Single-Level Posterior Cervical Foraminotomy associated with Increased Incidence of Early Postoperative Wound Infection Rates Relative to Anterior Cervical Discectomy with Fusion and Cervical Disc Arthroplasty
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INTRODUCTION:
The three leading surgical procedures for managing cervical radiculopathy are anterior cervical discectomy with fusion (ACDF), cervical disc arthroplasty (CDA), and posterior cervical foraminotomy (PCF). There are advantages and disadvantages associated with each procedure. Notably, certain indications may dictate the preference of a specific procedure. While cervical radiculopathy secondary to central disc herniation is likely to benefit from ACDF or CDA, other underlying mechanical/deformity-related pathologies, including kyphosis and cervical instability, are more likely to require ACDF. Furthermore, some surgeons may reserve PCF for patients with a single osteophyte or for discectomy of a soft herniated disk. The objective of this study was to assess if there are differences in perioperative outcomes between cervical radiculopathy patients who can be appropriately treated with ACDF, CDA, or PCF.

METHODS:
Patients diagnosed with cervical radiculopathy who underwent a single-level ACDF, CDA, or PCF between 2012 and 2019 were identified from the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database using current procedural terminology codes. Patients were subsequently stratified into those who underwent ACDF, CDA, or PCF, and propensity score-matched (1:1:1) to adjust for differences in patient demographics/characteristics. Variables used in the matching process included age, sex, race, BMI category, diabetes, smoking status, the presence of underlying chronic obstructive pulmonary disease (COPD), hypertension, functional status and ASA class. Fisher’s exact test and Chi-square tests were used to compare counts and percentages of categorical variables as appropriate. Conversely, analysis of variance (ANOVA) was used to compare means ± standard deviations of continuous variables. All tests were two tailed with an alpha level of 0.05 (significance level at p<0.05). Differences were assessed in terms of operative time, healthcare utilization metrics (reoperations, readmissions, lengths-of-stay), as well as medical and surgical complications.

RESULTS: A total of 18,614 cervical radiculopathy patients undergoing surgery were identified (ACDF: n=15862, CDA: n=1731, PCF: n=1021). After 1:1:1 propensity score matching (n=535 each), there were no differences in characteristics in patients undergoing ACDF, CDA, or PCF (p>0.05). PCF patients had statistically higher rates of reoperation (2.1%) than ACDF (0.4%) or CDA (0.6%) patients (p=0.010). PCF patients also experienced higher rates of superficial infection, deep infection, wound dehiscence, and sepsis relative to ACDF and CDA patients (p<0.05 each) (Table 1). There were no other significant differences in medical/surgical complications between the ACDF, CDA, or PCF patients.

DISCUSSION AND CONCLUSION: Cervical radiculopathy patients undergoing PCF are associated with higher rates of perioperative infection (superficial/deep skin infection, wound dehiscence, sepsis, and overall reoperation) than ACDF or CDA. Although these three procedures are largely safe and effective, future studies should further characterize the mechanism behind the apparent increased infection risk seen in patients who undergo PCF, potentially attributable to the violation of the posterior cervical musculature.