

A 12-year-old boy is brought to the emergency department due to progressive headache and drowsiness. Earlier in the day while cycling with his family, the patient fell off his bicycle and hit his head on concrete. He was unresponsive for several seconds but spontaneously regained consciousness. The patient complained of mild pain at the injury site but otherwise was feeling well and could walk and talk normally. Several hours later, he started to experience progressive headache and vomiting and became somnolent. The patient has no medical problems and takes no medications. Blood pressure is 140/86 mm Hg and pulse is 66/min. He has a large bruise over the right temporal region. He is sleepy and requires constant painful stimuli to remain awake. The patient can follow simple instructions. On neurologic examination, the left pupil is 3 mm with normal pupillary reflex, but the right pupil is 8 mm and not reactive to light. Which of the following is the most likely diagnosis?

- ☐ A. Cerebral contusion
- ☐ B. Diffuse axonal injury
- ☐ C. Epidural hematoma
- ☐ D. Postconcussion syndrome
- ☐ E. Subdural hematoma

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- ☐ A. Cerebral contusion [1%]
- ☐ B. Diffuse axonal injury [1%]
- ☒ C. Epidural hematoma [88%]
- ☐ D. Postconcussion syndrome [1%]
- ☐ E. Subdural hematoma [9%]

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Explanation:

User Id: [redacted]

Epidural hematoma	
Pathogenesis	Trauma to sphenoid bone with tearing of middle meningeal artery
Clinical features	<ul style="list-style-type: none"><li>Brief loss of consciousness followed by lucid interval</li><li>Hematoma expansion leads to ↓ consciousness &amp; ↑ intracranial pressure (eg, headache, nausea/vomiting)</li></ul>
Diagnosis	Head CT: Biconvex (lens-shaped) hyper-density that does not cross suture lines



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Diagnosis	Head CT: Biconvex (lens-shaped) hyper-density that does not cross suture lines
Treatment	Urgent surgical evacuation for symptomatic patients

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This patient most likely has an **acute epidural hematoma (EDH)**, a condition resulting from accumulation of blood in the potential space between the cranium and dura mater. It most commonly occurs following traumatic injury to the **sphenoid bone**, resulting in laceration of the **middle meningeal artery**.

Patients may present with a brief period of unconsciousness followed by a **lucid interval**. As the hematoma rapidly expands, deterioration of consciousness and symptoms of **elevated intracranial pressure** (eg, nausea/vomiting, headache) arise. Failure to treat EDH emergently may result in worsening intracranial hypertension and **uncal herniation**. On examination, patients with uncal herniation have dilation of the pupil on the ipsilateral side of the lesion (due to **oculomotor nerve compression**) along with ipsilateral hemiparesis (due to contralateral crus cerebri compression). Emergent craniotomy should be performed in patients with focal neurologic deficits to prevent brain herniation and death.

**(Choice A)** Cerebral contusion is a bruise of brain tissue resulting from coup/contre-coup injuries. These are less likely to cause uncal herniation with focal neurologic deficits and typically heal without medical intervention.

**(Choice B)** **Diffuse axonal injury** is the result of traumatic acceleration/deceleration shearing forces that diffusely damage axons in the brain. Patients typically have coma, and head CT scan may show diffuse small bleeds at the grey-white matter junction.

**(Choice D)** Concussion is a form of mild traumatic brain injury typically associated with confusion and amnesia. It may involve loss of consciousness; however, elevated intracranial pressure and focal neurologic deficits are not typical and neuroimaging is usually normal.



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**(Choice E)** Acute **subdural hematoma** occurs secondary to tearing of the bridging veins with subsequent slow bleeding into the subdural space following a traumatic head injury. Symptoms of headache and confusion occur gradually (over 1-2 days) compared to those of EDH.

#### Educational objective:

Epidural hematoma occurs when blood accumulates between the cranium and dura mater due to sphenoid bone trauma with laceration of the middle meningeal artery. Patients classically present with a brief period of unconsciousness followed by a lucid interval. Rapid hematoma expansion leads to elevated intracranial pressure (eg, impaired consciousness, nausea/vomiting, headache) and uncal herniation (ipsilateral oculomotor nerve palsy).

#### References:

1. **Surgical management of acute epidural hematomas.**
2. **CT for acute stage of closed head injury.**



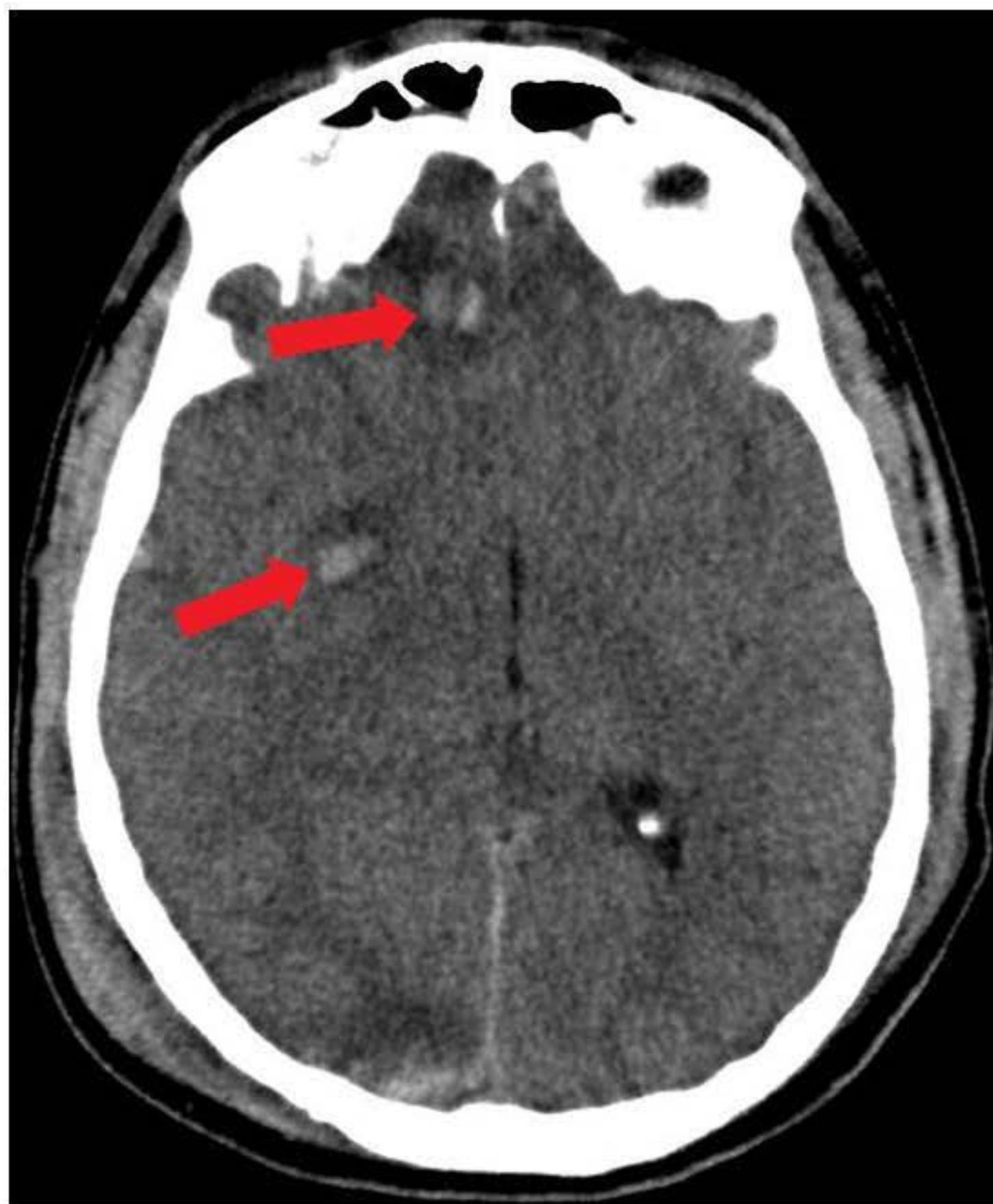
Media Exhibit

hematoma



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Shear Injury





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al hemorrhage

