Mr. T’s Headache

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Mr. T’s Presentation

- 45 year-old welder complains of sudden severe headache and witnessed seizure with loss of consciousness at work
- History of an assault, which was a closed fist punch to the face a week prior to admission
Mr. T’s Presentation

On PE:

- Hypertensive to 150s to 160s, Afebrile
- Lethargic, with garbled speech
- A + Ox2, following commands inconsistently
- PERLL, no seizure activity noted

Labs:

- Hct 42, WBC 18,000, coags WNL
DDx?

What Study?

CT Head
DDx?

What next?

Angiogram
Right ICA Angio

AP View
Right ICA Angio

Lateral View
What do you think they did?
S/P Coiling
S/P Coiling
A Week Later…
A Week Later…
Intracranial Hemorrhage Review

Epidural  $\rightarrow$ Biconvex, does not cross sutures except when fracture present, may cross falx and tent

Subdural  $\rightarrow$ Crescent, crosses sutures, not dural attachments

ICH  $\rightarrow$ Anywhere in parenchyma

Subarachnoid  $\rightarrow$...
Epidural Hematoma

http://brighamrad.harvard.edu/Cases/bwh/hcache/100/full.html
Subdural Hematoma
Subarachnoid Hemorrhage

- Usual presentation: worst headache of life, trauma
- What study? Where and what are we looking for?
- CT → look for hyperdensity in sulci, interhemispheric and sylvian fissures, and cisterns
Anatomy Review

- Interhemispheric fissure
- Sulcus
Anatomy Review

4th Ventricle

Mastoid Sinus
Anatomy Review

- Interpeduncular Cistern
- Ambient Cistern
- Suprasellar Cistern
- Quadrigeminal Cistern
- Interhemispheric Cistern
Anatomy Review

Sylvian Fissure

PACS, BIDMC
Once you’ve found the hemorrhage and location, using the history, narrow DDx

1. Nonaneurysmal SAH
2. Pseudo SAH
3. Nonaneurysmal Perimesencephalic SAH
4. Aneurysmal SAH
1. Nonaneurysmal SAH

- Trauma is #1 cause of SAH! Not aneurysm, as many believe\(^1\)
- Vascular malformation
- Neoplasm

1 Rinkel: Stroke 1993
Traumatic SAH

Look for the star

http://akimichi.homeunix.net/~emile/aki/medical/Image/subarachnoid-hemorrhage-CT-1.jpeg
Pneumococcal Meningitis

- Chased SAH, vasospasm
- After 1 day did LP: 1510 WBCs (all PMNs) and 160 RBCs
- SAH appearance 2/2 high protein, exudate.
- FLAIR also has high CSF signal in meningitis

Cerebral Edema

- Loss of cisterns
- Loss of gray-white differentiation
- Diffuse hypodensity
- CSF ‘appears’ more bright

http://merck.micromedex.com/index.asp?page=bpm_viewall&article_id=BPM01NE01&show_banner=no
2. Pseudo SAH

- Low density brain
  - Cerebral edema
- High density/FLAIR intensity CSF
  - meningitis
  - high O2 tension
  - contrast administration
3. Nonaneurysmal Perimesencephalic SAH

- Clinically benign entity
- SAH confined to perimesencephalic, prepontine cisterns
- Likely caused by ruptured perimesencephalic/prepontine vein$^3$

Matsumaru: J Neurosurg 2003
Interpeduncular Cistern
4. Aneurysmal SAH: Epi

- Aneurysms account for 85% of non-traumatic SAH$^4$
- Smoking, family hx increases risk
- Peak age: 40-60, F>M
- Concern: SAH causes vasospasm
  - $\Rightarrow$ 20-30% incidence in aneurysmal SAH$^5$
  - $\Rightarrow$ 3-14 days

4 Osborn: 2004
5 Kassell: Stroke 1985
Aneurysmal SAH

- 95% positive CT in first 24hr, <50% by 1 week
- Multislice CTA 90-95% sensitive for aneurysm >2mm
- MRA 85-95% sensitive
- Conventional Angio considered gold standard

6 Schwartz: Radiology 1994
7 Huston: Am J Neurorad 1994
Aneurysmal SAH

Hunt and Hess grade $\rightarrow$ prognostic
Fisher score $\rightarrow$ risk of vasospasm$^8$

8 Greenberg: Handbook of Neurosurgery 2000
Aneurysmal SAH: Location

- Rebleed risk is increased compared to initial bleed risk.
- So if you see 2 aneurysms, how can you figure out which bled, and which to clip/coil?
- SAH location may help:
  - Interhemispheric SAH suggests AcoA
  - Sylvian suggests MCA
MCA emerges from sylvian fissure
AcoA lives near interhemispheric
Types of Aneurysms

- **Saccular**
  - Round outpouching that lacks internal elastic lamina
  - Inherited susceptibility and acquired mechanical stress
  - 90-95% in circle of willis (AcoA>PcoA)
  - 10% posterior circulation
  - Most often at vessel bifurcations! May have apical ‘tit’
  - 20% multiple

9 Wiebers: Lancet 2003
Types of Aneurysms

- Be mindful of radiographic DDx if you think you see a saccular aneurysm:
  - Vessel loop
  - Infundibulum of PComm
Saccular Aneurysm

http://members.fortunecity.com/danilhammoudimd/neuro1/11ab5bc0.gif
Types of Aneurysms

- **Pseudoaneurysm**
  - Focal arterial dilatation not contained by layers of normal arterial wall
  - Most commonly from trauma
  - Cavitated clot communicates with vessel\(^\text{10}\)

10 Nomura: J Neurosurg 2000
Types of Aneurysms

- **Fusiform aneurysm**
  - Ectatic vessel and focal aneurysmal outpouching
  - More often found in vertebrobasilar circulation
  - Usually large
  - Elderly patients with atherosclerosis\(^\text{11}\)

11 Nakatomi: Stroke 2000
Left PCA Fusiform Aneurysm
Treatment: Coil vs Clip vs none

Treatment choices rest largely on weighing risk of bleed versus procedural risk
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References


Kassell NF; Sasaki T; Colohan AR; Nazar G. Cerebral vasospasm following aneurysmal subarachnoid hemorrhage. Stroke. 16(4):562-72, 1985.


