Secondary Surgical Procedure Rates after Cervical Disc Arthroplasty at One to Four Levels


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Introduction: Anterior cervical discectomy and fusion (ACDF) remains the surgical standard of care for cervical radiculopathy and/or myelopathy unresponsive to nonoperative treatment. With reported reoperation rates of 5-10% two years after single-level ACDF, cervical disc arthroplasty (CDA) is gaining interest as an alternative for up to 40% of ACDF candidates. Multilevel CDA patient outcomes at least equivalent to single-level CDA have also been reported. This study reports secondary surgery rates for a large consecutive series of CDA patients.

Methods: In this study at a single site, 237 patients with similar preoperative diagnoses including cervical degenerative disease at one or more cervical levels—but no prior surgery—were treated by two fellowship-trained spine surgeons in a hospital setting (99) or an outpatient center (138) with CDA through a standard anterior approach between April 2003 and October 2010. Patient demographics, intraoperative measures including operative time and blood loss, and postoperative observations including complications, readmissions, and secondary surgical procedures were reviewed.

Results: Patients (138 male/99 female) with average age of 45.0 years and average weight of 194.3 pounds (male 215, female 166) were treated at one (142), two (76), three (18) or four (1) levels. Median time since surgery was 27.9 months. Workers’ compensation claims totaled 70.5% of patients, and 46% were smokers. Mean operative time was 81.7 minutes (mean 58.8 minutes per device implanted), and mean estimated blood loss (EBL) was 49.4cc. No infections, delayed intubations or other postoperative complications were reported; there were no unplanned readmissions or transfers to hospital. One patient died in an accident 5 months after surgery. Eight (3.4%) patients underwent cervical revision or reoperation at an outpatient center, a median 603 days (range 104-918) after their index surgery. Four (4.0%) were originally hospital procedures, and four (2.9%) were outpatient center surgeries (p=0.72). Six of 142 (4.4%) single-level patients underwent secondary surgical procedures. The one revision was a device removal revised to an anterior fusion. There were 5 single-level reoperation surgeries as follows: one decompression, three CDA at another level, and one hybrid ACDF/CDA at the two superior adjacent levels. Two of 95 (2.1%) multilevel patients (both 2-level) had secondary surgeries: one was a decompression, and one a removal of the inferior level prosthesis revised to an anterior fusion. Differences in second surgery rates for single and multilevel CDA were not significant (p=0.48). Mean operative time for these eight secondary surgeries was 82.9 minutes with average 50cc EBL.

Conclusion: Cervical disc arthroplasty at a single level was shown to be safe and effective compared to ACDF in three recent large FDA prospective randomized controlled trials, and multilevel trials are in progress. In this large case series, reported rates of secondary surgical procedure after CDA at one to four levels were equivalent to or better than rates reported in the evidence-based literature for ACDF. CDA may be a safe and effective alternative to ACDF for appropriately selected patients, and long-term studies currently underway will answer important questions about adjacent level disease and the incidence of additional surgery.