Trends and Complications in Ankle Arthroplasty versus Arthrodesis in the State of New York, 2009-2018

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INTRODUCTION:
Ankle osteoarthritis is a debilitating pathologic process which leads to pain, stiffness, and difficulty ambulating. The two most common surgical procedures for ankle arthritis patients who fail conservative management are arthrodesis and arthroplasty. This study seeks to document population rates of arthroplasty and arthrodesis for ankle osteoarthritis in order to ascertain utilization of each procedure over time, complication rates, and stratification by patient demographics.

METHODS:
Adult (≥40 years old) patients from 2009-2018 were identified using International Classification of Disease (ICD)-9 and 10 Clinical Modification (CM) for ankle osteoarthritis and ICD-9 CM and ICD-10 Procedural Classification System procedural codes for inpatient ankle arthrodesis or ankle arthroplasty in the New York Statewide Planning and Research Cooperative System (SPARCS) database. SPARCS is an all-payer database collecting all inpatient and outpatient (emergency department, ambulatory surgery, and hospital-based clinic visits) claims in New York. A trend analysis between arthrodesis and arthroplasty was performed using linear regression. From 2011-2017 (due to dataset constraints) readmission, reoperation, inhospital mortality, and other adverse events were compared between ankle arthrodesis and arthroplasty using multivariable Cox proportional hazards regression, controlling for patient demographic and clinical factors such as Social Deprivation Index (SDI) and Charlson Comorbidity Index (CCI). Patients who underwent arthrodesis were mapped by ZIP code.

RESULTS:
A total of 2,567 cases were included in the trend analysis in years 2009-2018. Grossly, from 2012 to 2018, the number of arthrodesis cases remained relatively constant ranging from 92-123 cases per year while arthroplasty increased steadily from 69 to 308 cases per year. In 2009, 82.3% of procedures were ankle arthrodesis and 17.7% were ankle arthroplasty. By 2018, 27.9% were ankle arthrodesis and 72.1% were ankle arthroplasty. Linear regression showed a yearly 7% proportion shift toward ankle arthroplasty (p<.0001). Ankle arthrodesis had a lower mean age (61.4 vs. 64.8 yrs, p<.0001) and increased incidence for non-White race, having one or more Charlson comorbidities, and higher social deprivation index (p<.0001). Compared to ankle arthroplasty, ankle arthrodesis had increased 1, 3, and 12-month rates of acute renal failure and cellulitis; increased 3 and 12-month rates of readmission; increased 12-months rates of surgical site infection and deep vein thrombosis (all p values < 0.05). Patients that underwent arthrodesis were distributed toward ZIP codes with a higher SDI.

DISCUSSION AND CONCLUSION:
Proportionally, there was a significant shift with an increase in ankle arthroplasty and decrease in ankle arthrodesis in New York from 2009-2018. However, grossly, from 2012-2018 ankle arthrodesis stayed relatively constant while arthroplasty grew steadily suggesting more patients are becoming candidates for arthroplasty rather than a one-to-one switch from arthrodesis. Ankle arthrodesis was associated with younger age, non-White race, greater Charlson comorbidities, higher social deprivation, and increased postoperative complications compared to arthroplasty. While candidates for arthrodesis may be of worse health than candidates for arthroplasty, there is still likely to be underlying health disparities that should be further investigated and used to inform health policy.