Comparison of Long Term (5-yr) Reoperation Rates & Outcomes of Long Fusions to the Cervicothoracic Junction: Multi-level ACDF with BMP-2 vs. Posterior Fusion

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Introduction

- Particular challenges inherent to multilevel cervical decompression and fusion must be overcome in order to achieve a successful outcome.
- Inadequate restoration of lordosis, adjacent segment disease, junctional kyphosis, and pseudoarthrosis are among these concerns.
Surgeons must consider the most appropriate surgical approach (anterior versus posterior) and whether or not to include C7-T1 in the fusion construct.
Purpose

This study aims to compare the long term outcomes and complication rates of multilevel ACDF (with ultra-low dose BMP-2) to posterior fusions that either ended at or crossed the cervicothoracic junction.
Methods

This is a retrospective review of 149 patients who underwent long fusions either to or past the cervico-thoracic junction from 2006-2010 and had at least 5 years f/u.

Patients were divided into two groups based on approach:
1) 3-level ACDF (C4-C7)
2) Posterior Fusions at least 3 levels
   a). PSF ending at C7
   b). PSF extending to T1

Patients with complete medical and radiographic records were included in the statistical analysis. Cervical lordosis and junctional kyphosis were measured for each patient.

Patients with less than 5 year f/u were included in the analysis if complications were encountered.
## Demographic Data

<table>
<thead>
<tr>
<th></th>
<th>ACDF group (n=38)</th>
<th>Posterior C7+T1 group (n=54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>17</td>
<td>31</td>
</tr>
<tr>
<td>Women</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Mean age +/- SD and range</td>
<td>52 +/- 9 (29-73)</td>
<td>60.5 +/- 12.5 (24-88)</td>
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<tr>
<td>Mean follow up +/- SD and range</td>
<td>4.8 +/- 1.7 (2.5-8.5)</td>
<td>5.8 +/- 2 (2.5-9)</td>
</tr>
<tr>
<td>Mean levels +/- SD and range</td>
<td>3</td>
<td>5 +/- 1.5 (3-11)</td>
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</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>ACDF group</th>
<th>Posterior C7 group</th>
<th>Posterior T1 group</th>
<th>Posterior C7+T1 group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revision</strong></td>
<td>6 (15.7%)</td>
<td>1 (3.5%)</td>
<td>1 (4%)</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td><strong>Pseudo rate</strong></td>
<td>3 (8%)</td>
<td>1 (3.5%)</td>
<td>1 (4%)</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td><strong>Complication rate not requiring revision</strong></td>
<td>6 (21%)</td>
<td>2 (21%)</td>
<td>3 (16%)</td>
<td>5 (19%)</td>
</tr>
<tr>
<td><strong>Total complications including revision</strong></td>
<td>12 (37%)</td>
<td>3 (24%)</td>
<td>4 (20%)</td>
<td>7 (22%)</td>
</tr>
</tbody>
</table>

*Other complications include persistent pain, recurrent radiculopathy, facet arthropathy, persistent myelopathy, and residual foraminal stenosis*
Results

92 patients were included in the final analysis.

The multilevel ACDF group had a greater restoration of cervical lordosis when compared to the posterior group.

No statistical difference was seen between groups in demographic data, adjacent segment degeneration, or pseudoarthrosis.

Higher revision rate in ACDF but no significant difference. However it clearly trends toward significant p=0.057

Adjacent segment disease at the C7-T1 segment and pseudoarthrosis both occurred in each group.
Conclusion

- ACDF provides greater restoration of lordosis in multilevel decompression & fusion when compared to posterior approach.
- ACDF & PSF did not differ in rates of ASD or pseudoarthrosis.
- Clinically relevant complication rates leading to reoperation for long cervical fusions were less than anticipated in all groups.