Commentary: Patient heterogeneity complicates efforts to compare effectiveness for anterior versus posterior surgery for cervical spondylotic myelopathy

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Determining the optimal approach for treating cervical spondylotic myelopathy has been debated in the literature over the last 50 years. Randomized controlled trials (RCTs) have not been performed for a number of reasons. First, the patient population is heterogeneous making it difficult to appropriately define which patients to study. Second, there are a variety of approaches available—both ventral and dorsal. Third, surgeons’ preference and bias have made it difficult to define clinical equipoise that might permit randomization. Last, some approaches are not widely used. Laminoplasty, for example, has not gained significant traction in many regions of the United States. The ultimate goal when performing comparative effectiveness research is to compare different treatments using similar cohorts.

In the current issue of The Spine Journal, Seng et al. [1] report data from a cohort of 64 patients treated with anterior cervical discectomy and fusion (ACDF) primarily at 2 levels and compare the data with a population of 52 patients with 3 or more levels of disease treated with laminoplasty. The groups are not comparable in terms of pathology; so, it is not possible to draw any conclusions about the superiority or inferiority of either approach.

Nevertheless, there is valuable information contained within this article.

Complications

Although the cohorts were not comparable, the prospective assessment of complication rates is enormously useful. The authors identified a few more complications in the anterior group. There were two cases of postoperative hematoma after anterior surgery despite the routine usage of a postoperative drain. There was one patient in the anterior group who developed a vocal cord paresis that resolved after 6 months. Wound infections were reported in both cohorts. Interestingly, there were no reports of C5 paresis, which have been found to occur in up to 30% of patients after surgery for cervical spondylotic myelopathy (CSM) [2]. Administrative database studies suggest that the complication rate after posterior surgery for CSM might, in fact, be higher (16.4%) than anterior surgery (11.9%) in contrast with what the present study has found [3]. In addition, another administrative database study shows that the 5-year reoperation rate after posterior surgery (17.7%) is significantly higher than anterior surgery (12.1%) [4]. These types of studies lack the granularity of the current report, but these administrative studies include data from 1,000s of patients.

Quality of life

Ultimately, this report and other studies suggest that surgery, regardless of approach, is effective at decompressing the spinal cord, limiting further spinal cord injury, and
improving neurologic function for many patients. The major question for spinal surgeons when treating cervical spondylotic myelopathy is how to best improve quality of life. We have shown previously that posterior cervical fusion is associated with higher neck disability index (NDI) scores and, therefore, less improvement in health related quality of life (HR-QOL) compared with ventral surgery [5]. The present study also found that patients in the posterior group had more neck pain at 6 months compared with those patients treated using an anterior approach. Further studies will be needed to address patient-specific factors such as preoperative or even postoperative sagittal balance or degree of correction of kyphosis that might explain some of the observed differences in NDI and HR-QOL outcomes. Sagittal balance and kyphosis might ultimately prove to be more important predictors of NDI and HR-QOL outcome as opposed to the specific surgical approach.

**Randomized controlled trials**

As the authors have suggested, only an RCT will be able to answer the question regarding the superiority of one approach over another. An RCT will provide a greater chance of comparing treatments among similar patient cohorts by eliminating selection bias. An RCT will require the creation and establishment of a homogeneous population of patients for whom there is clinical equipoise. In addition, an RCT, if performed, will need to answer questions that will have lasting impact on the treatment of myelopathy. Surgical approaches might differ in their complication rates and their costs. In addition, these approaches might differ in their ability to permit correction of sagittal balance and kyphosis. The only way to study these questions in rigorous detail will be for randomized comparative studies to be performed, thereby eliminating the tempting desire to draw conclusions based on comparisons between dissimilar treatment groups. Ultimately, a comparative trial will require long-term follow-up that will enable multiple stakeholders to determine the true effectiveness, complication rates, and costs of these surgical procedures.

**References**


