

AMSER Case of the Month

November 2025

63yoM presented post cardiac arrest

Uyen Nguyen, MS4

UC San Diego School of medicine

Nikdokht Farid, MD

Professor of Radiology, Division of Neuroradiology

Patient Presentation

- **HPI:** 63yoM with PMHx of hepatocellular carcinoma and decompensated cirrhosis complicated by recurrent ascites, presented from home hospice status-post asystolic cardiac arrest after being found underwater in bathtub. Upon arrival, he was in normal sinus rhythm, intubated, and on vasopressors.
- **Vitals:** BP 61/36, P 38, T 96.8F, SpO2 96%.
- **Physical exam:** pertinent for unresponsive, GCS 3, unreactive 3mm-pupils bilaterally, scleral icterus, jaundice, distended abdomen with fluid wave and shift.

Pertinent Labs

- **Lactate:** 7.1 (H)
- **BMP:** Na 121 (L), K 5.7 (H), Cr 1.36 (H), BUN 25 (H), Anion Gap 22 (H)
- **VBG:** pH 7.03 (L), pCO₂ 64 (H), pO₂ 107, lactate 10.2 (H)
- **Ammonia:** 229 (H)
- **Coagulation studies:** PTT 46, PT 20.5, INR 1.8
- **CBC:** WBC 8.2, Hb 7.2 (L), Pt 121 (L)
- **Cardiac enzyme studies:** Troponin 15, CPK 65, CK-MB 2
- **Blood culture:** No growth in 48hrs

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

American College of Radiology
ACR Appropriateness Criteria®
Altered Mental Status, Coma, Delirium, and Psychosis

Variant 1: Adult. Altered mental status. Suspected intracranial pathology or focal neurologic deficit. Initial imaging.

| Procedure | Appropriateness Category | Relative Radiation Level |
|---------------------------------------|--------------------------|--------------------------|
| CT head without IV contrast | Usually Appropriate | ⊕⊕⊕ |
| MRI head without and with IV contrast | May Be Appropriate | ○ |
| MRI head without IV contrast | May Be Appropriate | ○ |
| MRI head with IV contrast | Usually Not Appropriate | ○ |
| CT head with IV contrast | Usually Not Appropriate | ⊕⊕⊕ |
| CT head without and with IV contrast | Usually Not Appropriate | ⊕⊕⊕ |

This imaging modality was ordered by the ER physician



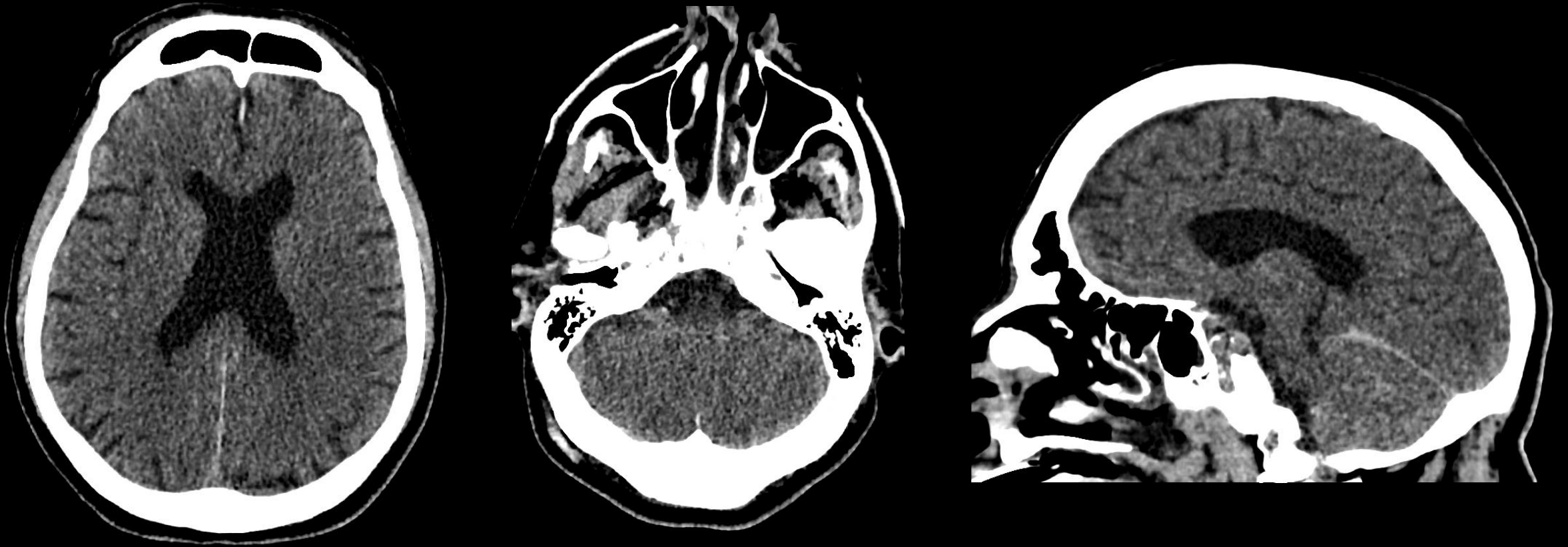
Findings (unlabeled)



Findings (unlabeled)



Findings (labeled)



Diffuse hypoattenuation and ill-defined gray-white matter differentiation throughout the bilateral cerebral and cerebellar hemispheres

Findings (labeled)



Apparent **hyperdensity** along the **falx and tentorial leaflets** is secondary to hypoattenuation of the adjacent brain parenchyma

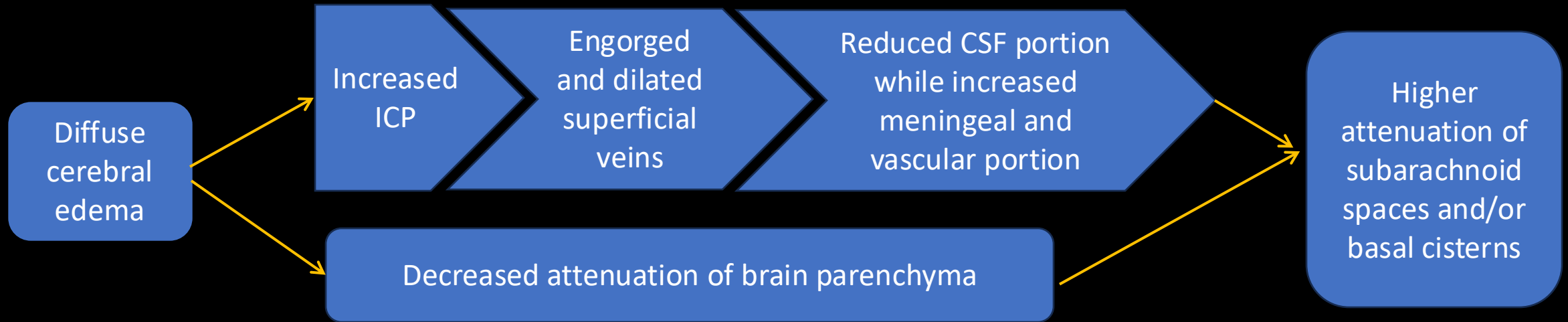
Final Dx:

Anoxic brain injury

Case Discussion

- CT head is commonly performed following cardiac arrest to exclude causes of neurological impairment and assess for cerebral edema ¹.
- Cytotoxic edema, caused by neuronal swelling from brain hypoxia, reduces grey matter density while sparing white matter, resulting in a blurred grey-white matter interface ¹.
- Diffuse cerebral edema can cause increased attenuation in subarachnoid spaces or basal cisterns on CT, resembling acute subarachnoid hemorrhage (SAH), a phenomenon known as pseudo-SAH ^{2,3}.

Case Discussion



- Attenuation in pseudo-SAH is lower (30–40 HU) than in true SAH (60–70 HU) due to intact dilated vessels rather than ruptured vasculature ⁴.
- In addition to anoxic brain injury, pseudo-SAH may also be seen in meningitis, venous sinus thrombosis, and intrathecal contrast ⁴.

Case Discussion

- Post-cardiac arrest brain injury following resuscitation is the leading cause of death and long-term disability in survivors ¹.
- An observational study found early head CT signs of hypoxic-ischemic brain injury in 29% of post-cardiac arrest patients, with only 1% achieving favorable neurological outcomes ⁵.
- Identifying patients with poor prognosis is essential for informed decisions on continuing or withdrawing life-sustaining treatment ⁶.
- In our case, after a thorough Goal-of-care discussion outlining his poor prognosis, comfort care was initiated.

References

1. Sandroni C, Cronberg T, Sekhon M. Brain injury after cardiac arrest: pathophysiology, treatment, and prognosis. *Intensive Care Med.* 2021;47(12):1393-1414. doi:10.1007/s00134-021-06548-2
2. Lewis O, Afreen S, Folaranmi S, Fidelia-Lambert M, Poddar V, Thomas A. Anoxic Brain Injury Presenting as Pseudosubarachnoid Hemorrhage in the Medical Intensive Care Unit. *Case Rep Crit Care.* 2017;2017:9071482. doi:10.1155/2017/9071482
3. Given CA 2nd, Burdette JH, Elster AD, Williams DW 3rd. Pseudo-subarachnoid hemorrhage: a potential imaging pitfall associated with diffuse cerebral edema. *AJNR Am J Neuroradiol.* 2003;24(2):254-256
4. Ramanathan RS. Pseudo-subarachnoid Hemorrhage Sign. *Ann Indian Acad Neurol.* 2018;21(1):83-84. doi:10.4103/aian.AIAN_152_17
5. Schick A, Prekker ME, Kempainen RR, et al. Association of hypoxic ischemic brain injury on early CT after out of hospital cardiac arrest with neurologic outcome. *Am J Emerg Med.* 2022;54:257-262. doi:10.1016/j.ajem.2022.02.003
6. Perkins GD, Callaway CW, Haywood K, et al. Brain injury after cardiac arrest. *Lancet.* 2021;398(10307):1269-1278. doi:10.1016/S0140-6736(21)00953-3