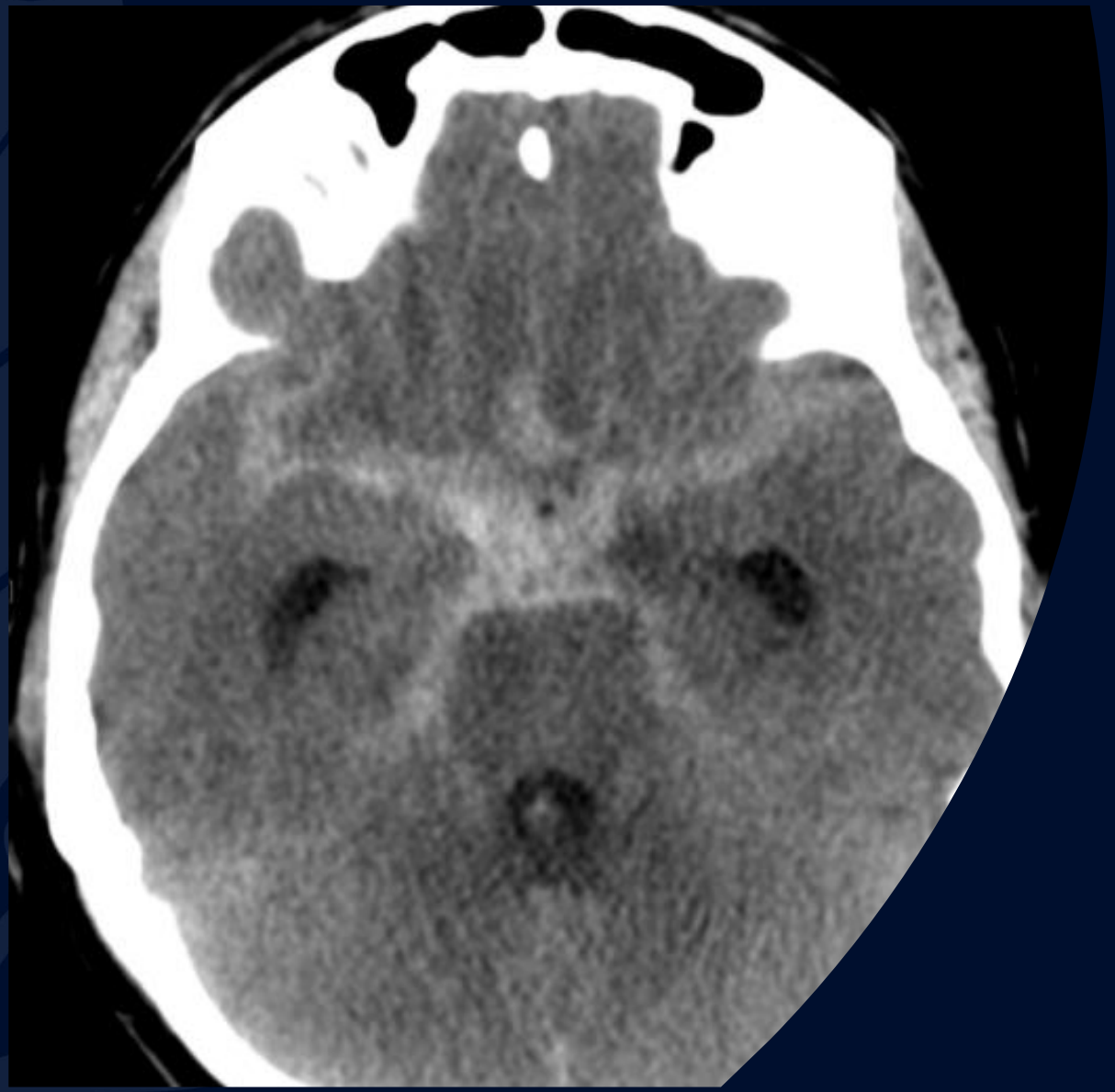
45-year-old female with the worst headache of her life

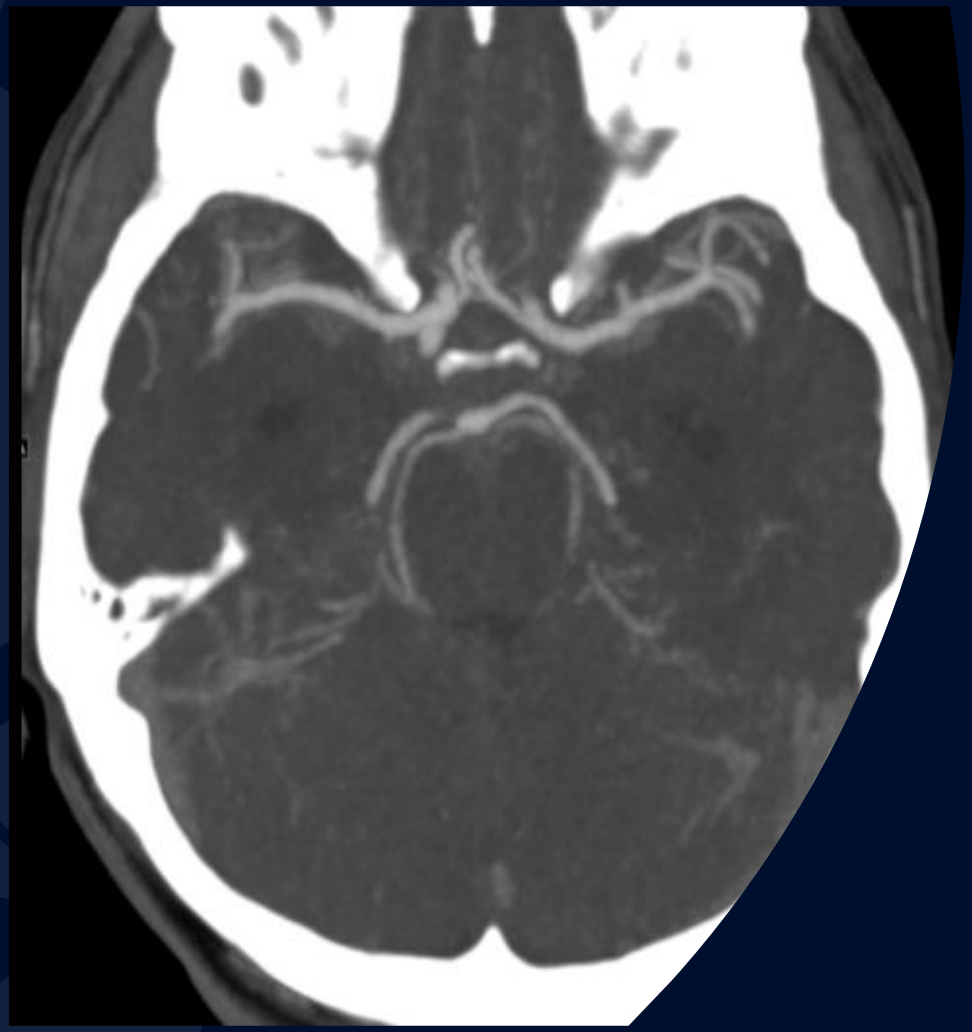
Jignesh Modi, MD

UCONN HEALTH
RADIOLOGY



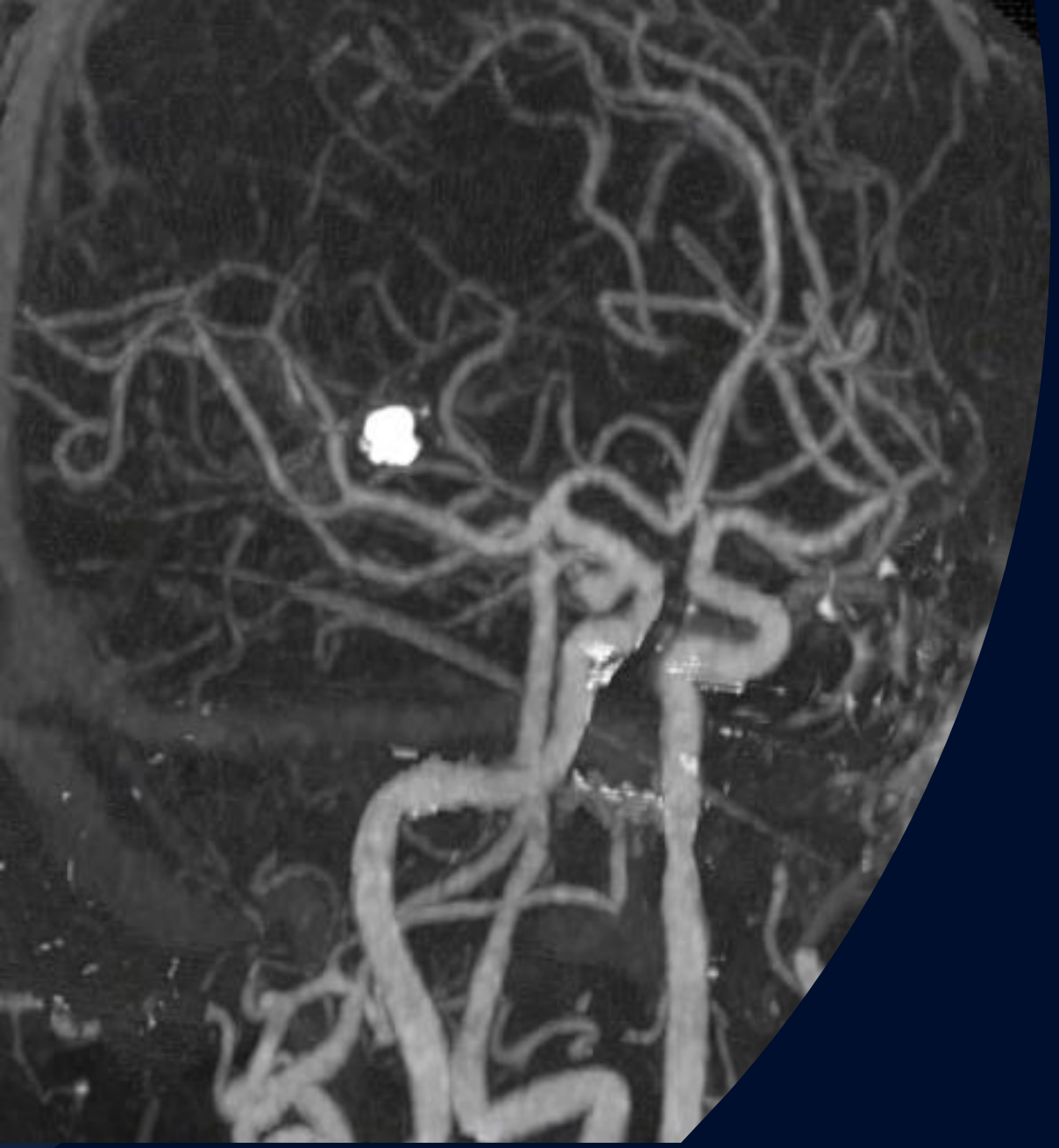
Non-contrast CT

UCONN HEALTH
RADIOLOGY



CT Angiogram

UCONN HEALTH
RADIOLOGY



Digital Subtraction Angiogram

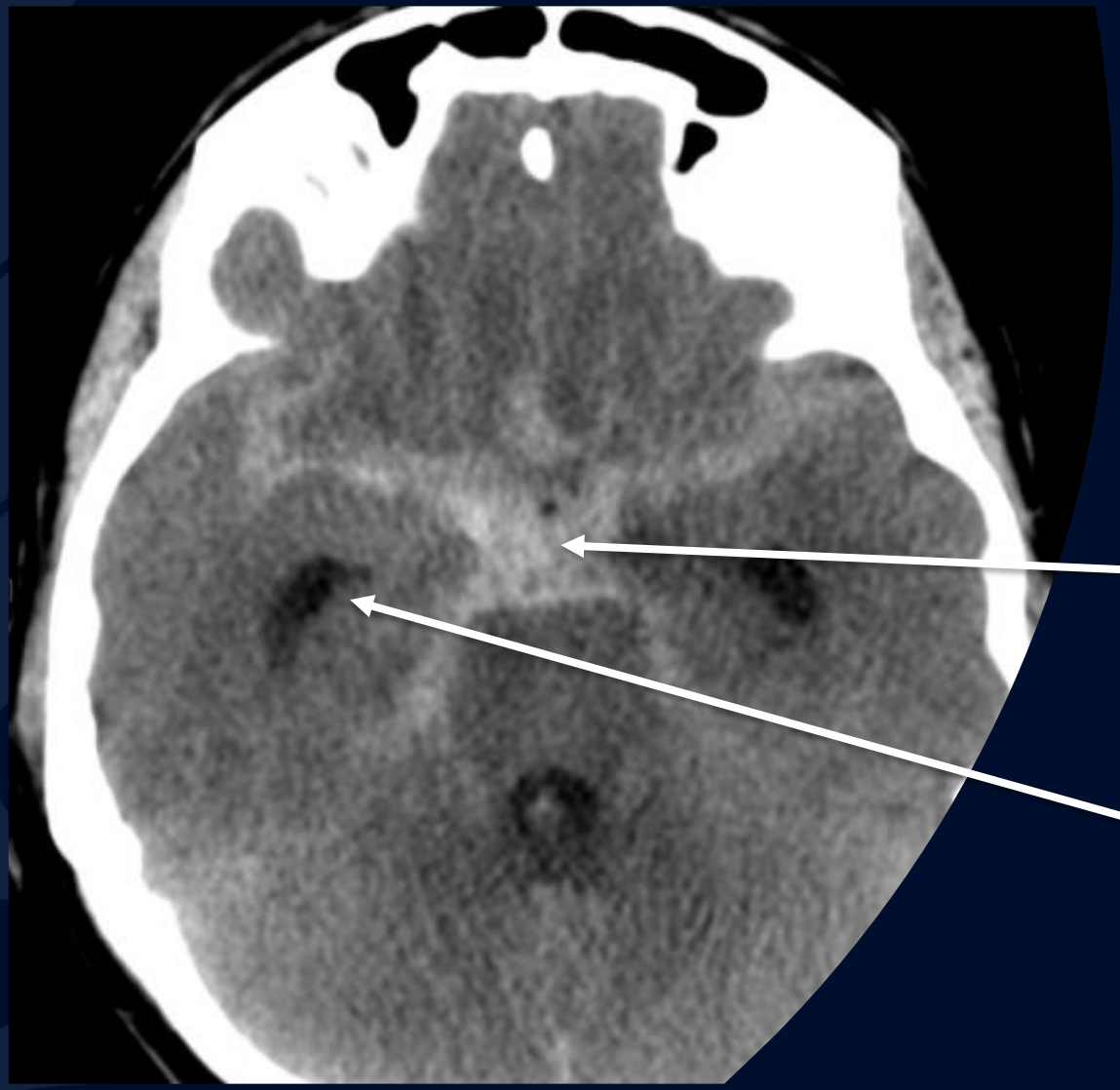
UCONN HEALTH
RADIOLOGY

?

UCONN HEALTH
RADIOLOGY

Acute subarachnoid hemorrhage due to ruptured PCA aneurysm

UCONN HEALTH
RADIOLOGY



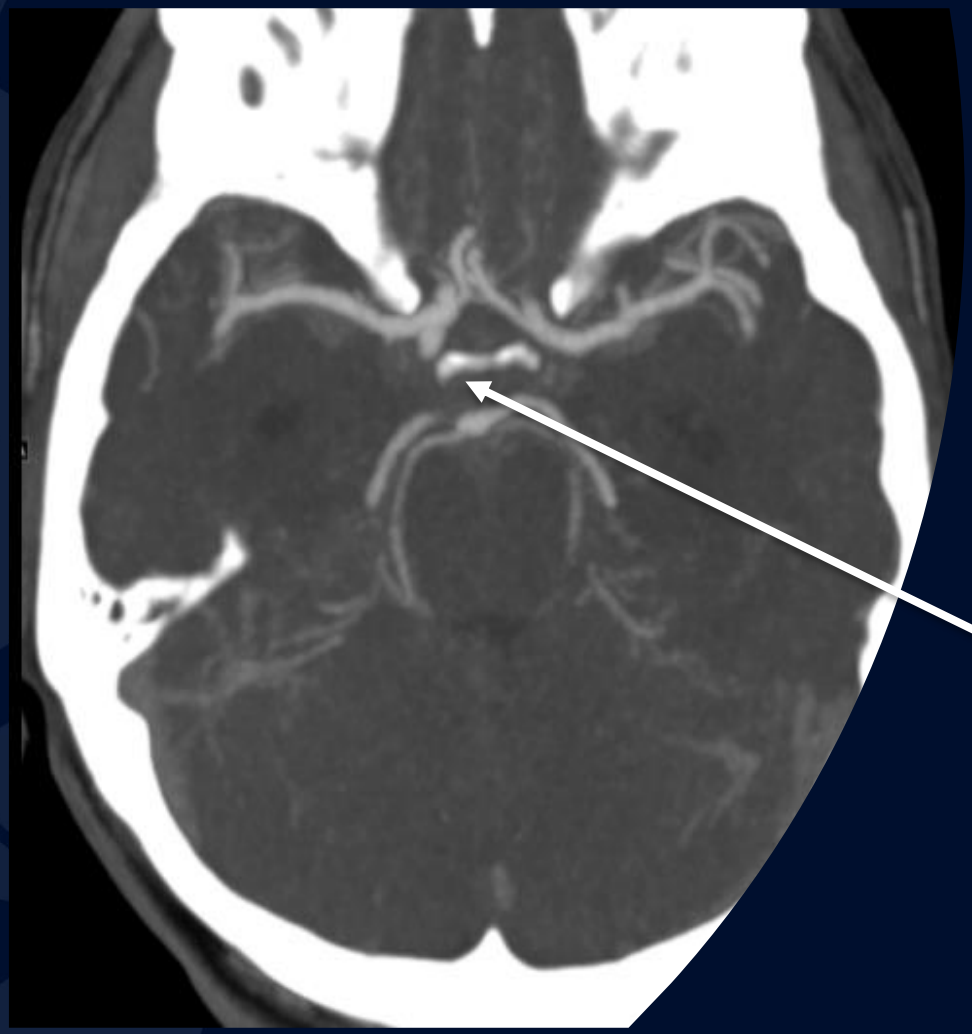
Non-contrast CT

Increased density in basilar cisterns

Hydrocephalus

UCONN HEALTH
RADIOLOGY

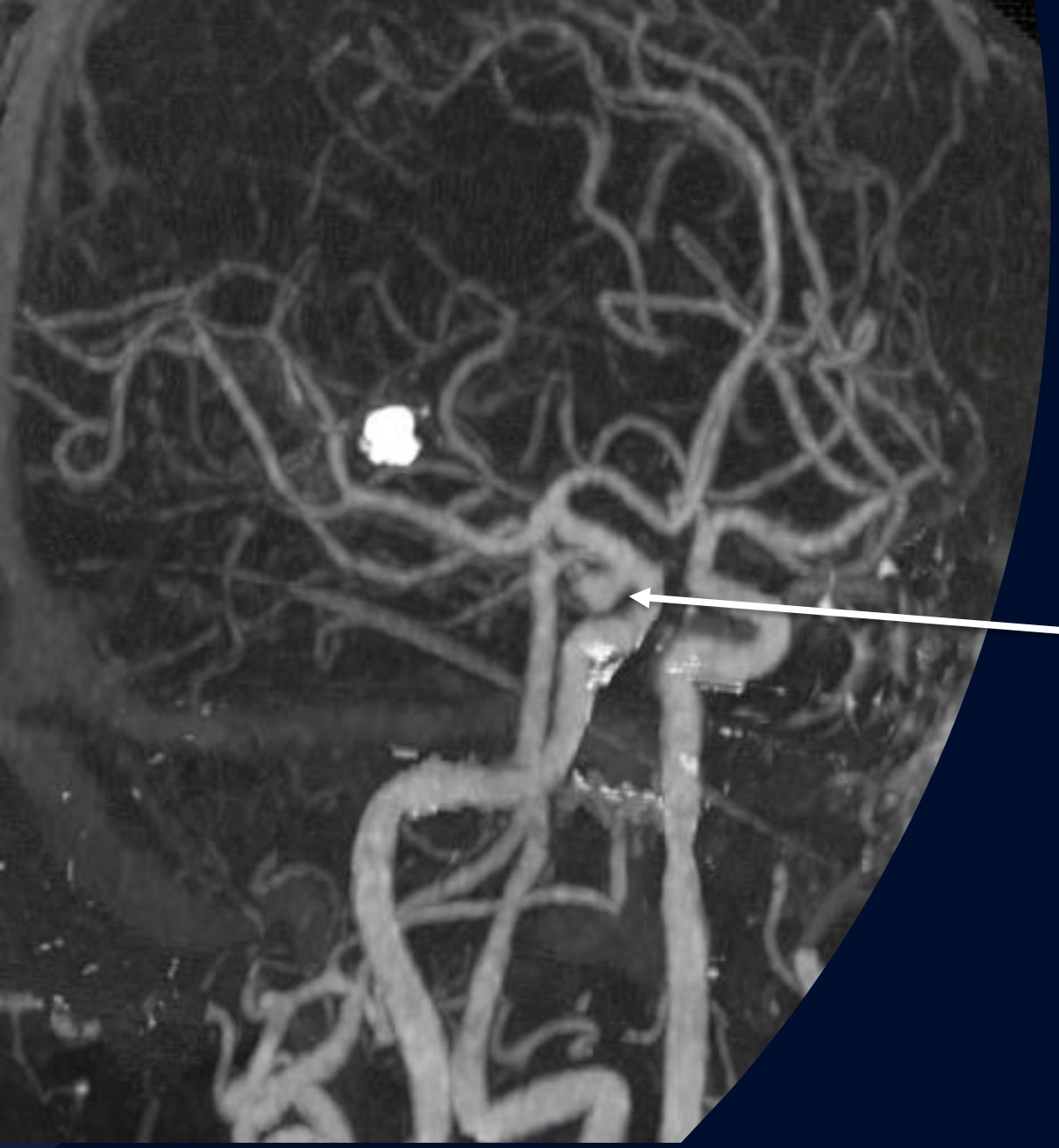
CT Angiogram



Saccular aneurysm from the posterior wall of the supra-clinoid right internal carotid artery near the origin of the posterior communicating artery

Right posterior communicating artery aneurysm

UCONN HEALTH
RADIOLOGY



Digital Subtraction Angiogram

Saccular aneurysm

UCONN HEALTH
RADIOLOGY

Subarachnoid Hemorrhage (SAH)

- Type of extra axial hemorrhage denotes the presence of blood within the subarachnoid spaces.
- Most common cause is trauma.
- Most common atraumatic cause is ruptured saccular aneurysm, accounts for 85% of spontaneous cases.
- Two thirds of the remaining 15% of spontaneous cases are due to idiopathic perimesencephalic hemorrhage, a benign non-aneurysmal form of SAH that is likely venous in origin.

Epidemiology, Risk Factors, Clinical Features

Epidemiology

- Middle age, typically less than 60 years old
- 3% Stroke cases

Risk factors

- Family history, hypertension, abnormal connective tissue disorders includes Autosomal dominant polycystic kidney diseases
- Female gender, African descent

Clinical presentation

- Sudden onset "thunderclap" headache (worst headache of patient's life)
- Half of cases have associated decreased or loss of consciousness

UCONN HEALTH
RADIOLOGY

Imaging Features

- **Noncontast CT** is the study of choice.
  - Hyperdense material in subarachnoid spaces.
  - Look for associated intraventricular hemorrhage to decide Modified Fischer scale for grading and decide risk of developing vasospasm,
- **MRI:** hyperintensity on flair sequences, blooming artifacts on gradient echo images.
- **CTA and MRA:** to look for site of aneurysm.
- **DSA:** gold standard for diagnosis and treatment.

UCONN HEALTH
RADIOLOGY

Treatment & Prognosis

- Treatment will vary according to underlying cause
- ICP monitoring often needed
- Extraventricular drain for hydrocephalus
- Cerebral vasospasm causes delayed cerebral ischemia
  - Triple H therapy (**H**emodilution, **H**ypertension, **H**ypervolemia)
  - Calcium channel blockers (e.g., nimodipine)
  - Endovascular intervention (e.g., intra-arterial delivery of vasodilating agents (such as NO) and/or balloon angioplasty)
- Prognosis depends on cause, grade of SAH, and presence of other injuries
- A small amount of traumatic subarachnoid hemorrhage or small perimesencephalic blood has an excellent prognosis with little if any significant long-term sequelae

UCONN HEALTH
RADIOLOGY

References

Anne Osborn, Diagnostic Imaging, Brain, Amirsys, 2016

https://www.ajronline.org/doi/full/10.2214/AJR.12.9749

UCONN HEALTH
RADIOLOGY