

MIMICS OF ACUTE INTRACRANIAL HEMORRHAGE ON CT OF THE BRAIN IN THE ACUTE SETTING-SEPARATING THE GOOD, THE BAD, AND THE UGLY

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There are no conflicts of interest or relevant disclosures.

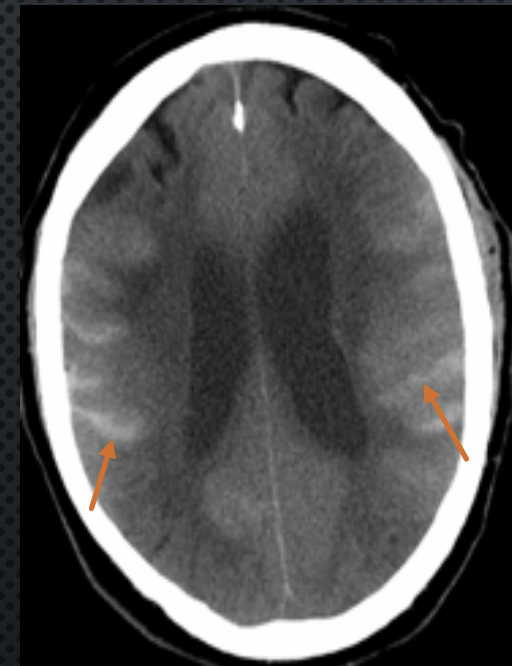


Goals and Objectives:

- Demonstrate the variety of intracranial pathology that may mimic acute intracranial hemorrhage on non-contrast CT of the brain through several example cases
- Briefly describe the utility of dual energy CT in distinguishing intracranial hemorrhage from non-hemorrhagic etiologies

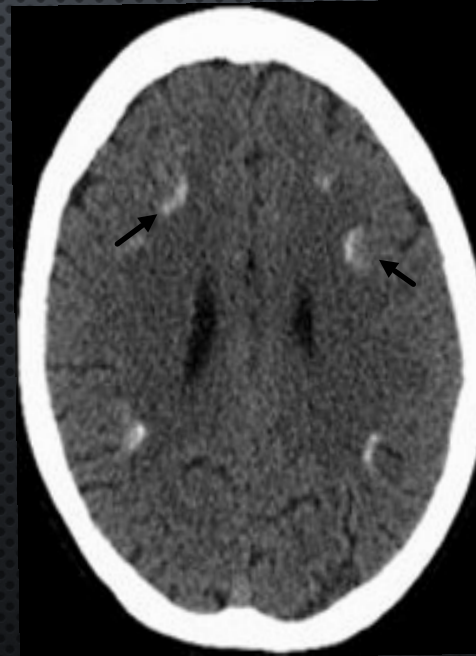
Background: Intracranial hemorrhage is readily identified by regions of increased attenuation in characteristic locations and patterns. However, not all hyperdense intracranial lesions on CT represent acute hemorrhage. Many additional pathological entities of varying acuity may also appear hyperdense and mimic hemorrhage. The following cases briefly demonstrate the breadth of acute hemorrhagic mimics potentially encounterable in the emergent setting on noncontrast CT.

Subarachnoid Contrast



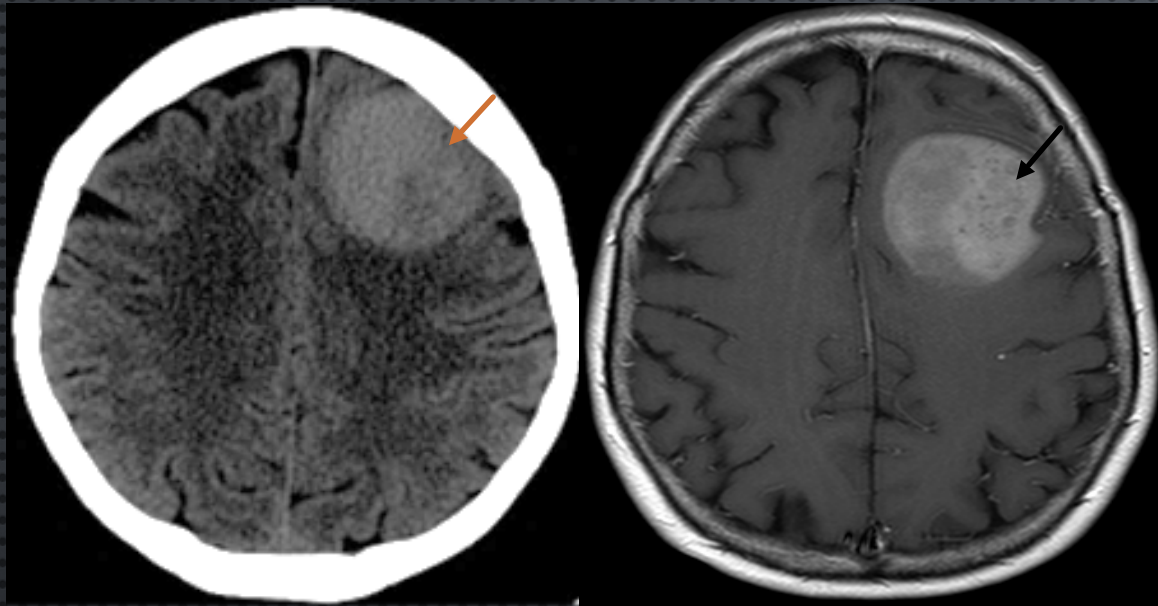
Bihemispheric increased sulcal attenuation (orange arrows) in this patient who recently was administered intrathecal contrast for myelography unbeknownst to the ED and radiologist.

Parenchymal Calcifications



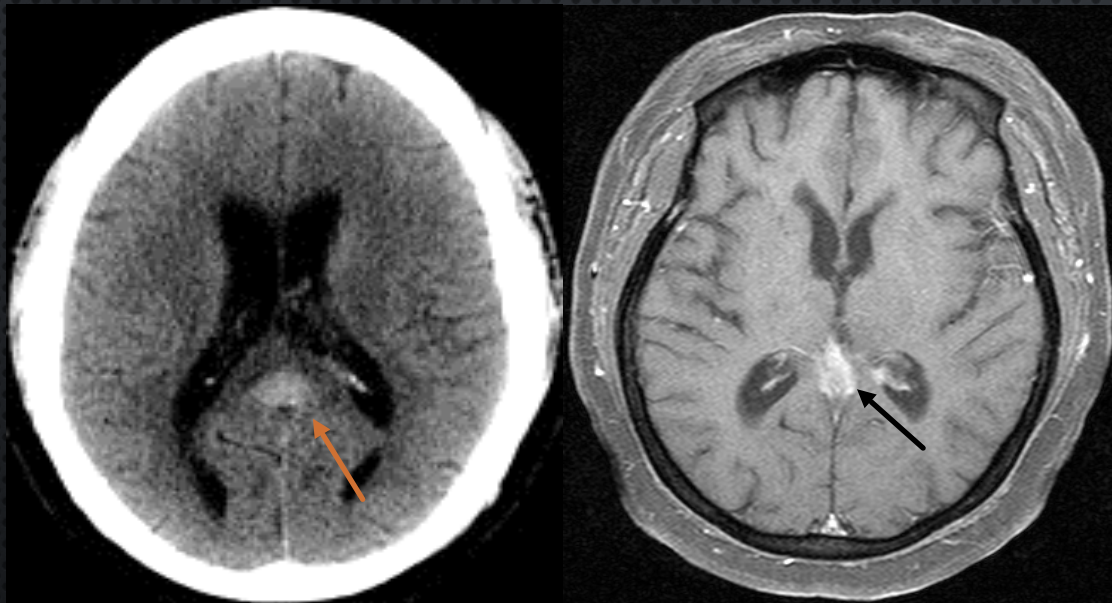
Trauma patient with curvilinear hyperdensities in the subcortical white matter (black arrows) characteristic of mineralizing microangiopathy in the setting of remote CNS chemoradiation.

Hypercellular Neoplasm



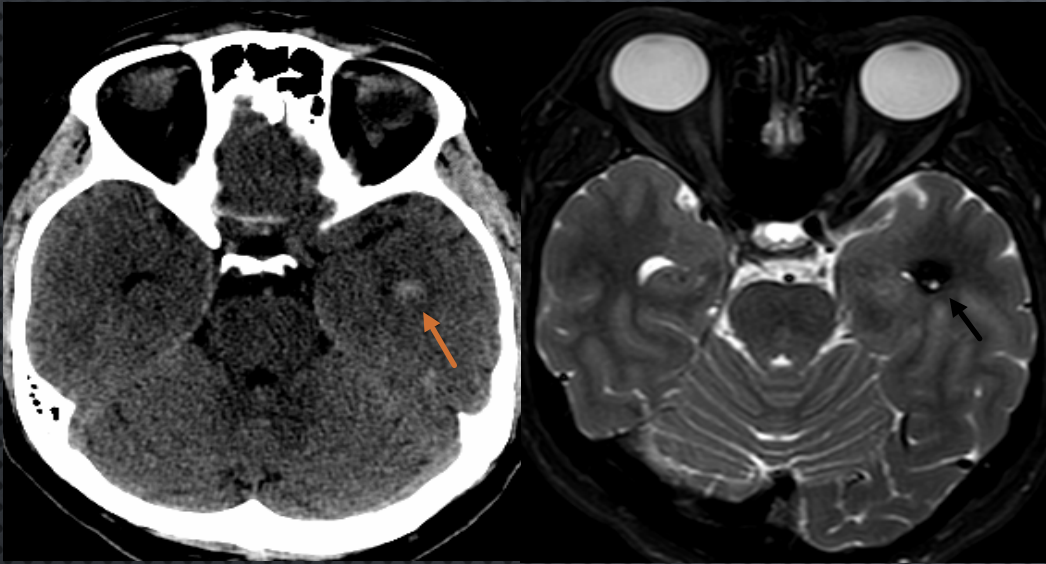
Left frontal "hemorrhage" (orange arrow) in a patient with AMS subsequently shown to represent avidly enhancing mass on T1 MRI (black arrow) in a patient with CT hyperdense CNS lymphoma. Mass was suspected on CT given the lack of significant surrounding vasogenic edema.

Subarachnoid Inflammation/Infection



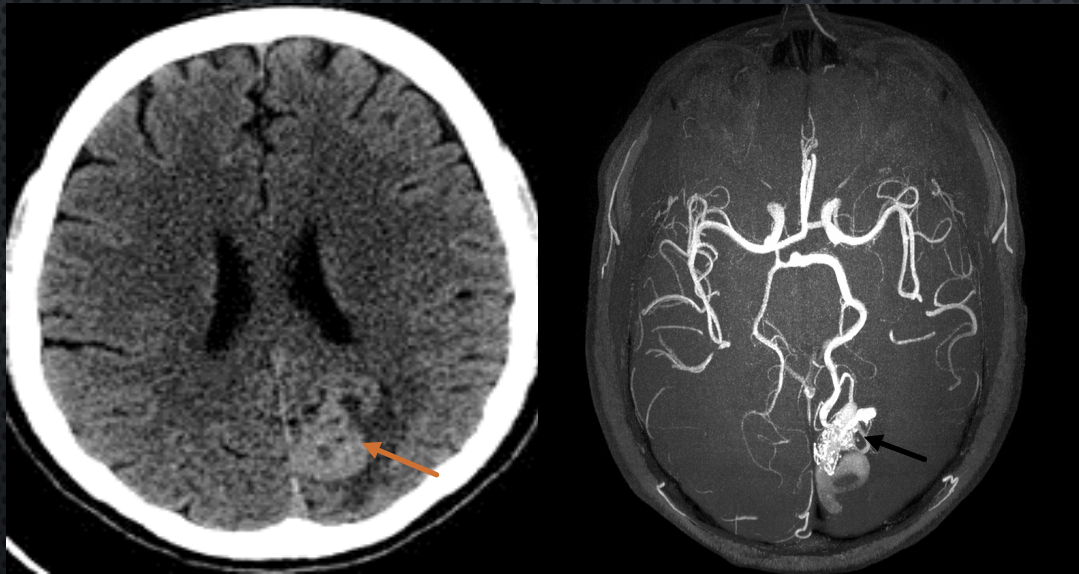
Pineal region "subarachnoid hemorrhage" (orange arrow) in a non-traumatic ED patient with multiple neurological deficits shown to represent avidly enhancing leptomeningeal sarcoidosis on subsequent T1 MRI (black arrow) and with further clinical testing.

Vascular Lesions



Left temporal "hemorrhage" in minor trauma patient on CT (orange arrow) shown to represent a typical cavernous malformation on subsequent T2-weighted MRI (black arrow). Atypical location of "hemorrhage" in a minor trauma patient should raise suspicion of a hyperdense lesion and prompt MR imaging.

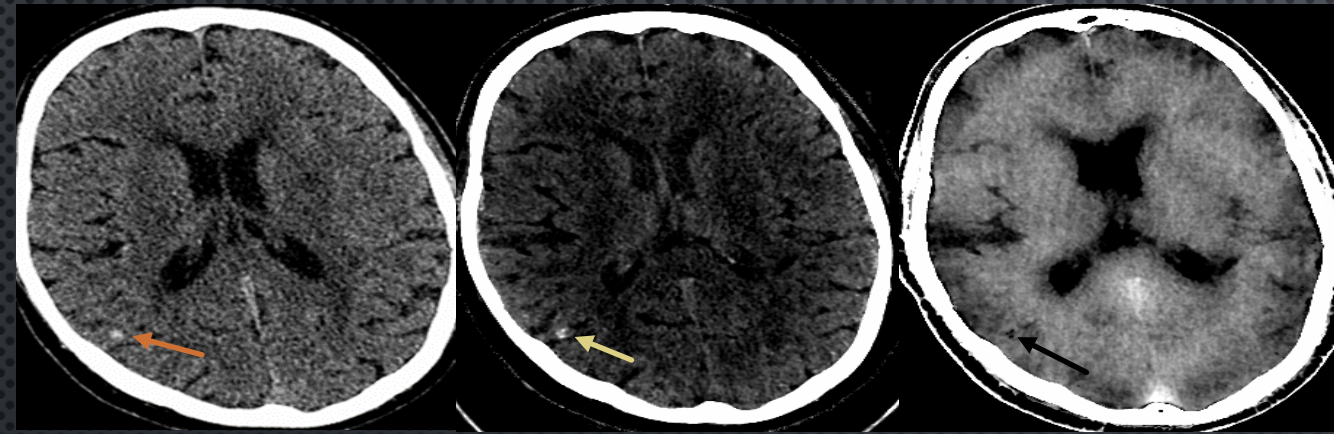
Vascular Lesions



Left parieto-occipital lobar hemorrhage or hemorrhagic mass on CT (orange arrow) in young ED patient with headache represents an AVM by MRA (black arrow). Unusual lobar location of hemorrhage in a young patient should prompt further characterization for underlying lesion.

Troubleshooting with Dual Energy CT:

Spectral imaging applicable in distinguishing acute hemorrhage from benign calcified lesions.



Spectral imaging confirms that a suspected small hemorrhage on CT (orange arrow) in an ED patient disappears on calcium map (non-calcium map yellow arrow, calcium map black arrow) and represents benign parenchymal calcification. Confirmation precludes further testing and hospital admission.

References:

1. Grajo JR, Patino M, Prochowski A, Sahani DV. Dual energy CT in practice: Basic principles and applications. *Appl Radiol*. 2016;45(7):6-12.
2. Lin, Chun-Yu et al. Pseudo-Subarachnoid Hemorrhage: A Potential Imaging Pitfall. *Canadian Association of Radiologists Journal*, Volume 65, Issue 3, 225 – 231.
3. Heit JJ, Iv M, Wintermark M. Imaging of Intracranial Hemorrhage. *J Stroke*. 2017;19(1):11–27. doi:10.5853/jos.2016.00563