Surgical Trends Demonstrate Increased Utilization of Cervical Disc Arthroplasty over Anterior Cervical Discectomy and Fusion from 2016 to 2021

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INTRODUCTION: Anterior cervical discectomy and fusion (ACDF) has been the most common procedure to treat degenerative cervical conditions, but recently cervical disc arthroplasty (CDA) has arisen as a motion-preserving operation to decrease risk of adjacent segment disease. The objective of this study was to determine surgical trends between CDA versus ACDF over the past 5 years, quantifying surgical volume over time, comparing baseline patient demographics and resultant post-operative complications.

METHODS: A total of 69,287 patients were identified from a nationwide database who underwent either ACDF (n=44,652) or CDA (n=24,635) from 2016 to 2021. The percentage of patients managed by each operative procedure was calculated overall and sub-divided by year. Baseline patient demographics were compared between operative groups, comparing resultant post-operative re-admission rates and 2 year revision rates. Linear regression modelling was performed to evaluate trends/differences in procedural volume by year.

RESULTS SECTION: From 2016-2021, CDA constitute 35.6% of procedures, although the number/proportion of CDA procedures has significantly risen relative to ACDF (23.3% in 2016 to 43.2% in 2021, $p<0.001$). Patients undergoing CDA were younger and less likely to have diabetes, rheumatoid arthritis, obesity or tobacco use disorder relative to ACDF ($p<0.0001$ for all). Patients undergoing CDA had lower rates of re-admission (1.7 vs. 8.2%, $p<0.0001$) but higher 2-year revision rates (1.23 vs. 0.84%, $p<0.0001$).

DISCUSSION: Our findings quantify the increased surgical volume of CDA, both absolutely and relative to ACDF over the past 5 years. Of note, patients undergoing CDA have fewer baseline demographics, highlighting patient selection measures may be in place. This in turn has led to decreased re-admission rates for patients undergoing CDA, although both surgeons and patients should be aware of the increased 2-year revision risk of CDA relative to ACDF. Additional long-term studies evaluating patient reported outcomes and potential long-term complications of CDA are still required.

SIGNIFICANCE/CLINICAL RELEVANCE: While the current study quantified an increased utilization of CDA relative to ACDF between 2016 to 2021, these findings should be considered in the context of increased 2-year revision rates of CDA.