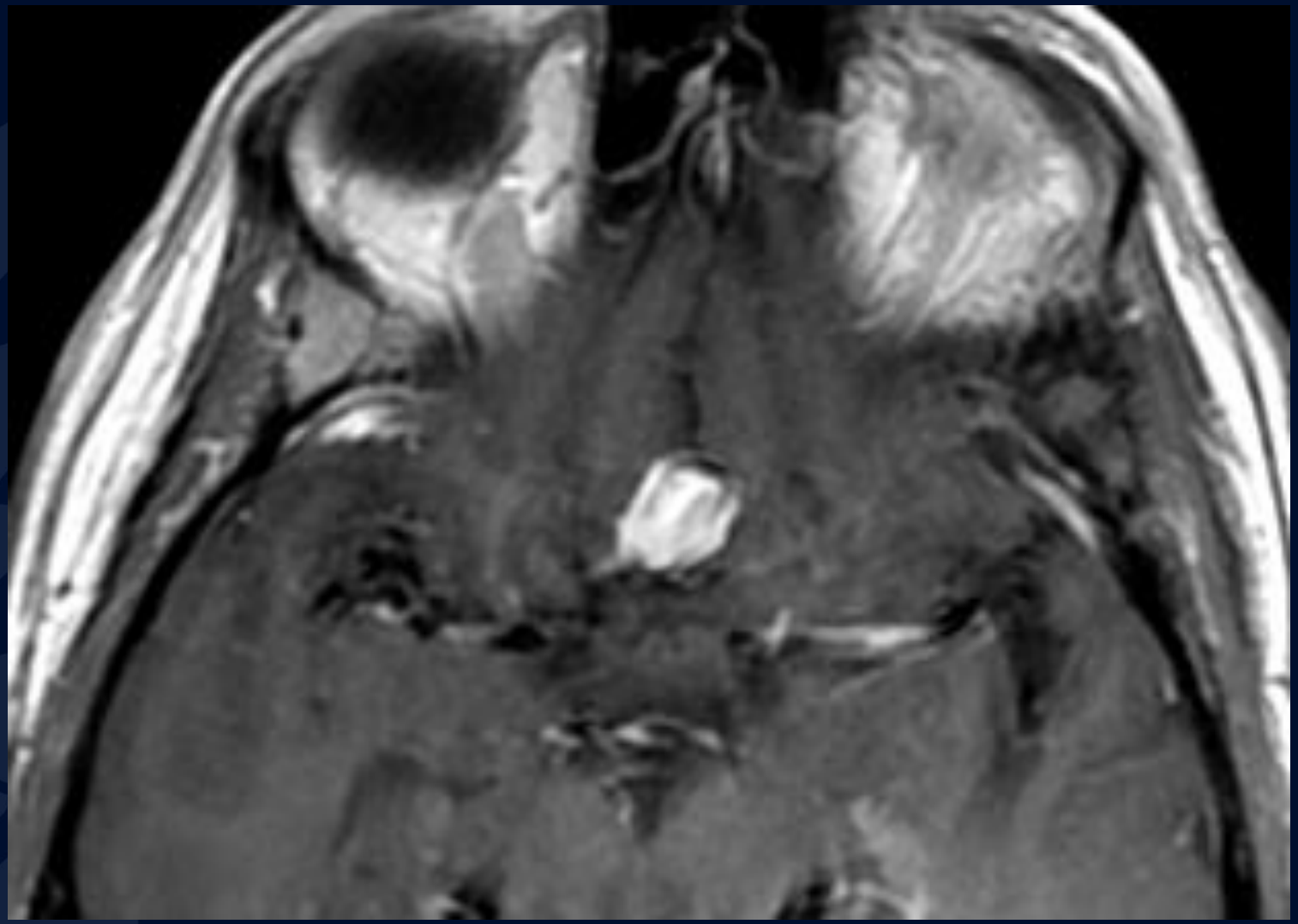
63M w/ Lung Cancer for Staging

Andrew Klufas, MD
Roman Klufas, MD

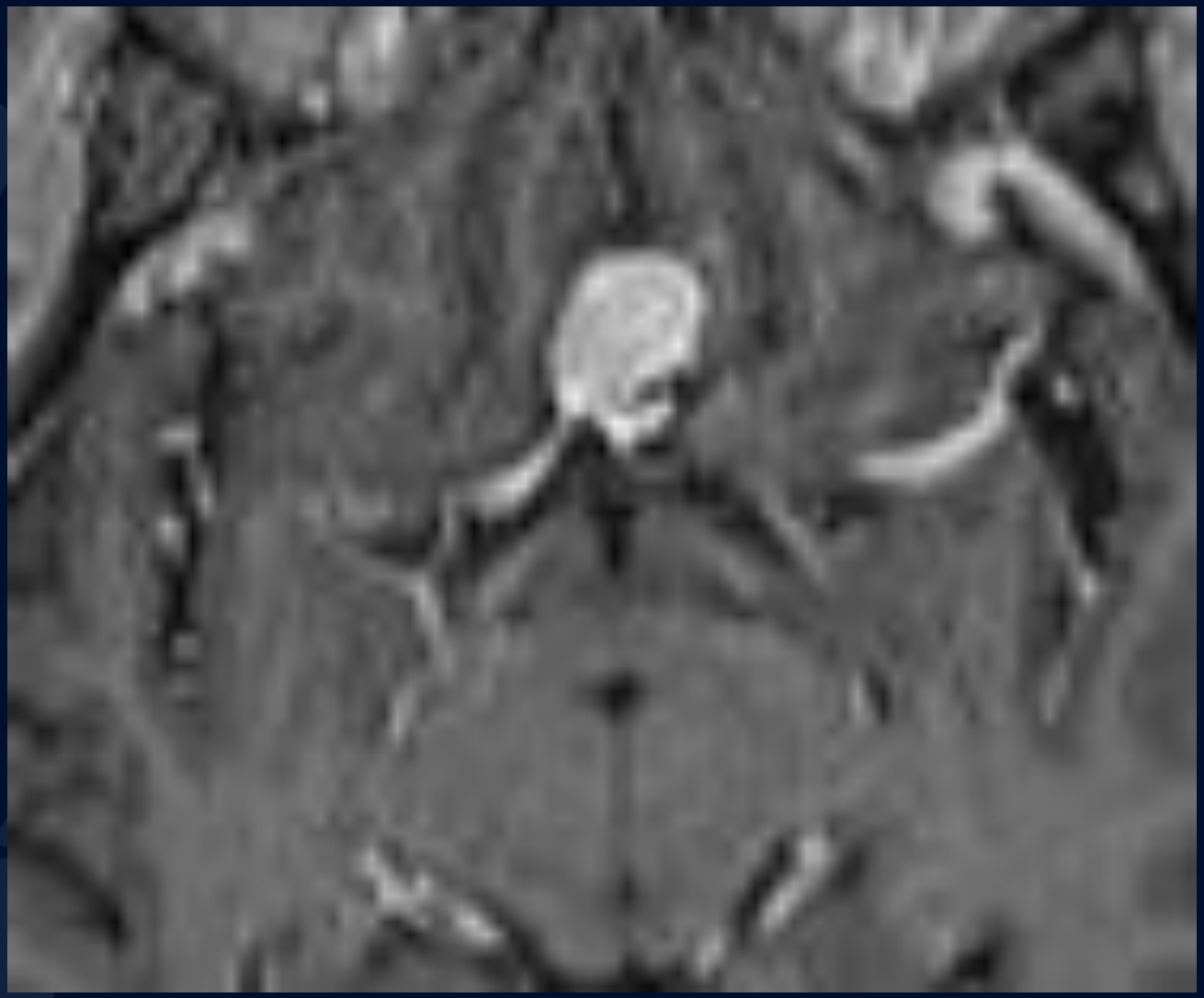
UCONN HEALTH
RADIOLOGY

Axial Gd-T1 MRI



UCONN HEALTH
RADIOLOGY

Axial Gd-T1 MRI (Volumetric)



UCONN HEALTH
RADIOLOGY

?

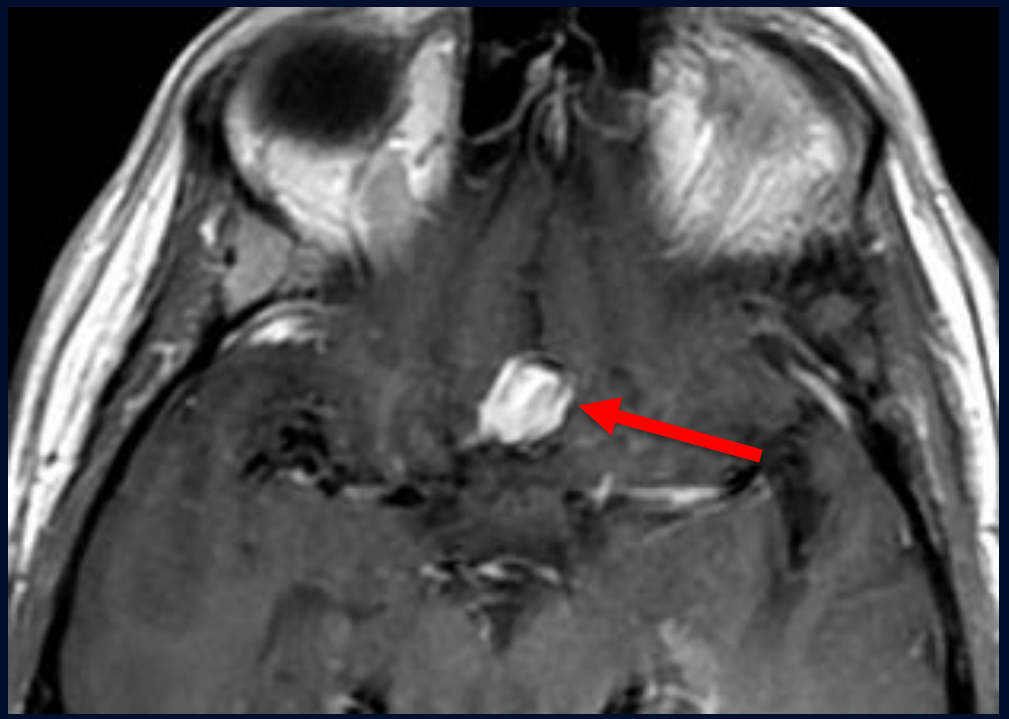
UCONN HEALTH
RADIOLOGY

Anterior Communicating Artery Aneurysm

UCONN HEALTH
RADIOLOGY

Axial MRI Brain (w/ Contrast)

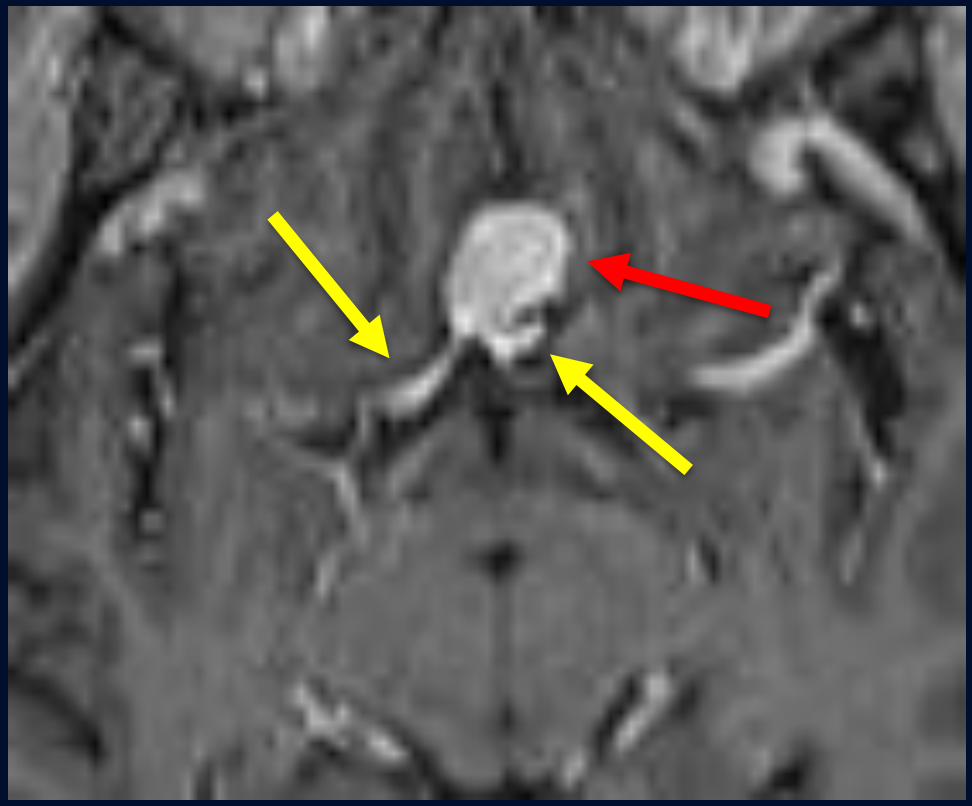
- Enhancing lesion noted (red arrow)



UCONN HEALTH
RADIOLOGY

Axial MRI Brain (w/ Contrast)

- Enhancing lesion is better seen on volumetric (thin section) Gd-T1 (red arrow)
- Lesion is seen to be connected to the anterior cerebral artery A1 segment, bilaterally (yellow arrows)
- These features are typical of an anterior communicating artery aneurysm rather than a metastasis



UCONN HEALTH
RADIOLOGY

Anterior Communicating Artery Aneurysm

Associations: Atherosclerosis, Congenital, HTN, Fibromuscular Dysplasia, Hereditary Connective Tissue Disorders (i.e. Marfans, Ehlers-Danlos), Trauma, and Iatrogenic Causes

Terminology: Saccular (“berry”) aneurysms are intracranial lesions with a distinctive, round shape and the most common cause of non-traumatic subarachnoid hemorrhage

Important Complication: Rupture with Subarachnoid Hemorrhage

UCONN HEALTH
RADIOLOGY

Anterior Communicating Artery Aneurysm

Imaging (Specific to Saccular Aneurysms)

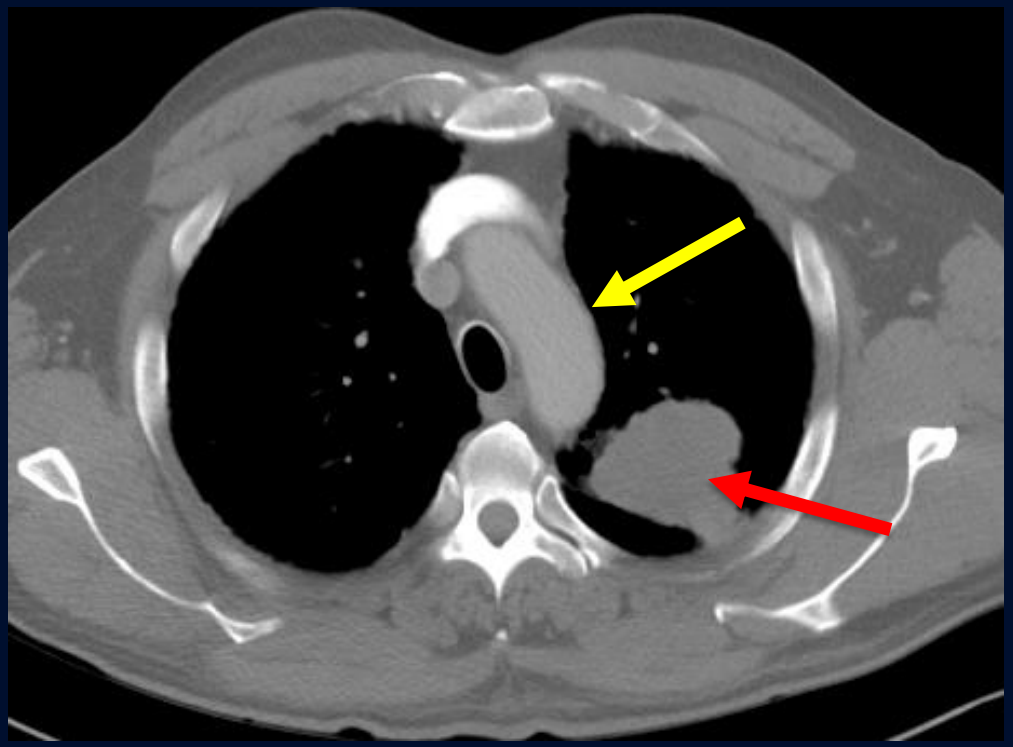
- **MRI**: Patent and thrombosed aneurysms will display different imaging features
  - T1 imaging will appear as ”flow void” or may show heterogenous signal intensity
    - Thrombosed aneurysm appearance will depend on age of clot
  - T2 imaging typically shows hypointensity-”flow void”
- **CT**: Presentation dependent upon the presence of thrombosis within an aneurysm
  - Contrast administration will cause bright and uniform enhancement with rim enhancement seen if thrombosed
  - Calcification can be present

Rarity: 0.2-8.9% of the population has an asymptomatic aneurysms, with 15-30% of these patients having multiple aneurysms on angiography

UCONN HEALTH
RADIOLOGY

Axial Chest CT (w/ Contrast)

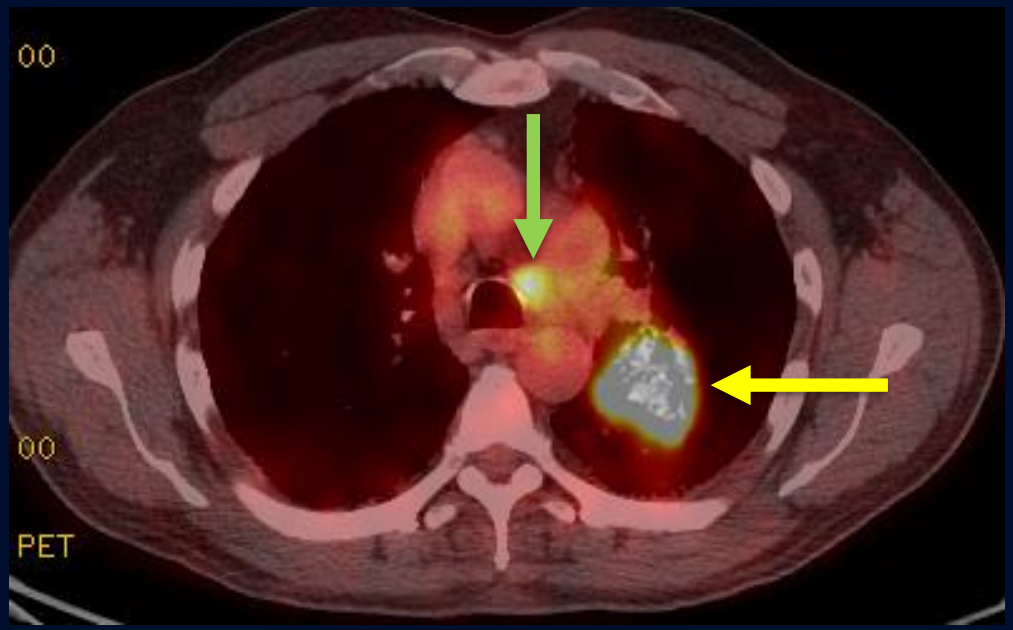
- Patient's chest CT revealed irregularly shaped isodense lesion in the left posterior lung field without enhancement (red arrow) seen at the level of the aortic arch (yellow arrow)
  - Wall attachment also noted just below red arrow
- This is the primary site of lung cancer in this patient



UCONN HEALTH
RADIOLOGY

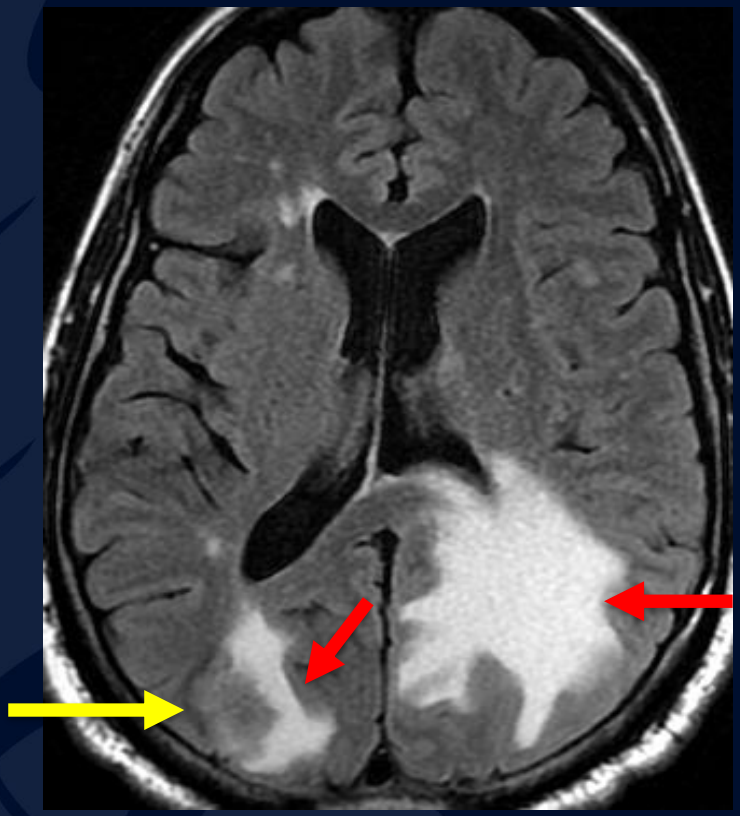
Axial FDG-PET CT (w/ Contrast)

- PET revealed heterogenous mass (yellow arrow) with increased FDG avidity seen just below the level of the aortic arch
  - View is slightly inferior to previous image
- Additionally there is a paratracheal FDG avid lymph node (green arrow)



UCONN HEALTH
RADIOLOGY

Axial FLAIR and T1-Gd Brain MRIs



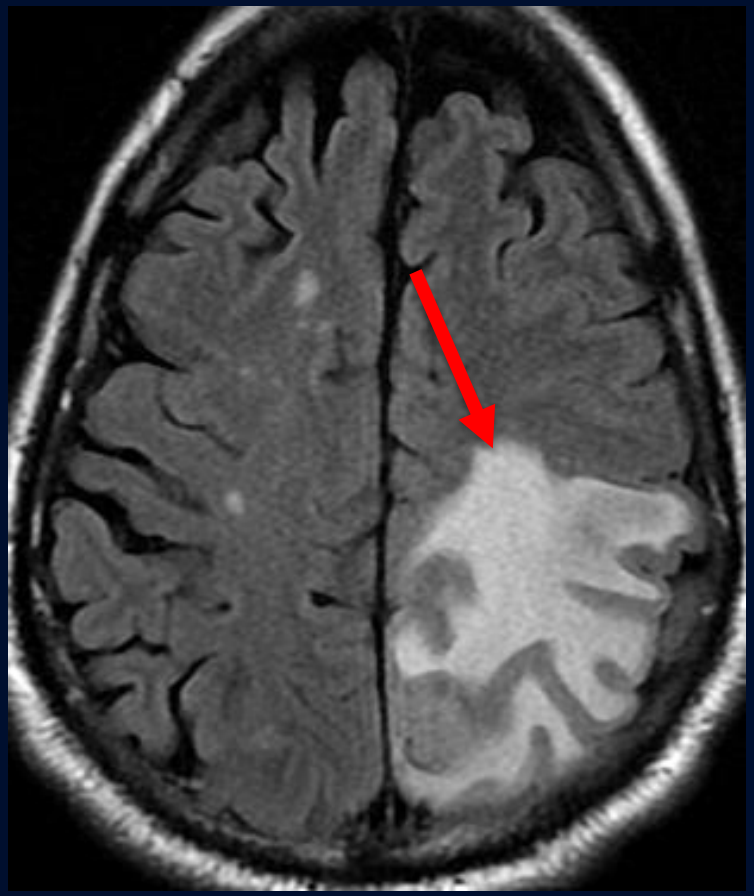
Isointense lesion (yellow arrow) shows area of metastasis and hyperintensities (red arrows) demonstrate vasogenic edema within both parietal lobes.

Postcontrast imaging demonstrates the metastatic focus (green arrow) at grey-white junction within the parietal lobe

UCONN HEALTH
RADIOLOGY

Axial T1-Gd and FLAIR Brain MRIs

Left parietal enhancing lesion with region of necrosis (yellow arrow)



Extensive vasogenic edema also noted within the parietal lobe (red arrow)

UCONN HEALTH
RADIOLOGY

Brain Metastasis

Causes: 80% of all brain metastasis is the result of the following cancers

- Lung Cancer
- Breast Cancer
- Melanoma
- Renal Cell Carcinoma
- Gastrointestinal Tract Adenocarcinoma

Patient Presentation: Although 60-75% of patients are asymptomatic, symptoms may include headaches, seizures, changes in mental status, ataxia, nausea and vomiting, and visual disturbances

UCONN HEALTH
RADIOLOGY

Brain Metastasis

Imaging:

- **MRI**: Gadolinium enhanced MRI is the gold standard for detecting intracranial metastasis
  - We specifically look for Gd-enhancing lesions with associated vasogenic edema (which may or may not be present)
    - Non-contrast studies may miss small, metastatic lesions
  - T1 typically shows iso- or hypo-intense lesions with contrast enhancement
    - Hemorrhagic and non-hemorrhagic lesions are usually high signal
  - T2 and FLAIR typically show hyperintense

Clinical Pearls: Multiple lesions most likely indicate the need to identify a primary cancer within a patient

In this patient, despite the history and presence of metastases, the imaging feature of the aneurysm led to the correct diagnosis

UCONN HEALTH
RADIOLOGY

References

- Faluk M, De Jesus O. Saccular Aneurysm. [Updated 2021 Aug 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557867/
- D'Souza D, Rasuli B. Saccular cerebral aneurysm. Reference article, Radiopaedia.org. https://doi.org/10.53347/rID-986
- Amsbaugh MJ, Kim CS. Brain Metastasis. [Updated 2021 Aug 7]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470246/
- Orton T, Gaillard F. Brain metastases. Reference article, Radiopaedia.org. https://doi.org/10.53347/rID-4924
- Citation: Klufas A, Klufas R. Anterior Communicating Artery Aneurysm. Radiology Online. 2021

UCONN HEALTH
RADIOLOGY