palsy
 - Sensory Loss
- Tend to be younger
- Tend not to arrive by EMS



In Depth Look at Major Mimics



Seizures



- 20-33% of all stroke mimics
- Active Seizure or Postictal
- Stroke can present with seizure or cause seizures
- Seizures can be the result of prior CVA
- Can show edema on CT/MRI imaging



More Likely to be Seizures with

- History of Seizures/epilepsy
 - Tongue biting and incontinence
 - Witnessed seizure activity
 - Post ictal confusion
-
- But.....8% stroke patients have SZ with CVA
 - What about post-seizure paralysis?



Todd's Paralysis

- Postictal state after seizures
- Can last up to 48 hours, typically shorter
- Partial or complete paralysis
- Affects one side of the body
- May also affect speech or vision
- Occurs in 10% of seizure patients



Migraines

- 5-10% of all Stroke Mimics
 - Due to vasospasms & lack of brain perfusion
- 1 million ED patient visits annually
- Females 3x more often than males
- Can run in families—75% risk if both parents have
- Usually comes on slowly & builds



Migraines Continued

- 20-30% have auras with migraine
- Can present with both anterior and posterior stroke signs
 - Hemiplegia
 - Photophobia, phonophobia
 - N/V/D
- Ophthalmic affects cranial nerves-
 - eye palsy & vision distortions or blindness



Could it still be a Stroke?

- 30% of all stroke patients report Headache at presentation
- 15% of all strokes under 45 are due to Migraines
- Stroke Concerning in those with no History
- Ruled out with imaging—diagnosis of exclusion



Functional Disorders

- Conversion DO
 - Up to 75% of stroke mimics who receive tPA
- Psychological Disorder
- Often associated with other psychological DO
 - Bipolar
 - Depression
 - PTSD



Conversion/Factitious DO

- Most common in women
- May include paralysis, seizures, ataxia, blindness, numbness
- *La belle indifference* – may exhibit lack of concern
- “Diagnosis of exclusion”



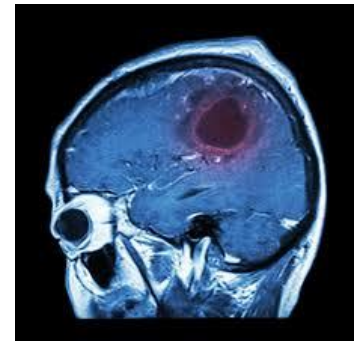
Conversion/Factitious DO

- Physical manifestation of emotional distress
 - Panic attacks, dissociative episodes
- Don't confront with your suspicions
- Patients lack insight into condition
- Removing stressors and reassurance may lead to rapid recovery
- Still treat for CVA in acute setting



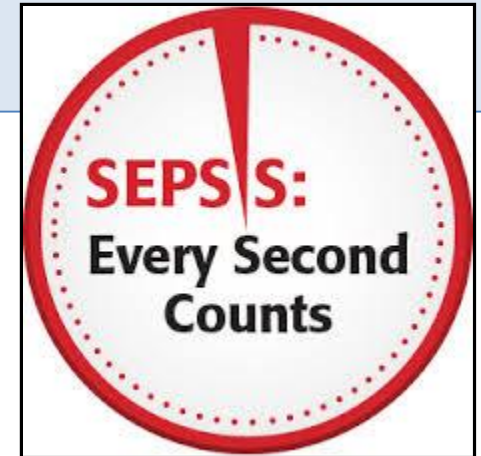
Brain Tumors

- 5-6% of all brain tumors diagnosed at initial presentation of stroke
 - 12% CVA patients have tumor also
- Usually gradual onset
- Acute onset due to hydrocephalus or edema
- Can have hemorrhaging
- Not always Primary Tumor
- Usually vision & speech changes



Sepsis

- 6-17% of all Stroke Mimics
- UTI is most common cause
 - Consider other infections also
- May have hypo/hyperthermia & tachycardia
- May have focal neurological deficits
 - Especially if prior CVA
 - Usually a gradual process



Sepsis

- Can have Sepsis & CVA at same time
- Need for accurate medical history
- Severe sepsis can cause clotting disorders
 - tPA with sepsis can lead to massive bleeding
- Treat the brain
- But move fast to treat the sepsis too



Hypoglycemia



- BGL below 45 mg/dl
- Brain needs Glucose to function
- Can Cause focal neurological deficits
 - Decreased level of consciousness/coma
 - AMS
 - Aphasia
 - Hemiplegia, especially on Right side
- Can take several hours to recover
- Can Cause an Ischemic Stroke



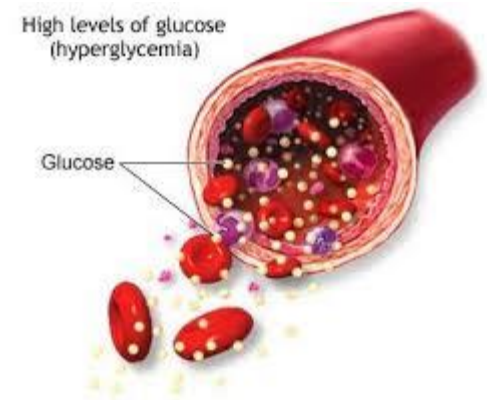
Hypoglycemia

- If diabetic, consider insulin or medication over dosage
- Consider alcohol usage
- Consider endocrine sources
 - Addison's, insulin secreting tumors
- May take several hours to return to baseline, do you wait after addressing BGL??



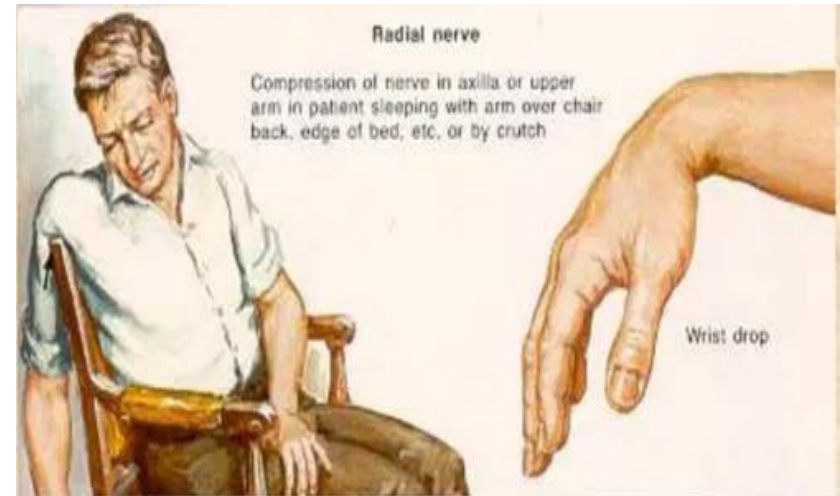
Nonketotic Hyperglycemia

- Type 2 Diabetics
- Symptoms
 - New onset Seizures
 - AMS
 - Focal deficits
 - Sensory deficits
- Can take hours/days to resolve
- Can have CVA and hyperglycemia at same time



Peripheral Neuropathy

- Acute hand or arm weakness/numbness
- Wrist drop
- Foot Drop



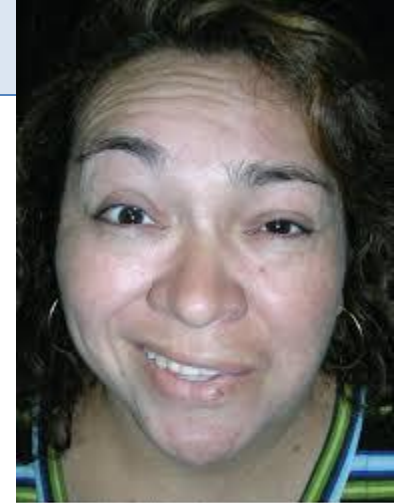
- “Saturday Night Palsy”

– Arm draped over chair or under body during sleep



Bell's Palsy

- Unilateral facial weakness
- Both upper & lower face affected—
 - Movement & sensation
- Most common in
 - pregnant women
 - those with Diabetes
 - Infectious disorders—Lyme (25%), viral, herpes
- Less common over 60
- Often preceded by viral infection



Source: Greater MS Society, Watson, A.S., Chertsey, H.S. The Causes and Effects of Stroke, Revised Edition, 1998, Greenwood Publishing Co., Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

Vertigo

- 5% of all ED visits (10 million)
- Only 3% of strokes are posterior circulation
- S/S of N/V, dizziness, nystagmus
- Acute Vestibular Syndrome—viral source
- Peripheral AVS—absence of motor or sensory deficits and gaze palsy



Vertigo Vs Posterior Stroke

- 35% of posterior stroke present with dizziness plus other S/S
- 10% of posterior strokes present with only dizziness
- 40% from embolic sources

Suspect stroke in

- Hearing loss
- ACUTE Inability to walk without support
- Direction-changing nystagmus
- Older patients with CV risk factors
- With other neurological deficits



Syncope



- 13% of Stroke Mimics
- Common after eating in elderly
- Could be cardiac related – ortho HoTN
- Also could be S/S vertebrobasilar insufficiency
- S/S include diplopia, dysarthria, vertigo, ataxia
- Exaggerates deficits from prior CVAs



Encephalopathy

- **Hypertensive**
- **Hypoxic-Ischemic**
 - Cardiac arrest
 - Respiratory failure
 - Shock
- **Hepatic**
- **Metabolic 2/2 anemia**
- **Wernicke's**
 - Alcoholics/malnourished
 - Thiamine deficiency
 - AMS, memory impaired
 - ataxia



Neurodegenerative Disorders

- **Multiple Sclerosis**
 - Visual deficits, ataxia, dysarthria
 - More common in warm weather
- **Optic Neuritis**
 - Sudden unilateral vision loss
 - More often in young women
- **Guillain-Barre**
 - Progressive ascending paralysis
 - Looks like brainstem infarcts
 - Brainstem infarcts usually have crossed findings cranial nerves on one side with motor/sensory on other



AMS/Memory Problems

Transient Global Amnesia

- Sudden onset of memory loss
- Can be caused by hypoxia, seizures or migraines
- Can be recurrent

Dementia

- Usually slow onset
- Can be exacerbated by other conditions
 - UTI
 - Pneumonia
 - Sepsis
 - MI



Other Conditions

- **Creutzfeldt-Jacob Disease**
 - Rapidly progressive
- **Osmotic myelinolysis**
 - Rapid correction of hyponatremia
 - Malnourishment
 - Hyperglycemia
- **Heroin leukoencephalopathy**
- **Drug Toxicity**
 - Methotrexate
 - Metronidazole
 - Crohns Disease
 - Long-term usage
- **Brain Abscess**
- **Eastern Equine Encephalitis**
 - Edema present
- **Fakers - Malingering**



*“In case of doubt, **physicians should not postpone thrombolysis (tPA)**, because its potential benefit in confirmed ischemic stroke might be higher than the risk of complications in stroke mimics.”*

Forster, et al. (2012)

Risk of complication after tPA in a stroke mimic is less than 1%



Any Stroke Chameleons here?



Syndromes that do not appear to be a stroke upon initial presentation but later are found to represent an acute stroke



Most Common Stroke Chameleons

- **Hypertensive Emergency (8%)**
 - HTN is leading cause of AIS and ICH but....
 - Hypertensive response is normal in CVA ~60%
- And
- Too quickly lowering BP in AIS can worsen infarct

Difficult to tell the difference



Most Common Stroke Chameleons

- **Syncope (7.7%)**
 - More likely CVA in Elderly men with HTN/CV risks
 - Could be transient low-flow state 2/2 stenosis
 - Get history of event
- **Altered Mental Status (6%)**
 - Delirium, psychosis, memory loss
 - Prior stroke S/S highlighted in AMS
 - Look for focal deficits, aphasia



Most Common Stroke Chameleons

- **Systemic Infection (11%)**
 - Generally over 80
 - Generalized weakness, vague sensory issues
 - Positive UTI/ pneumonia
- **R/O Acute Coronary Syndrome (10%)**
 - Numb/tingling left hand, arm face with chest pressure and/or SOB
 - Overlapping Stroke and CV risk factors



Other Possible Stroke Chameleons

- Seizure ~5%
- Vertigo ~3.2%
- Bell's Palsy ~1%
- Migraine ~1%
- Hypoglycemia ~1%
- Generalized body weakness
- Hand pain
- Fall
- **What have you seen???**
- **How can we be sure???**



*“We would propose that certain patients who present with an **AMS of acute onset, syncope, or HTN emergency** be considered to have a possible stroke chameleon. These patients should have a careful neurological evaluation, and if any doubt exists, there should be a low threshold to initiate a formal neurological consultation, brain imaging, and an appropriate stroke workup”*

Dupre, et al., 2013



Conclusions for Clinicians

- There will always be overtreatment for strokes due to stroke mimics.

Better to overcall than under call.

- There will be missed strokes due to stroke chameleons.

Be on the lookout for possible CVAs.

- Information helps decision making



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