Imaging of the Cervical Spine: Craniocervical Junction

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Imaging of the Cervical Spine: Craniocervical Junction

Objectives

• Axis Fx’s - Dens fracture, Hangman’s fracture
• Atlanto-occipital dissociation (AOD)
• Normal anatomy
DENS FRACTURE
TABLE 1: Clinical and Radiologic Variables

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Patients (n = 149)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Men</td>
<td>77</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>72</td>
<td>48</td>
</tr>
<tr>
<td>Age</td>
<td>65–75 years</td>
<td>59</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>&gt;75 years</td>
<td>90</td>
<td>60</td>
</tr>
<tr>
<td>Mechanism</td>
<td>Falls from standing or seated height</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Falls from greater than standing height</td>
<td>28</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Motor vehicle crashes</td>
<td>72</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Othersa</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Location of injury</td>
<td>Upper cervical spine (C0–C2)</td>
<td>95</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Lower cervical spine (C3–C7)</td>
<td>54</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Hyperextension teardrop fracture</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

TABLE 2: Distribution and Pattern of Injuries in the Upper Cervical Spine

<table>
<thead>
<tr>
<th>Level</th>
<th>No. of Injuries</th>
<th>Categories</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DENS FRACTURE</td>
<td>Commonest Fx &gt; 65 Yrs</td>
<td>Mechanism – MVC &amp; fall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three types</td>
<td>Type II - nonunion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*F. M. Lomoschitz, C.C. Blackmore, S. K. Mirza, F.A. Mann
Objective: Our objective was to describe types and distribution of cervical spine injuries in elderly patients in regard to cerebrospinal mechanism and patient age.*

*Materials and Methods: The distribution and type of 225 cervical spine injuries in 149 consecutive patients 65 years old and older over a 5-year interval were retrospectively assessed. For each patient, initial admission imaging studies were reviewed, and injuries were classified.*

AJR 2002;178:573–577
DENS FRACTURE

- Subtle on lateral radiographs & axial CT
- Step off or disruption – cortex or C2 ring
Anderso & D’Alonzo in: The Radiology of Acute Cervical Spine Trauma
Harris JH, Mirvis SE
TRAUMATIC SPONDYLOLISTHESIS
TRAUMATIC SPONDYLOLISTHESIS

- Hyperextension & axial loading
- Pars interarticularis
- MVC
Effendi et al
The Radiology of Acute Cervical Spine Trauma
Harris JH, Mirvis SE
ATLANTO-OCCIPITAL DISSOCIATION
ATLANTO-OCCIPITAL DISSOCIATION

- Uncommon injury
- Three types – direction the skull displaces
  - Anterior, Posterior, Vertical
- Subtle – radiographs, CT, MRI
ATLANTO-OCCIPITAL DISSOCIATION

- X-line method
- Powers ratio \( \geq 12 \text{ mm} \)
- Basion-dental interval (BDI)
- Basion-axial interval (BAI)
**ATLANTO-OCCIPITAL DISSOCIATION**

### TABLE 1: Name and Description of Measurements Measured on Radiographs and MDCT Images

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Radiograph</th>
<th>MDCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI</td>
<td>12 mm</td>
<td>9.5 mm</td>
</tr>
<tr>
<td>BAI/PAL</td>
<td>12 mm</td>
<td>5.4 mm</td>
</tr>
<tr>
<td>Condylar sum</td>
<td>-</td>
<td>6.2 mm</td>
</tr>
</tbody>
</table>

Note—MPR = multiplanar reformation.
ATLANTO-OCCIPITAL DISSOCIATION

- X-line method
- Powers ratio $\geq 12\ mm$
- Basion-dental interval (BDI)
- Basion-axial interval (BAI)
ATLANTO-OCCIPITAL DISSOCIATION

- X-line method
- Powers ratio $BC/OA \leq 1$
- Basion-dental interval (BDI)
- Basion-axial interval (BAI)