

Comparison of Outcomes between Anterior and Posterior Cervical Procedures: Results of Surgery Involving Four or More Vertebral Levels from the AOSpine North America Cervical Spondylotic Myelopathy Study

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Introduction

Debate continues about the relative merits of anterior versus posterior surgery for multilevel cervical stenosis causing myelopathy. Conclusions from previous studies were limited because one- or two-level anterior surgeries have been compared with multilevel posterior cases. The objective of this study was to compare outcomes and complications of anterior versus posterior-based cervical procedures (≥ 4 levels) for patients with multilevel disease.

Material and Methods

Data from the AOSpine North America Cervical Spondylotic Myelopathy Study, a prospective, multicenter study, were analyzed. A subset of patients with myelopathy involving four or five vertebrae was analyzed in this study. The outcome measures included NDI, modified-Japanese Orthopaedic Association scores, SF36v2, and Nurick grades. Adverse events were also collected in a standardized manner and externally monitored. Rates of perioperative complications (within 30 days of surgery) and delayed complications (31 days–2 years following surgery) were tabulated and stratified based on clinical factors.

Results

Of the 264 patients in the main study, 113 patients (42.8%) had four or more levels of surgery. There were 49 patients who underwent anterior cervical surgery (ACS, combination of anterior cervical decompression fusion \pm corpectomy) and 64 patients who underwent posterior-based cervical surgeries (PCS, 45 laminectomy + fusion, 19 laminoplasty). There were statistically significant differences in age, cardiovascular comorbidities, and source of stenosis between these two groups. There was a statistically significant difference in baseline Nurick grades between groups (2.8 ACS vs. 3.3 PCS, $p = 0.0075$). There was no difference in any outcome measures at baseline. Outcome scores improved in both the ACS and PCS groups from baseline over a period of 2 years. There were no statistically significant differences between the anterior and posterior surgical procedures in terms of outcomes at 2 years ($p > 0.05$). This was true for NDI, mJOA, SF36v2, and

Nurick scores for both unadjusted and adjusted analyses. There was no significant difference in complication rates between ACS and PCS groups. Each group had 14 reported complications (total 28). Both the groups reported two postoperative C5 radiculopathies. There was one reoperation in the ACS group. Worsening of neck pain was reported in one patient who had an anterior corpectomy/fusion procedure and there was one case of infection in the PCS group. Two patients in the ACS group had worsening of myelopathy.

Conclusion

In patients with four or five involved vertebral levels of pathology that require surgical intervention for cervical myelopathy, both anterior and posterior surgical procedures demonstrate improved outcomes. With this dataset, we found no evidence of difference between anterior versus posterior surgical procedures in outcomes or associated complication rates. Surgical decision-making related to approach and technique to address issues in these patients can be made by surgeons based on their judgment and experience with these procedures. The limitations of this study include (1) a nonrandomized study design and (2) the grouping together of different subtypes of anterior or posterior procedures.