Establishing Maximal Medical Improvement Following Anterior Cervical Discectomy and Fusion

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Disclosures

Benjamin Khechen, Dil V. Patel, Anirudh K. Gowd, Mundeep S. Bawa, Harmeet S. Bawa, Jordan A. Guntin, Sailee S. Karmarkar, Joseph N. Liu – Nothing to disclose

Kern Singh, MD

- **Board Membership** – Vital 5 LLC, Avaz Surgical LLC
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Background and Purpose

• The identification of a time point at which patients reach **maximal medical improvement (MMI)** allows providers to understand **postoperative requirements** and manage **expectations** of surgical patients.

• To identify the time point at which patients undergoing **primary, single-level anterior cervical discectomy and fusion (ACDF)** can be considered to have reached MMI.
Methodology

- Retrospective review of a prospectively-maintained database
- 69 patients that underwent a primary, single-level ACDF for degenerative pathology from 2014 to 2017
Methodology

• Variables Analyzed
  • Patient demographics
  • Patient-Reported Outcomes (PROs)
    ■ Neck Disability Index (NDI)

• Statistical Analyses
  • Pearson chi-square
  • Multivariate linear regression
  • Distribution-based MCID
  • Nonparametric receiver operating characteristic (ROC) curve
  • Kaplan-Meier survival analysis
  • Cox regression
### Results

**Table 1. Demographics and baseline characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (Mean ± SD)</strong></td>
<td>49.7 ± 10.1</td>
<td></td>
</tr>
<tr>
<td><strong>Gender (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>36.2%</td>
<td>(25)</td>
</tr>
<tr>
<td>Male</td>
<td>63.8%</td>
<td>(44)</td>
</tr>
<tr>
<td><strong>Body Mass Index (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Obese (&lt;30 kg/m²)</td>
<td>63.8%</td>
<td>(44)</td>
</tr>
<tr>
<td>Obese (&gt;30 kg/m²)</td>
<td>36.2%</td>
<td>(25)</td>
</tr>
<tr>
<td><strong>Smoking Status (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Smoker (&lt;30 kg/m²)</td>
<td>92.8%</td>
<td>(64)</td>
</tr>
<tr>
<td>Smoker (&gt;30 kg/m²)</td>
<td>7.2%</td>
<td>(5)</td>
</tr>
<tr>
<td><strong>Insurance Type (n)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Workers’ Compensation</td>
<td>62.3%</td>
<td>(43)</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>37.7%</td>
<td>(26)</td>
</tr>
<tr>
<td><strong>Charlson Comorbidity Index (Mean ± SD)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 ± 1.3</td>
<td></td>
</tr>
</tbody>
</table>

SD = Standard Deviation

**Patient demographics and baseline characteristics**
Results

NDI improvements in ACDF patients ranging from preoperative to 12-months postoperatively
Over 95% of patients reach MCID for NDI at 6 months

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>(N=69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 weeks</td>
<td>62.3% (43)</td>
</tr>
<tr>
<td>3 months</td>
<td>75.4% (52)</td>
</tr>
<tr>
<td>6 months</td>
<td>95.7% (66)</td>
</tr>
</tbody>
</table>

**Table 2.** Percent of patients who achieved MCID for NDI

MCID = Minimal Clinically Important Difference; NDI = Neck Disability Index
Discussion

- 95.7% achieved MCID by 6 months, allowing MMI to be established at this point.
Limitations

• Incomplete survey data beyond 1-year limited analysis of detecting further improvement in NDI

• Other patient-reported outcomes, such as pain scores, were not evaluated during this investigation
Conclusions

• The majority of patients (62.7%) achieved MCID by 6-weeks.

• As over 95% of patients achieved **MCID by 6-months** postoperatively, this time point was determined to represent MMI.

• Future outcome reporting in patients undergoing **ACDF** should include **follow-up to 6 months postoperatively**.
References

THANK YOU!

Contact us about questions and membership opportunities

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