Two level corpectomy versus three level discectomy of the cervical spine, which is preferred?: analysis of spinal alignment, adjacent level disease, neck pain, and neurologic outcomes

Darryl Lau; Dean Chou M.D.; Praveen V. Mummaneni MD
Department of Neurological Surgery, University of California, San Francisco

Introduction

In the treatment of cervical spondylotic myelopathy (CSM), anterior cervical corpectomy and fusion (ACCF) and anterior cervical discectomy and fusion (ACDF) are effective decompressive techniques. It remains to be determined whether ACCF or ACDF offers equivalent outcomes for multilevel CSM. In this study, we compared perioperative, radiographic, and clinical outcomes between 2-level ACCF vs. 3-level ACDF.

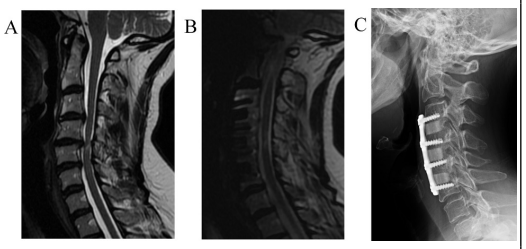
Methods

Between 2006 and 2012, all patients who underwent 2-level ACCF or 3-level ACDF performed by 2 surgeons were identified. Primary outcomes of interest were sagittal Cobb angle, adjacent segment disease (ASD) requiring treatment, neck pain visual analogue scale (VAS), and Nurick score. Secondary outcomes of interest included estimated blood loss (EBL), length of stay, perioperative complication, and pseudarthrosis. Chi-squared test and two tailed student's t-test were used to compare the two groups. A subgroup analysis of patients without posterior fusion spinal (PSF) was performed.

Results

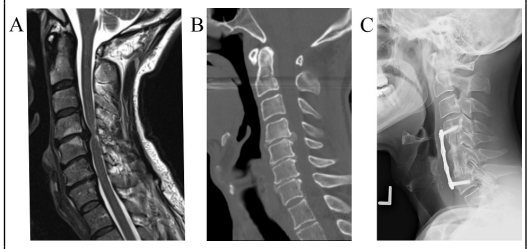
Twenty (20) patients underwent 2-level ACCF and 35 patients underwent 3-level ACDF over a 6-year period. Two-level ACCF was associated with significantly higher EBL compared to 3-level ACDF for the anterior stage of surgery (382.2 cc vs. 117.9 cc, $p<0.001$). Two-level ACCF was also associated with longer hospital stay compared to 3-level ACDF (7.2 days vs. 4.9 days, $p=0.048$), but subgroup comparison of patients without PSF, showed no significant difference in length of stay (2-level ACCF, 3.1 days vs. 3-level ACDF, 4.4 days) ($p=0.267$). Similarly, there was a trend for higher complications in the 2-level ACCF group (20.0%) compared to the 3-level ACDF group (5.7%) ($p=0.102$), but subgroup analysis to exclude those having second stage PSF no longer showed the same trend (2-level ACCF, 0.0% vs. 3-level ACDF, 3.4%) ($p=0.594$). There were no significant differences between the ACCF group and the ACDF group in regards to radiographic outcomes: postoperative sagittal Cobb (7.2 vs. 12.1, $p=0.173$), ASD (12.5% vs. 7.1%, $p=0.552$), and pseudarthrosis (6.3 % vs. 7.1%, $p=0.909$). Both groups obtained similar improvement in VAS neck pain (3.4 vs. 3.2, $p=0.860$) and Nurick score (0.8 vs. 0.7, $p=0.925$).

3-Level ACDF



(A) Sagittal T2-weighted MRI of cervical spine showing severe to moderate spinal canal stenosis from the inferior endplate of C3 to the superior endplate of C6. T2 hyper-intensity signal is seen within the cord at the level of C4-C5. (B) Sagittal T2-weighted MRI of the cervical spine following ACDF shows adequate decompression with cerebrospinal fluid anterior and posterior to the cord. (C) Lateral neutral cervical spine radiograph demonstrating discectomy decompression at C3-4, C4-5, and C5-C6, anterior plate fixation, and fusion.

2-Level ACCF



(A) Sagittal T2-weighted MRI of cervical spine showing severe spinal canal stenosis from C4-C6 and focal spinal cord compression secondary to a herniated disc at the C4-C5 level. (B) Sagittal non-contrast CT of cervical spine showing a mildly calcified herniated disc and no evidence of ossification of the posterior longitudinal ligament. (C) Lateral neutral cervical spine radiograph demonstrating C5-C6 corpectomy, anterior plate fixation, and fusion.

Conclusions

These findings suggest 2-level corpectomy and 3-level ACDF offer similar outcomes in regards to spinal alignment, adjacent segment disease, neck pain, and neurologic function. However, the group that underwent corpectomy had greater blood loss.

Learning Objectives

1. Discuss the in which situations are better for corpectomy or discectomy

2. Recognize that long-term outcomes are similar in patients who under go 2-level corpectomy and 3 level discectomy.