

# RADY 401 Case Presentation

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# Focused patient history and workup

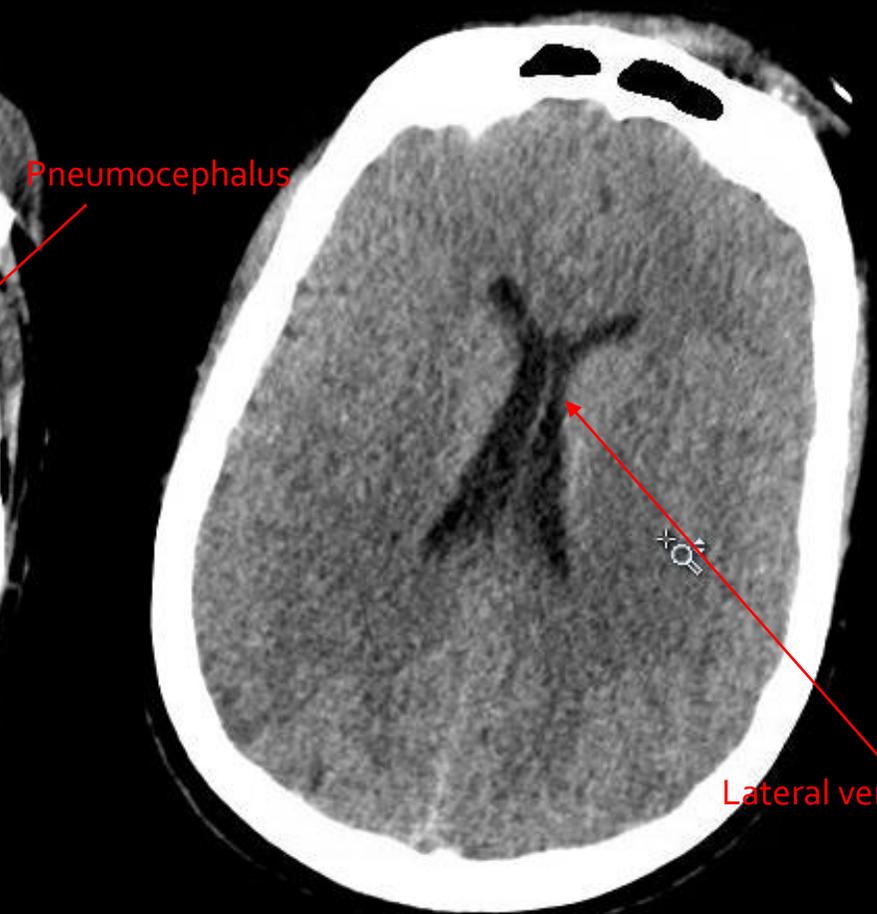
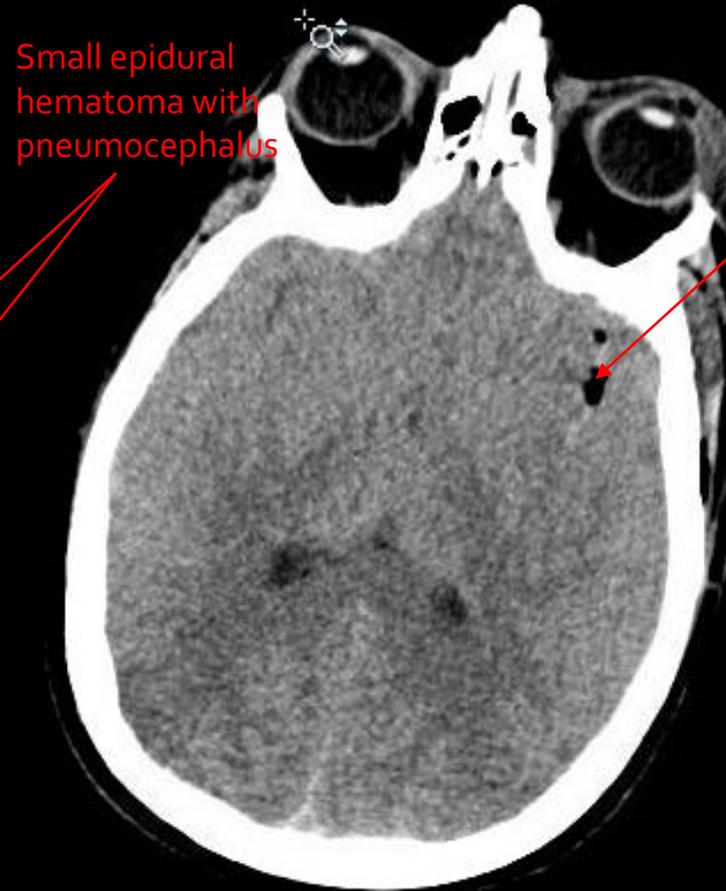
- Ms. SL is a 41 yo F with no pertinent PMH who presented as a trauma to the ED s/p MVC. She was a restrained driver in a pickup truck traveling 50-60 MPH that rear-ended a logging truck. Pt had initial loss of consciousness at the scene. On arrival to UNC, initial GCS was 13 and the pt was hemodynamically stable. Bleeding noted from forehead.
- VS remarkable for tachycardia only.
- Initial neuro exam: Pt oriented x1 w/ some confusion but able to briskly follow commands with intact cranial nerves and symmetric strength 4+ out of 5 bilaterally.

# List of imaging studies

- CT head without contrast
- CT cervical spine
- CT abdomen and pelvis with contrast
- CT maxillofacial without contrast
- XR chest
- XR pelvis

# Initial CT head wo contrast at 12:45 PM

## Axial CT head wo contrast



## Case cont.

- Reexamination approximately 2 hours later
- Pt more awake and following commands with 5 out of 5 strength, however she had a right pupil dilation from 3 mm to 5 mm
- Repeat CT head ordered

# Repeat CT head wo contrast at 4:00 PM

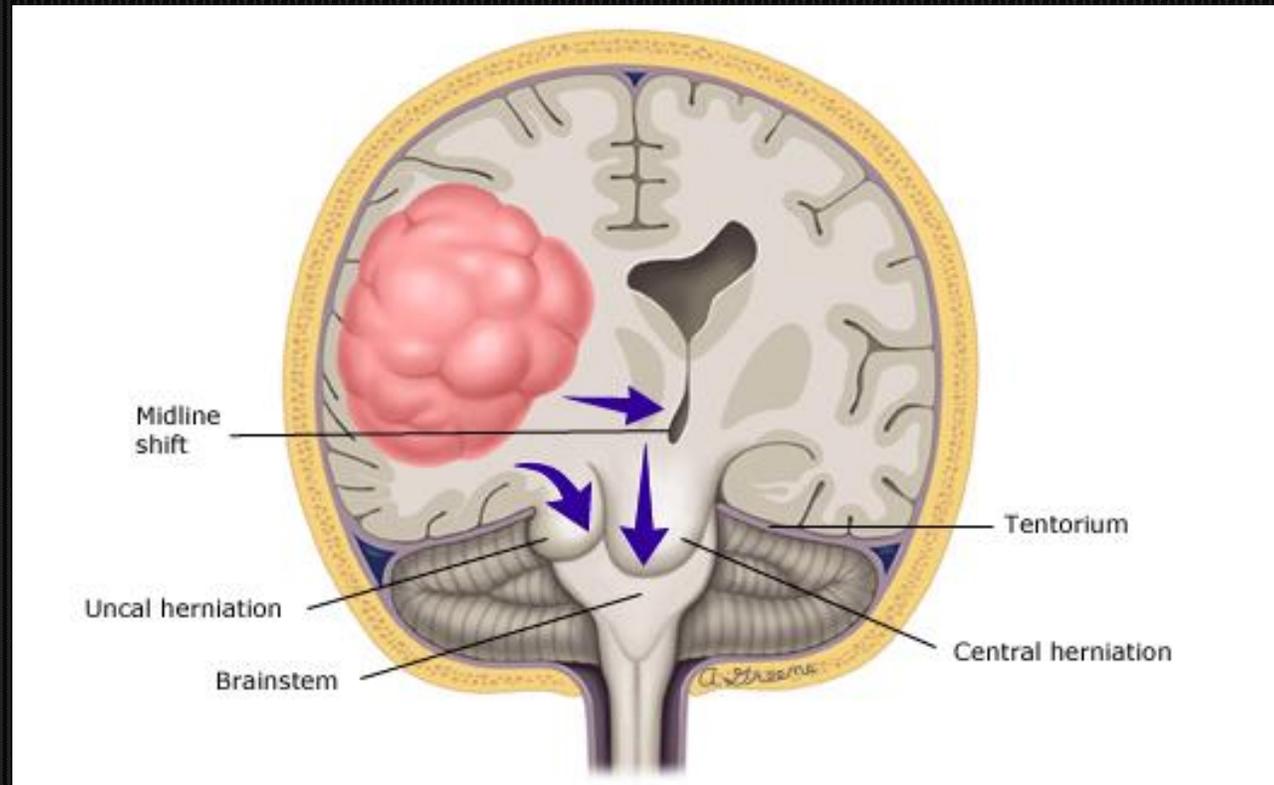
Axial CT head wo contrast

Expanding EDH

Mass effect/Herniation



# Cerebral Herniation illustrated

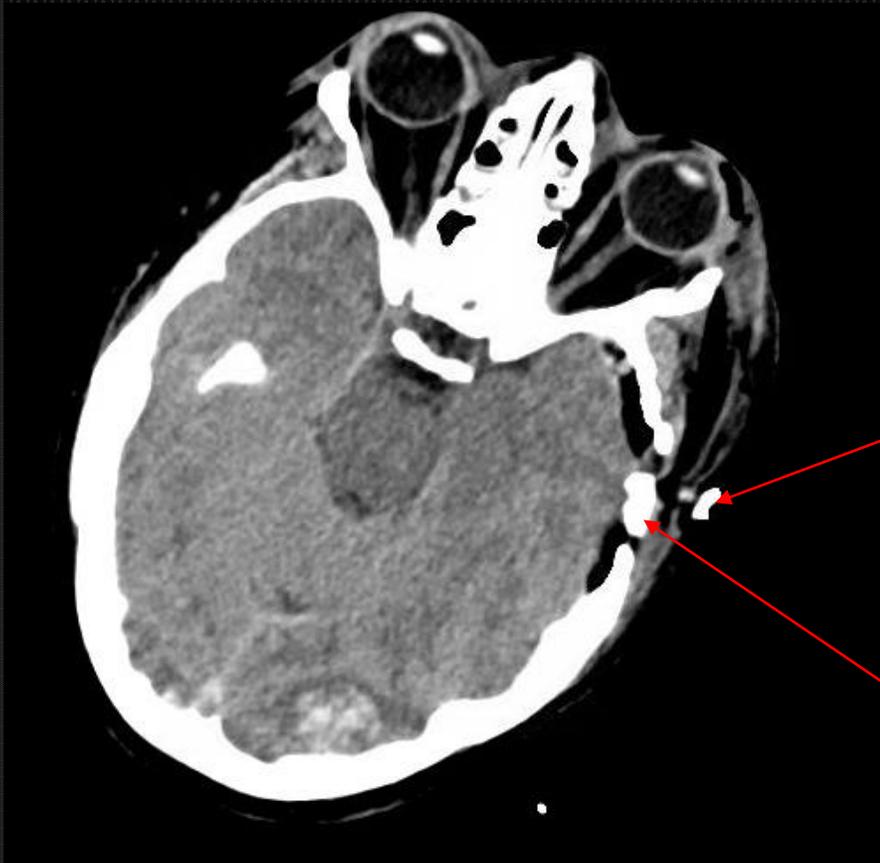


# Patient treatment or outcome

- Repeat CT head demonstrated expansion of the epidural hematoma (EDH) from 15 mm to 25 mm
- Pt underwent emergency craniotomy and hematoma evacuation
- She remains hospitalized but is recovering well and plan is to discharge soon
- F/u planned with neurosurgery and ENT

# S/p Craniotomy

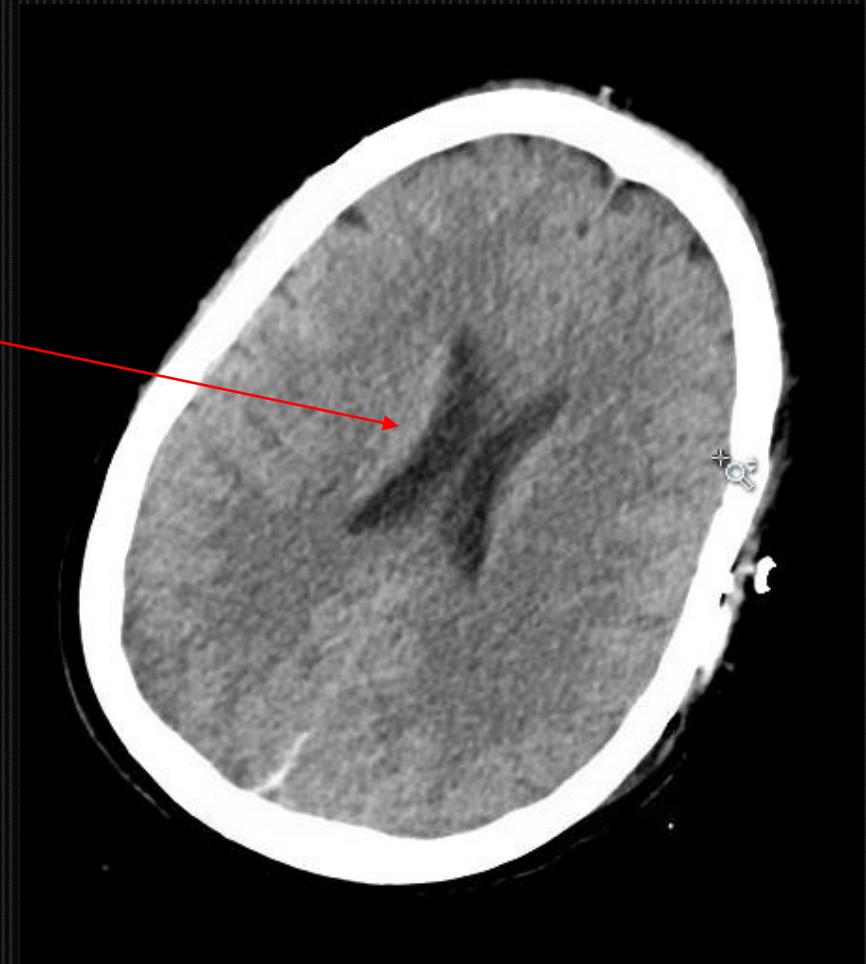
Axial CT head wo contrast



Surgical drain

Postsurgical packing material

Mass effect relieved



# ACR Appropriateness Criteria

**Clinical Condition:** Head Trauma

**Variant 2:** Minor or mild acute closed head injury (GCS  $\geq$ 13), imaging indicated by NOC or CCHR or NEXUS-II clinical criteria (see Appendix 1). Initial study.

Radiologic Procedure	Rating	Comments	RRL*
CT head without IV contrast	9		☼☼☼
MRI head without IV contrast	5	This procedure may be appropriate in the outpatient setting, but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating.	○
MRA head and neck without IV contrast	2		○
MRA head and neck without and with IV contrast	2		○
CTA head and neck with IV contrast	1		☼☼☼
MRI head without and with IV contrast	1		○
MRI head without IV contrast with DTI	1		○
CT head without and with IV contrast	1		☼☼☼
CT head with IV contrast	1		☼☼☼
Tc-99m HMPAO SPECT head	1		☼☼☼☼
FDG-PET/CT head	1		☼☼☼☼
X-ray skull	1		☼
Arteriography cervicocerebral	1		☼☼☼
<b>Rating Scale:</b> 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

**Clinical Condition:** Head Trauma

**Variant 3:** Moderate or severe acute closed head injury (GCS <13). Initial study.

Radiologic Procedure	Rating	Comments	RRL*
CT head without IV contrast	9		☼☼☼
MRI head without IV contrast	2		○
CTA head and neck with IV contrast	2		☼☼☼
MRA head and neck without IV contrast	1		○
MRA head and neck without and with IV contrast	1		○
CT head without and with IV contrast	1		☼☼☼
MRI head without and with IV contrast	1		○
MRI head without IV contrast with DTI	1		○
X-ray skull	1		☼
CT head with IV contrast	1		☼☼☼
FDG-PET/CT head	1		☼☼☼☼
Arteriography cervicocerebral	1		☼☼☼
Tc-99m HMPAO SPECT head	1		☼☼☼☼
<b>Rating Scale:</b> 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

# Imaging discussion: CT head for EDH

- CT head most widely used imaging to diagnose EDH but MRI brain is more sensitive for detection of ICH
- EDHs are most common in the temporal or temporoparietal regions, often due to laceration of the middle meningeal artery
- Epidural blood produces a lens-shaped or biconvex pattern on head CT because its collection is limited by firm dural attachments at the cranial sutures



# Imaging discussion: CT head for EDH

On imaging, findings that suggest a **worse prognosis and prompt early surgical evacuation needed include**

- Significant hematoma thickness (>15 mm)
- Large hematoma volume (>30 cm<sup>3</sup>)
- Significant midline shift
- Compression of the basilar cisterns
- Mixed density of the hematoma

# Cost of Patient Imaging Studies

- CT head without contrast: **\$2,207**
- CT cervical spine: **\$2,272**
- CT abdomen and pelvis with contrast: **\$2,554**
- CT maxillofacial without contrast: **\$2,221**
- XR chest: **\$253**
- XR pelvis: **\$377**

# Radiation Doses of Patient Imaging Studies

- CT head without contrast: 2.0 mSv (0.9-4.0)
- CT cervical spine: 6.0 mSv (1.5-10)
- CT abdomen and pelvis with contrast: abd 8 mSv (3.5-25)/  
pelvis 6.0 mSv (3.3-10)
- CT maxillofacial without contrast: Unk
- XR chest: 0.1 mSv (0.05-0.24)
- XR pelvis: 0.7 mSv (0.04-1.1)

# References

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