Stroke Syndromes

Craig DiTommaso, MD
The Strokes

Last Night, “Julian” was out with his friends. They went for dinner and drinks at Machu Picchu. At some point, he got separated from the group.

They later found him Under Cover of Darkness in a stuporous state. He was slurring his words and stumbling around and his friends assumed he was Taken For a Fool. But when they noted him drooling and with a facial droop, they brought him to the Harborview Emergency Room.
Strokes

In ER, he was noted to be hemiparetic on his right side. He was unable to give any history but his friends provided the following:

- **PMH**
  - Hypertension (He was going to see a doctor about it someday)

- **Social**
  - Lives a “rockstar” lifestyle
  - Smokes ½ pack a day for past 20 years
Strokes

As you begin examining him, he quickly loses consciousness and begins projective vomiting.

T: 36.5°C
BP: 250/120 mmHg
P: 45 bpm
RR: 10 – 20 breaths per min

You intubate him for airway protection and send him to the CT Scanner but when the Radiologist calls you already know he has a …..
Stroke: Definition

- Interrupted blood flow to an area of the brain causing a focal (or global) neurologic deficit
- Symptoms >24 hours: stroke
- Symptoms <24 hours: TIA

- Two main types: Ischemic and Hemorrhagic
Ischemic stroke

85% of all strokes

- Thrombotic
- Embolic
- Lacunar
- Systemic hypoperfusion
Ischemic stroke

Thrombotic Strokes

- 35% of all strokes
- Progressive deficit(s)
- Often occurs during sleep

http://www.taafonline.org/ba_about.html
Thrombotic Strokes

Risk Factors

- Hypertension
- Smoking
- Dyslipidemia
- Diabetes
Ischemic stroke

Embolic strokes

- 30% of all strokes
- Usually have a cardiac source
- Sudden severe deficits

http://ehealthmd.com/content/how-deep-vein-thrombosis-treated#axzz2IAqQRKa0
Embolic strokes

Risk Factors

- Atrial fibrillation
- Carotid Atherosclerosis
- Hypercoagulability
- Smoking
Ischemic stroke

Lacunar Strokes
- 20% of all strokes
- Most common in sub-cortical structures
- May cause “pure” syndromes

http://www.ne.jp/asahi/ueda/stroke/lacunar-mr.html
Lacunar Infarction Syndromes

- Persistent hypertension causes sclerosis
- Arteriolar sclerosis progression to cause occlusion
- Usually affects penetrating branches of MCA
Lacunar Infarction Syndromes

Commonly results in:

- Pure motor hemiplegia
  - Posterior Limb of Internal Capsule

- Dysarthria-clumsy hand syndrome
  - Anterior Limb of Internal Capsule
Hemorrhagic Stroke

- 15% of all strokes
- Weakened vessel ruptures and bleeds into the surrounding brain. The blood accumulates and compresses the surrounding brain tissue
Hemorrhagic Stroke

Intracerebral hemorrhage

- 10% of all strokes
- Often due to hypertension
- Occur when patient calm and unstressed
Hemorrhagic Stroke

Risk Factors

- Hypertension
- Drug use (cocaine, meth)
- Smoking
Hemorrhagic Stroke

Subarachnoid hemorrhage

- 5% of all strokes
- Most common from a ruptured aneurysm or AV malformation
- Occurs with strenuous activity/stress
Brain Anatomy Basics

Our pinkish-gray walnut that weighs 3 pounds

- Visible surface is the cortex → higher level functions and intelligence
- Subcortex → below the cerebral cortex (brainstem, midbrain, forebrain); part of your normal functioning
Blood carried to the brain by two paired arteries:

- Internal carotid arteries – anterior circulation that supplies most of cerebrum
- Vertebral arteries – posterior circulation supplies brainstem, cerebellum and underside of cerebrum.
Anterior Circulation

- Anterior Cerebral Artery
- Middle Cerebral Artery
- Posterior Cerebral Artery
Internal Carotid Artery (ICA)

- Most variable syndrome → the good, the bad, and the ugly
  - **Good** – no symptoms (30-40%) if good collateral circulation.
  - **Bad** – ocular infarction or transient monocular blindness.
  - **Ugly** – massive infarction of MCA and ACA distribution causing contralateral motor and/or sensory symptoms.
Middle Cerebral Artery

- Contralateral weakness in face, arm, and maybe leg
- Hemisensory loss of face, arm, and maybe leg
- Homonymous hemianopia
- Ipsilateral gaze preference (toward lesion)
Middle Cerebral Artery

- M1 (Horizontal) segment
- M2 (Sylvian) Segment
- M3 (Cortical) Segment

http://www.meddean.luc.edu/lumen/meded/neuro/neurovasc/navigation/mca.htm
## Middle Cerebral Artery – M1 Segment

<table>
<thead>
<tr>
<th>Dominant Hemisphere</th>
<th>Non-Dominant Hemisphere</th>
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</thead>
<tbody>
<tr>
<td>Receptive Aphasia</td>
<td>Hemineglect</td>
</tr>
<tr>
<td>Expressive Aphasia</td>
<td>Emotional Instability</td>
</tr>
<tr>
<td>Fluent Aphasia</td>
<td>Lack of Emotional Competency</td>
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<tr>
<td>Non-Fluent Aphasia</td>
<td></td>
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<tr>
<td>Sometimes called Global Aphasia</td>
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</tbody>
</table>
MCA – Superior Division of M2

- Contra weakness of arm, face, maybe leg
- Contra hemisensory loss of arm, face, maybe leg
- Ipsilateral eye deviation
- Dominant hemisphere → Broca’s aphasia (global initially)
- Non-dominant → contra hemineglect, visual spatial deficit, aprosody

Most common cause of occlusion is an embolus.
MCA – Inferior Division of M2

- Contra vision loss, either homonymous hemianopia or upper quadrant anopsia
- Dominant lesion → Wernicke’s / receptive aphasia
- Non-dominant lesion → contra hemineglect, affective agnosia

Motor and sensory function is generally intact.
ACA Syndromes

Occlusion of one ACA distal to ACOM:

- Contra hemiplegia – distal leg +/- shoulder; spares hand and face
- Contra hemisensory loss
- Looking toward lesion
- Gegenhalten (paratonia)
- Grasp reflex - groping
- Gait apraxia
- Transcortical motor aphasia (if dominant side)
- Urinary incontinence
ACA Syndromes

Occlusion is at the stem of the ACA proximal to connection with ACOM:
- Well tolerated
- Thank you collateral circulation

If both ACA arise from one stem:
- Major disturbances with infarction at the medial aspects of both cerebral hemispheres
- Aphasia, paraplegia, incontinence, frontal lobe/personality dysfunction.
Posterior Circulation

- **Vertebrobasilar Arteries**
  - Vertebral artery – supplies medulla
    - Cerebellum by PICA
  - Basilar artery – supplies pons and midbrain
    - Cerebellum also by AICA and superior cerebellar artery

- **Posterior Cerebral Arteries**
  - Anatomy varies – may come off basilar artery, ICA or combination
PCA Syndromes

- Hemisensory deficit
- Visual impairment
- Visual agnosia
- Prosopagnosia
- Dyschromatopsia
- Alexia without agraphia
- Memory Deficits

Remember:

- Occipital lobe does vision.
- Blood supply of the thalamus is provided by the perforating arteries of the PCA.
PCA Syndromes

- Unilateral occipital
  - Contralateral homonymous hemianopia

- Visual field defects are frequently the only neurological abnormalities.

- Other associated syndromes:
  - Alexia without agraphia
  - Visual or color anomia
Anton Syndrome
aka Anton-Babinski syndrome

- Lesion of bilateral PCA (specifically the calcarine artery off P2 segment) or top of basilar artery

- Cortically “blind”
  - Bilateral vision loss
  - Unawareness or denial of blindness
  - Use confabulation to explain away their lack of sight
Medial Brainstem Syndromes

- **Midbrain**
  - CN3

- **Pons**
  - CN6, CN7, CN8

- **Medulla**
  - CN12
  - Wallenberg Syndrome

[Brainstem Cranial Nerve Nuclei diagram]
Wallenberg’s syndrome

- **NO** muscle weakness (usually)
- Dysphagia
- Dysarthria
- Hoarseness
- Vertigo
- Hiccups
- Nystagmus, diplopia

- Usually occlusion of the vertebral arteries or PICA
Wallenberg’s Lateral Medullary Syndrome

- **Ipsilateral**
  - Horner’s
  - Decrease in pain and temperature on face
  - Cerebellar signs

- **Contralateral**
  - Decreased pain and temperature on the contra body
Basilar Artery Occlusion Syndrome

Locked-in syndrome

- Lesion of bilateral ventral pons
- Aware and awake
  - Sparing of RAS
- Tetraparesis / Quadraparesis
- Only able to move eyes vertically or blink