Posterior Strokes

- Involve the vertebral-basilar system
  - Includes vertebral, basilar, posterior cerebral artery and their branches

Posterior Circulation

- Supplies blood to:
  - Medulla
  - Pons
  - Midbrain
  - Thalamus
  - Hippocampus
  - Cerebellum
  - Parts of occipital and temporal lobes (visual cortex)

Posterior Strokes

- Accounts for 20% of ischemic strokes
- Up to 20 – 60% will have poor outcomes
- Basilar artery occlusion represents 8-14% of the posterior strokes and results in over 90% mortality
Causes

- Primarily local atherosclerosis
  - More prone than intracranial portion of carotid arteries
  - One vertebral artery occlusion, collateral flow from the other one and PCA
- Penetrating artery disease (lacunar)
- Cardiogenic embolization

Presentations

- Hemi to quadriplegia
  - May progressively progress to lock-in syndrome
- CN deficits (III-XII)
- Respiratory difficulty
- Altered sensorium
- Vertigo
- Ataxia

Hallmark Sign

- Crossed motor or sensory
  - Example: Right face and left limbs
  - Cranial findings ipsilateral
  - Motor or sensory of limb findings contralateral

Posterior D’s

- Dizziness
- Diplopia
- Dysarthria
- Dysconjugate gaze
- Dysesthesia
- Dysphagia

Dysmetria
- Dysdiadokinesis
- Dyspepsia
- Deficits (CN)

Posterior Circulation TIAs

- TIAs occur for at least 2 weeks prior to stroke presentation in 50% of patients
- Prodromal symptoms occurred in 75% of the vertebral basilar artery occlusion
  - Most common signs include vertigo, nausea and headache
  - Ranges from days to months
- Gradual and progressive signs occurred in 63% of cases
  - Common signs vertigo, nausea, headache, dysarthria and CN palsies
Dizziness
- Common ED symptom
- Can also be described as near syncope, lightheadedness or faintness to a sensation of movement or dysequilibrium, unsteadiness or imbalance
- Distinguish between dizziness and vertigo (sensation of spinning)
  - Vertigo alone without other symptoms is rarely CNS (stroke) related

Vertebrobasilar Insufficiency
- Describes fluctuating brainstem symptoms over a period of days to weeks (i.e., dizziness)
- Indicates insufficient flow through posterior circulation
  - Essentially TIA in brainstem

Wallenberg Syndrome
- Also called Lateral Medullary Syndrome
- Characterized by dissociated sensory loss
- Occlusion vertebral artery and posterior inferior cerebellar artery
- Causes nystagmus, vertigo, ataxia, hoarseness, dysphagia, Horner’s Syndrome, and loss of pain and temperature sensation on the face (ipsilateral) and (contralateral) loss of pain and temperature on the body

Basilar Syndrome
- Also called Anton Syndrome
- Caused by occlusion of basilar tip artery as into the PCA it bifurcates
- Affects occipital lobe and deeper structures
- Results in somnolence, memory deficits, confusion, mutism, visual hallucinations and bilateral loss of vision with unawareness or denial of blindness, vertical gaze paralysis and deviation of the eyes

Dejerine-Roussy Syndrome
- Involves thalamic compromise due to ischemia or malignancy
- Causes hemisensory loss of all modalities on one side of the body, contralateral to the side of lesion
- Position sense is affected more than any other sensory function and greater deep sensory loss (over cutaneous)

Physiology: Dizziness/Vertigo
- Vestibular, visual and proprioceptive systems work together with a significant amount of redundancy
  - Maintains spatial orientation
- If 2 of the 3 systems are down = Vertigo
- If only 1 of the systems is affected = Dizziness
- Romberg test eliminates visual system
Weber Syndrome
- Caused by vascular occlusion to the midbrain from an aneurysm or tumor resulting in ipsilateral oculomotor (CN 3 and 4) with contralateral hemiplegia

Locked-In Syndrome
- Most dreaded
- Caused by Basilar Artery Occlusion
- Bilateral infarct midbrain
- Characterized by a progression of symptoms leading to quadriplegia with paralysis, horizontal gaze, bilateral facial palsy and oropharyngeal palsy
- Patient is awake, able to move eyes vertically
  - If involves RAS, may become stuporous or comatose
- May be preceded by brief brainstem TIA occurring several times a day

Diagnostics
- Noncontrast CT scan
  - Initial study to R/O hemorrhage
  - Limitations: Interference of bone
- MRI
  - Superior
  - Study of choice for posterior strokes

Treatment
- IV Alteplase indicated within time frame
- Suspected Basilar artery occlusion – IA tPA
- Traditionally, heparin has been used
- TOAST trial did not demonstrate benefit LMWH

Case Study
- MM (63 y.o. male) developed dizziness, ataxia and vision changes and went to an outside hospital. Multiple TIAs several days prior (dizzy and blurred vision). Diagnosed with cerebellar ischemic stroke. Discharged after three days.
  - No tPA given (outside window??)
- Presented in the ED with sudden worsening of dizziness and limb ataxia on left
  - NIHSS 0-2
- Initial CT in ED
  - Small completed infarct right cerebellum

Case Study
- Initial MRI/MRA
  - Multiple infarcts within right cerebellum
  - Small infarct along right anterolateral pons
  - No flow distal right vertebral artery
    - Retrograde flow from the left vertebral
  - Hypoplasia of left vertebral and basilar artery
- Admitted to ICU
  - Embolic stroke
Case Study

- Placed on heparin gtt and ASA
- Continues to complain dizziness, ataxia
- Out of bed with assistance, sitting in chair, ambulating with PT
- Failed swallow – DHT with TF

Case Study

- 4 days post admission, develops AMS
  - Sepsis alert called
  - UTI
- Significant left sided weakness, garbled speech
  - Arteriogram
  - Basilar tip occlusion with thrombus compromising right superior cerebellar artery

Case Study

- Day 5
  - Dense left-sided hemiplegia
  - Intubated due to respiratory distress/AMS

Case Study

- Day 6
  - MRI
    - Extensive infarcts involving brainstem, right and left cerebellar peduncle, pons, midbrain bilateral
  - Patient had a seizure
Case Study

- Day 7
- "Locked-In"
- Remains intubated, off sedation, able to follow with eyes and communicate with eyes. No motor movement

Case Study

- Day 9
- Communicating with eyes, discussed withdrawal life support
  - Indicates desire for aggressive management
- Periods of non-sustained VT

Case Study

- Day 15
- Family discussed life support, trach/PEG with patient. It was decided to withdraw life support and Hospice Consult

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