



Proximal Instrumentation Failure Rates of C2 pedicle Screws versus C3 Lateral Mass Screws in Posterior Cervical Fusion Constructs

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Introduction

Biomechanical studies have suggested that C2 pedicle screws are stronger compared to C3 lateral mass screws. Surgeons oftentimes must decide whether there is benefit incorporating C2 pedicle instrumentation rostrally in long posterior cervical fusions and decompressions, however, there is little data.

Methods

Retrospective review of 380 adult patients undergoing posterior cervical fusion up to C2 or C3 for degenerative disease (by 32 surgeons) between 2003-2013 was performed (119 patients in the C2 pedicle screw group and 261 in the C3 lateral mass group). Minimum follow-up was 12 months. The primary outcome was symptomatic proximal instrumentation failure (PIF) requiring reoperation. Variable analysis included demographic, operative, and complication data. Independent t-tests and chi-squared tests were used in the comparison of the C2 and C3 groups. Multivariate logistical regression analysis was performed to identify independent factors associated with PIF.

Results

There were no significant differences in terms of age, gender, comorbidities (including osteoporosis, $p=0.303$), or presenting symptoms between groups. Patients in the C2 group had a significantly higher average number of levels decompressed (4.3 vs. 3.6, $p<0.001$) and fused (6.1 vs. 4.4, $p<0.001$). A higher proportion of patients in the C2 group presented preoperatively with spondylolisthesis (26.5% vs. 10.7%, $p<0.001$) and focal kyphosis (23.1% vs. 10.7%, $p=0.002$). Risk of PIF was 2.5% in the C2 group and 2.3% in the C3 group ($p=0.899$). Following multivariate analysis, the only independent factor associated with PIF was preoperative spondylolisthesis (OR 4.61; 95% CI, 0.1.13 – 18.79; $p=0.033$). There were no significant differences in complications; vertebral artery injury rates were 0.9% in the C2 group and 0.0% in the C3 group, $p=0.292$.

Conclusions

There is no significant difference in the PIF rates of C2 pedicle screws versus C3 lateral mass screws. The only independent PIF variable was preoperative spondylolisthesis.

Learning Objectives

Know the difference in proximal instrumentation failure of constructs involving C2 pedicle screws vs. C3 lateral mass screws

References