

No Difference in Short-Term Outcomes among Orthopaedic vs. Neurosurgery Trained Spine Surgeons Performing Single-Level Cervical Disc Arthroplasty

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INTRODUCTION: Cervical disc arthroplasty (CDA) has recently gained increasing popularity, offering multiple theoretical advantages, including same-level motion preservation and mitigation of adjacent segment degeneration. This may be particularly true in single-level disease. Due to its novelty and potential steep learning curve, the training background of spine surgeons (Orthopaedic Surgery vs. Neurosurgery) may have some impact on short-term outcomes. The current study aimed to compare the perioperative; and the 30-day outcomes after single-level CDA performed by Orthopaedic vs. Neurosurgery trained spine surgeons.

METHODS: Patients receiving single-level CDA by spine surgeons with Orthopaedic or Neurosurgical training between 2012 and 2018 were identified from the National Surgical Quality Improvement Program (NSQIP) database using the Current Procedural Terminology code 22856. Patients who received a second (22858) or a third (0098T) level CDA during the same surgical episode were excluded. A 1:1 propensity score match (PSM) was conducted between the Orthopaedic surgeon and the Neurosurgeon cohorts based on pre-operative patient determinants. A comparison of perioperative and 30-day post-operative outcomes was conducted. Univariate analyses were then performed using independent-sample t-test, chi-square, or Fisher's exact test when appropriate.

RESULTS: A total of 2207 cases (Orthopaedic Surgery: n = 771; Neurosurgery: n = 1436) were identified. PSM eliminated any significant discrepancy in patient determinants and comorbidities (n = 741 for each group). There was no significant difference between both groups in the overall rates of infection, wound dehiscence, extubation failure, readmission, reoperation, bleeding requiring transfusion, dyspnea, pneumonia, or other perioperative complications ($p > 0.05$ for all). Mean operative time (minutes) was significantly lower among spine surgeons with Orthopaedic training (98.75 ± 36.69) compared to Neurosurgical training (103.7 ± 36.18 ; $p = 0.009$).

DISCUSSION AND CONCLUSION: Our study is the first to compare OS vs NS sub-specialty outcomes for cervical disc arthroplasty. Despite being a novel intervention, the perioperative and early post-operative outcomes of CDA were similar among spine surgeons with different training backgrounds. The only statistically significant difference was operative time, which while statistically significant likely has minimal clinical implication. Ultimately, our findings further underscore that the training background of spine surgeons (OS vs NS) is not associated with differences in short-term CDA outcomes, and suggests both orthopaedic spine surgeons and neurosurgeons can perform such relatively novel procedures equally safely and efficiently.

Table 2. Peri- and Post-Operative Outcomes after Cervical Disc Arthroplasty.

Outcome	Neurosurgery (n = 741)	Orthopedics (n = 741)	p-value
Any Readmission	9 (1.21%)	7 (0.94%)	0.803
Any Reoperation	9 (1.21%)	5 (0.67%)	0.422
Superficial Incisional SSI	3 (0.4%)	1 (0.13%)	0.624
Deep SSI	0 (0%)	0 (0%)	1.000
Wound Dehiscence	0 (0%)	1 (0.13%)	1.000
Transfusions	1 (0.13%)	0 (0%)	1.000
Acute Renal Failure	0 (0%)	0 (0%)	1.000
Urinary Tract Infection	1 (0.13%)	1 (0.13%)	1.000
Pneumonia	1 (0.13%)	0 (0%)	1.000
Mechanical Ventilation	1 (0.13%)	1 (0.13%)	1.000
DVT Requiring Therapy	1 (0.13%)	0 (0%)	1.000
Occurrences Sepsis	0 (0%)	1 (0.13%)	1.000
Length of Total Hospital Stay	0.96 ± 0.93	1.03 ± 1.4	0.285
Total Operation Time	103.7 ± 36.18 minutes	98.75 ± 36.69 minutes	0.009