A systematic review on neurological outcome for cervical degenerative myelopathy after anterior decompression surgery: motion preservation versus fusion.

Rationale

• It is well established that CDM improves irrespective of the anterior decompression technique used.

• No consensus exists on what technique is superior in terms of neurological recovery.

• A general concern exists that ACDA leads to less favorable outcomes in CDM due to microtrauma caused by preserved mobility.

• It is remarkable that current literature mainly uses pain scores to assess clinical outcomes after anterior decompression surgery, especially as pain may not be the most relevant outcome for CDM.
Objective

To evaluate neurological outcomes for cervical degenerative myelopathy after anterior decompression surgery, assessed by validated myelopathy scores.
Methods

• Prospective studies were included when patients with isolated CDM were treated with anterior decompression surgery and a validated myelopathy outcome score was used.

• Quality of included studies was assessed according to Cochrane risk of bias tool and ROBINS-I.

• Exclusion of studies including patients with myeloradiculopathy, follow-up time < 1 year, comparison of anterior and posterior techniques, N < 10 or any other underlying pathology than degeneration.
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Figure 1
PRISMA Flowchart

Abbreviations: CDM = Cervical Degenerative Myelopathy, ACDF = Anterior cervical discectomy and fusion, ACDA = anterior cervical discectomy with arthroplasty, CASP = Clinical adjacent segment pathology, (m)JOA = (modified) Japanese Orthopedic Association

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Results

• All studies showed general post-operative neurological improvement
  • according to the (m)JOA
  • for all groups
  • with all of the evaluated techniques
• ACDF showed a mean improvement of 4.80 in mJOA and 3.64 in JOA
• ACDA showed a mean improvement of 5.51 in JOA
• The overall quality of the included articles was low to moderate.

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Table 1
Pre- to post-operative improvement

<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Study Time Span (Years)</th>
<th>Utility Measurement Tool</th>
<th>Intervention</th>
<th>Change in mean score from pre- to post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen et al. (2019)</td>
<td>3</td>
<td>JOA</td>
<td>ACDF (n=30)</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ACDA (n=30)</td>
<td>8.0</td>
</tr>
<tr>
<td>Cheng et al. (2011)</td>
<td>3</td>
<td>JOA</td>
<td>ACDF (n=42)</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
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<td>ACDA (n=41)</td>
<td>6.2</td>
</tr>
<tr>
<td>Sun et al. (2020)</td>
<td>1</td>
<td>JOA</td>
<td>Normal ACDF (n=31)</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distraction ACDF (n=30)</td>
<td>4.5</td>
</tr>
<tr>
<td>Sorar et al. (2007)</td>
<td>2.7</td>
<td>mJOA</td>
<td>Corpectomy (n=14)</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Corpectomy (mild CDM) (n=6)</td>
<td></td>
</tr>
<tr>
<td>Pescatori et al. (2020)</td>
<td>3</td>
<td>mJOA</td>
<td>Corpectomy (mild CDM) (n=30)</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Corpectomy (severe CDM) (n=30)</td>
<td>5.4</td>
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<tr>
<td>Li et al. (2019)</td>
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<td>JOA</td>
<td>Anterior techniques (n=117)</td>
<td>3.2</td>
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<tr>
<td>Pandita et al. (2018)</td>
<td>1</td>
<td>mJOA, Nurick</td>
<td>ACDF (n=30)</td>
<td>2.5</td>
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<tr>
<td>Zika et al. (2020)</td>
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<td>mJOA</td>
<td>ACDF (n=36)</td>
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<tr>
<td>Zhang et al. (2020)</td>
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<td>mJOA</td>
<td>ACDF (n=35)</td>
<td>5.6</td>
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<tr>
<td>Pehlivanoglu et al. (2019)</td>
<td>2</td>
<td>JOA</td>
<td>ACDA (n=18)</td>
<td>5.3</td>
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<td>Tian et al. (2010)</td>
<td>3.49 (mean)</td>
<td>JOA</td>
<td>ACDA (n=50)</td>
<td>2.5</td>
</tr>
</tbody>
</table>

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Conclusion

• Neurological recovery of CDM is similar after all anterior decompression techniques.
  • Including ACDA when compared to ACDF.
• The concern that ACDA is inferior to ACDF for the treatment of CDM is contradicted.
• Few prospective studies focus on anterior decompression surgery for isolated CDM.
  • Even fewer use a validated myelopathy outcome score.

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Conflict of interest

I herewith declare anything that may potentially be viewed as a conflict of interest:

Nothing to declare