RADY 401 Case Presentation

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Ed. John Lilly, MD
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 ×1 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

- Sphenoid sinus
- Small epidural hematoma with pneumocephalus
- Pneumocephalus
- Lateral ventricles
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
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
### Clinical Condition: Head Trauma

#### Variant 2:

**Minor or mild acute closed head injury (GCS ≥13), imaging indicated by NOC or CCHIR or NEXUS-II clinical criteria (see Appendix 1). Initial study.**

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT head without IV contrast</td>
<td>9</td>
<td></td>
<td>★★★★</td>
</tr>
<tr>
<td>MRI head without IV contrast</td>
<td>5</td>
<td>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.</td>
<td>O</td>
</tr>
<tr>
<td>MRA head and neck without IV contrast</td>
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<td>O</td>
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<tr>
<td>MRA head and neck without and with IV contrast</td>
<td>2</td>
<td>O</td>
<td>O</td>
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<tr>
<td>CTA head and neck with IV contrast</td>
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<tr>
<td>MRI head without and with IV contrast</td>
<td>1</td>
<td>O</td>
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<tr>
<td>MRI head without IV contrast with DTI</td>
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<tr>
<td>CT head without and with IV contrast</td>
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<tr>
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<tr>
<td>To-99m HMPAO SPECT head</td>
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<td>★★★★</td>
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<tr>
<td>FDG-PET/CT head</td>
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<tr>
<td>X-ray skull</td>
<td>1</td>
<td>O</td>
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<tr>
<td>Arteriography cervicocerebral</td>
<td>1</td>
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**Rating Scale:** 1-2.3 Usually not appropriate; 4.5-6 May be appropriate; 7-8.9 Usually appropriate

**Relative Radiation Level:**

#### Variant 3:

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

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

- Significant hematoma thickness (>15 mm)
- Large hematoma volume (>30 cm³)
- 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
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