Anterior Screw Fixation in Type II Odontoid Fractures: Comparison between the Young and the Elderly

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The type II odontoid fracture, according to the classification of Anderson and D’Alonzo
✓ the most common injury of the axis in the elderly patients
✓ optimal surgical treatment is still controversial
  → lead to high failure rate owing to osteoporosis

Few publications regarding type II odontoid fractures of elderly patients used anterior screw fixation

Anterior odontoid screw fixation using a single compression screw in patients aged over 60 years and compared it with the younger patients.
**Material and method**

- anterior odontoid screw fixation using single compression screw
- **29 cases** of type IIB odontoid fractures
- M:F = 23:6

- Group I ≥ 60 years (mean age, 64.5 yr)
  Group II < 60 years (mean age, 38.4 yr)

- Evaluation by radiographs (pre-, post-operative)
  1. Type of fracture
  2. Initial displacement
  3. Reduction postoperatively
  4. time to union
  5. cervical range of motion
  6. neurological complications

**Operative procedure**

- One compression screw → inserted through skin incision of C5-6 interspace
- 3.5mm cannulated screw (Synthes®, Davos, Swiss) or 4.5mm Herbert cannulated screw (Zimmer®, Warsaw, USA)

**Postoperative management**

- Ambulate within 3 days
- Soft neck collar for a minimum 6 weeks
- Solid bony fusion - bony bridging in 3D CT, lack of motion by flexion-extension view
### Results

#### Comparison of various factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Group 1</th>
<th>Group 2</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>13</td>
<td>16</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Age (year)</td>
<td>64.5 (61-78)</td>
<td>38.4 (17-58)</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Sex (M:F)</td>
<td>5:6</td>
<td>6:5</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Follow-up period (months)</td>
<td>18.3 (14-48)</td>
<td>20.4 (12-46)</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Type of fractures</td>
<td>IIB</td>
<td>IIB</td>
<td></td>
</tr>
<tr>
<td>Associated fracture (No. of pts)</td>
<td>4</td>
<td>8</td>
<td>P=0.046</td>
</tr>
<tr>
<td>Loss of consciousness</td>
<td>4</td>
<td>3</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Presurgical stay (day, range)</td>
<td>3 (1-7)</td>
<td>3 (1-21)</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Operation time (min, range)</td>
<td>55 (45-75)</td>
<td>60 (40-82)</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Displacement (ant:post)</td>
<td>4:9</td>
<td>9:7</td>
<td></td>
</tr>
<tr>
<td>Amount of displacement (mm, range)</td>
<td>4.2 (2–12)</td>
<td>4.8 (3-14)</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Underlying medical disease (No.)</td>
<td>8</td>
<td>3</td>
<td>P=0.032</td>
</tr>
<tr>
<td>Medical complications (No.)</td>
<td>5</td>
<td>4</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>Union time (weeks)</td>
<td>16.5 (12-40)</td>
<td>17.9 (12-43)</td>
<td>P=0.042</td>
</tr>
<tr>
<td>Union rate (%)</td>
<td>77</td>
<td>81</td>
<td>p&gt;0.05</td>
</tr>
<tr>
<td>LOM (No. of pts)</td>
<td>5</td>
<td>2</td>
<td>p&gt;0.05</td>
</tr>
</tbody>
</table>
Results

- **Medical complications** not related to surgical technique
  - Group 1 - 40% of cases (5 of 13 patients)
  - Group 2 - 25% of cases (4 of 16 patients) \( (p>0.05) \)

- **Mean union time**
  - Group 1 - 17.1 weeks (range, 12 to 24)
  - Group 2 - 14.4 weeks (range, 8 to 20) \( (P=0.042) \)

- **Union rate**
  - Group 1 - 77%
  - Group 2 - 81% \( (p>0.05) \)

- **Additional posterior fusion** with transarticular C1–C2 screws with wiring or posterior rod-screw fixation
  - Group 1 - 15% of cases (2 of 13 patients)
  - Group 2 - 19% of cases (3 of 16 patients)
  → resulted in stable fusion in all case
Conclusions

• **Outcomes after anterior odontoid screw fixation** in Type II B odontoid fractures
  ✓ higher rates of medical complications
  ✓ slightly delayed union time

  ✓ not be affected by patient age
  ✓ can be performed successfully without serious complications in elderly patients
  ✓ comparable to those of younger patients.

References

• Nothing to disclose