

# AMSER Case of the Month

## February 2021

32-year-old female unrestrained driver involved in  
MVA with ejection

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# Patient Presentation

- HPI: 32 yo F with unknown PMH who was an unrestrained driver involved in **MVC rollover with ejection, GCS 8 at the time of EMS arrival**. Her eyes were closed and she was moaning incomprehensibly. She was **moving purposefully on the right side more than the left side**. She was taken to OSH where she was intubated and unable to verbalize.
- Exam: **Left scalp hematoma with bogginess, GCS 7T**, PERRL, moves right upper and lower extremities spontaneously and purposefully, **does not move left hemi body to painful stimulation**.
- Labs: Hgb 11.4, WBC 17.53, Na<sup>+</sup> 161, K<sup>+</sup> 2.9, Glucose 158

What Imaging Should We Order?

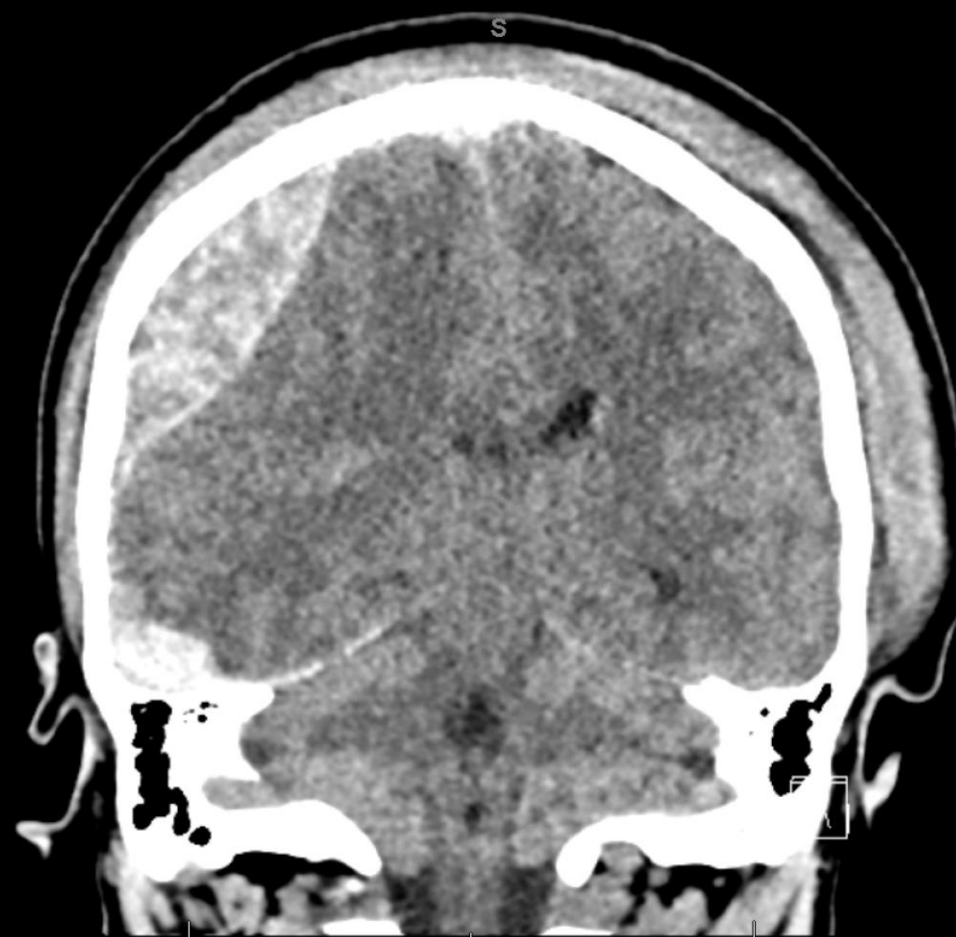
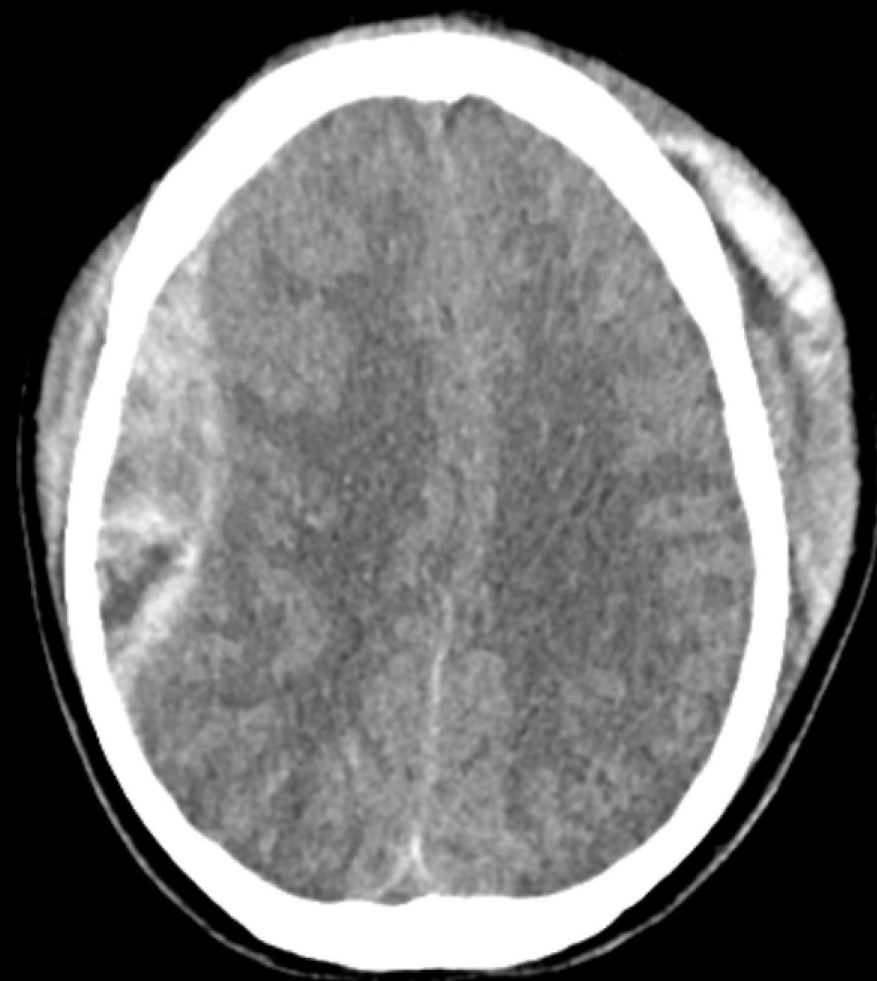
# Select the applicable ACR Appropriateness Criteria

**Variant 2: Major blunt trauma. Hemodynamically stable. Not otherwise specified. Initial imaging.**

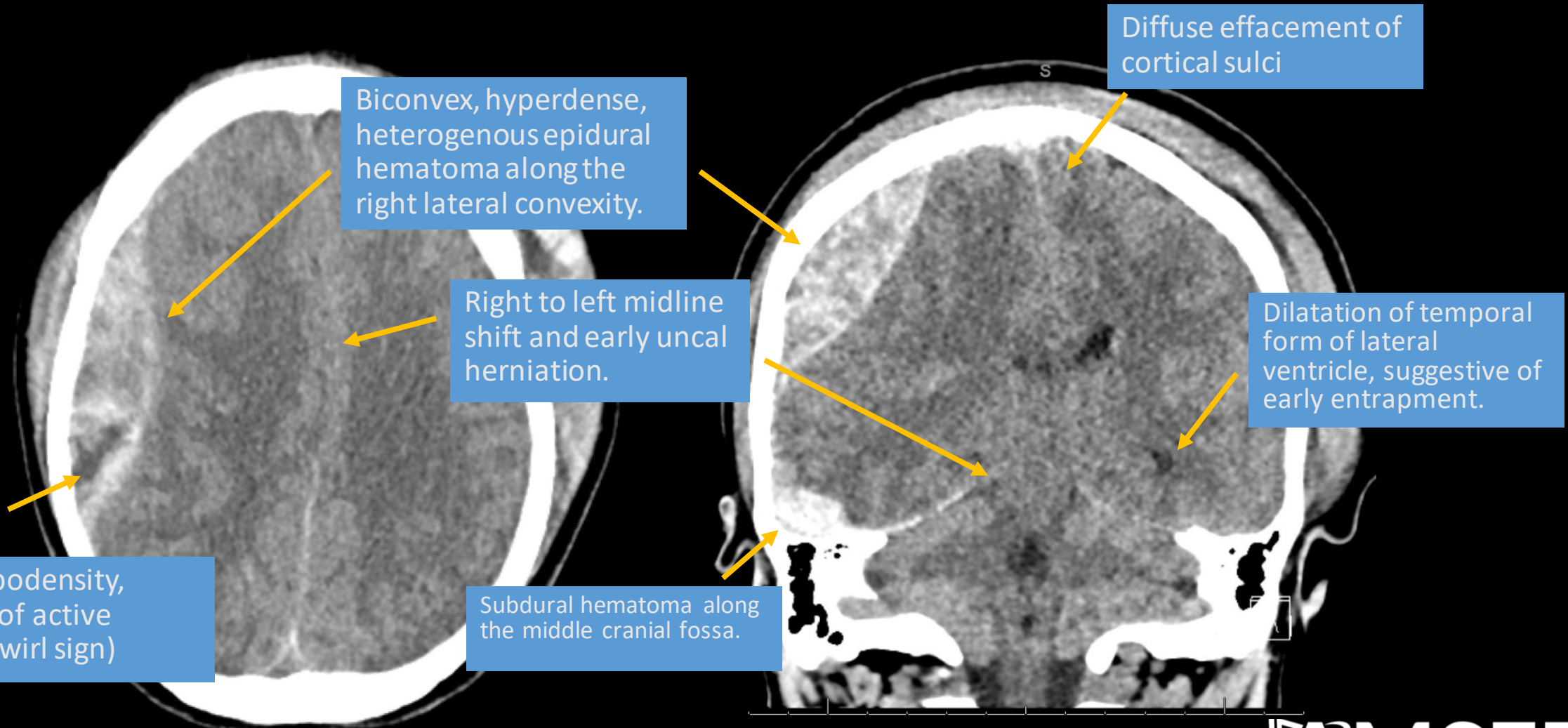
Procedure	Appropriateness Category	Relative Radiation Level
CT whole body with IV contrast	Usually Appropriate	⊕⊕⊕⊕
Radiography trauma series	Usually Appropriate	⊕⊕⊕
US FAST scan chest abdomen pelvis	Usually Appropriate	○
CT whole body without IV contrast	May Be Appropriate	⊕⊕⊕⊕
Fluoroscopy retrograde urethrography	Usually Not Appropriate	⊕⊕⊕
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	○
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	○

These imaging modalities were ordered by the ER physician

# CT Head WO IV Contrast



# CT Head WO IV Contrast



## Final Diagnosis:

Combined Epidural and Subdural Hematomas  
with subfalcine and uncal herniation

# Epidural Hematoma (EDH)

- Collection of blood in the potential space between the inner table of the skull and the outer (periosteal) layer of the dura mater.
- About 10% of patients hospitalized for traumatic brain injury (TBI) are found to have EDH.
- Higher incidence in adolescents and young adults; in advanced age, dura becomes more adherent to overlying bone, making EDH less common.
- Most common cause is middle meningeal artery disruption, although up to 10% of cases are venous in origin following a dural venous sinus laceration.



# Clinical Findings

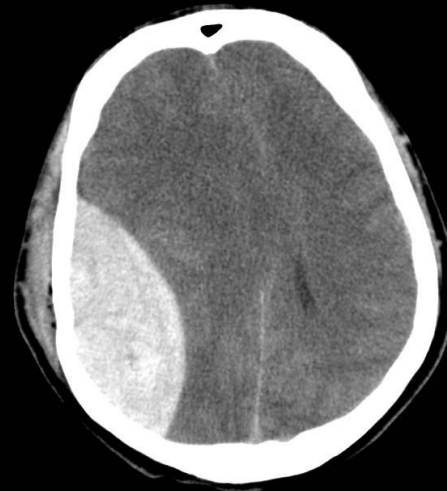
- Classic presentation is initial loss of consciousness, followed by transient complete recovery (lucid interval), then rapid progression of neurological decline.
- Signs of elevated intracranial pressure may be seen with rapidly enlarging EDH. These include hypertension, bradycardia, and irregular breathing (Cushing triad), as well as ipsilateral pupil dilation secondary to uncal herniation.

# Imaging Findings and Classification

- Biconcave hyperattenuating collection on non-contrast CT.
- Does not cross suture lines.
- Areas of low density (“swirl sign”) indicates active bleeding.

## Type 1: Acute

Within 1<sup>st</sup> 24 hours, hyperdense associated with clotted blood.



Case courtesy of Dr Sandeep Bhuta, Radiopaedia.org, rID: 4458

## Type 2: Subacute

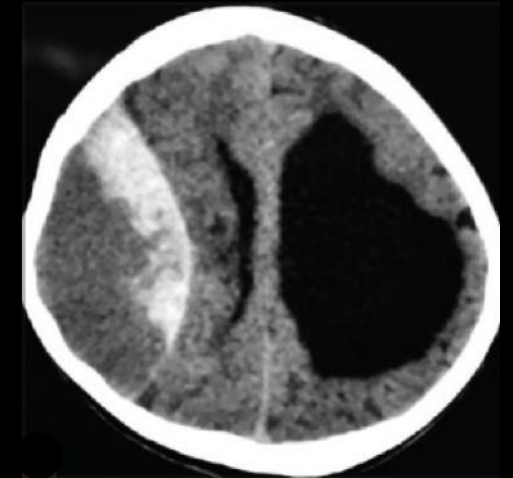
Between 2 and 4 days, usually less dense.



Case courtesy of Dr Fakhry Mahmoud Ebouda, Radiopaedia.org, rID: 28001

## Type 3: Chronic (Rare)

Between 7 and 20 days. Mixed or lucent appearance with dural calcification and/or contrast enhancement.



Bishnoi et al., 2019

# Management and Prognosis

- EDH is a neurosurgical emergency; intervention is required within 1 to 2 hours of presentation.
- Surgical intervention recommended in acute EDH, hematoma > 30 mL, and GCS < 9 with pupillary abnormalities.
- Preferred treatment is craniotomy and hematoma evacuation; however, burr hole evacuation can be performed.
- Excellent prognosis with rapid surgical evacuation; morbidity and mortality increase with delayed diagnosis and treatment.

# References:

- Bishnoi S, Bishnoi I, Gahlawat N, Saini V. Ipsilateral Two Spontaneous Chronic Calcified Epidural Hematoma. *Asian J Neurosurg*. 2019;14(3):1048-1049. doi:10.4103/ajns.AJNS\_199\_17
- Kabbani A, Gaillard F. Extradural hemorrhage. Radiopaedia website. Accessed October 17, 2020. <https://radiopaedia.org/articles/extradural-haemorrhage?lang=us>
- Khairat A, Waseem M. Epidural Hematoma. 2020 Aug 8. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan–. PMID: 30085524.