Rates and Risk of Reoperation in Laminoplasty versus Laminectomy/Fusion for Multilevel Posterior Cervical Spine Surgery: A Cohort Study of 4,412 Patients

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INTRODUCTION:

Posterior approaches to the cervical spine are versatile and comprehensive means of addressing operative cervical degenerative pathology. However, there is no consensus regarding the optimal surgical procedure. We sought to compare multi-level posterior cervical laminoplasty (CLP) versus multi-level posterior cervical laminectomy and fusion (CLF) in a large US-based cohort, hypothesizing there would be a difference in postoperative outcomes by approach.

METHODS:

We conducted a retrospective cohort study using data from a multicenter spine registry. Adult patients who underwent primary posterior only cervical spine surgeries from 2009-2023 were identified. Inclusion criteria included 2 or more levels of either PCL or PLF between C3 and T2. Staged or hybrid procedures were excluded. The primary outcomes were evaluated longitudinally over all follow-up and included: operative non-union, operative adjacent segment disease (ASD), reoperation for any reason, and mortality. Secondary outcomes included 90-day emergency department (ED) visit and readmission. Multivariable Cox proportional hazards for longitudinal outcomes and logistic regression for binary outcomes were used with adjustment for covariates and operating surgeon.

RESULTS: The study included 4,412 patients, 1,294 (29.3%) with CLP. Mean age (64.2 vs 65.2 years), gender (36.9% vs 41.7% female), and BMI (29.0 vs 29.1 kg/m2) were similar between PCL and PLF groups, respectively. In adjusted analyses, CLP was associated with a lower risk of operative ASD (hazard ratio [HR]=0.41, 95% confidence interval [CI]=0.21-0.80) and all-cause reoperation (HR=0.51, 95% CI=0.33-0.79) when compared to PLF, while no differences were observed in mortality (HR=0.81, 95% CI=0.62-1.06, p=0.120), 90-day ED visits (odds ratio [OR]=0.84, 95% CI=0.67-1.05), or 90-day readmissions (OR=0.84, 95% CI=0.63-1.11).

DISCUSSION AND CONCLUSION:

The present study demonstrated that CLP was associated with lower rates of all-cause reoperation, including statistically significant reduced rates of operative adjacent segment degeneration. This finding is novel as prior studies have not reliably demonstrated significant differences in reoperation. CLP is performed far less frequently than CLF for similar indications, and further research should be performed to investigate possible reasons for this difference. In conjunction with prior data demonstrating lower incidences of short-term surgical and medical complications, there is growing evidence to support that CLP should be considered more frequently when considering operative management of degenerative cervical pathology.