Emergency Department Visits within 90 Days of Isolated Ankle Fracture Surgery: Incidence, Risk Factors, and Cost
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INTRODUCTION:
While readmissions after orthopaedic procedures are a widely used quality metric, postoperative emergency department (ED) visits have received far less attention despite their cost and association with low patient satisfaction. ED visits within 30 days of ankle fracture surgery have been previously looked at in a 596-patient institutional sample. To analyze ED visits with a larger study population and longer follow-up period, the current study used a national administrative claims database to determine the incidence, timing, risk factors, primary diagnoses, and cost of 90-day postoperative ED visits following surgery for ankle fractures.

METHODS:
Ankle fractures undergoing open reduction and internal fixation (ORIF) from 2010 to Q2 2020 were extracted. Exclusion criteria included: age less than 18 years, fewer than 90 days of follow up in the database, and concomitant fractures of the femur, tibia, and fibula. The following patient characteristics were tabulated: age, sex, Elixhauser Comorbidity Index (ECI), region of the country (West, South, Midwest, Northeast), and insurance plan (commercial, Medicare, Medicaid). The incidence of 90-day ED visits (weekly and total) was determined. For comparison, the baseline weekly ED incidence for the cohort was assessed at one year post-surgery, and readmissions were identified by the presence of any inpatient code. The primary diagnoses of ED visits and total 90-day cost of care (reimbursement) were also determined.

Logistic regression was used to determine the relative effects of the independent variables that were statistically significant on univariate analysis. All statistical analyses were performed within the database, with statistical significance set at p<0.05. Our Institutional Review Board determined studies using this database exempt from review.

RESULTS:
The final cohort consisted of 47,545 adult patients who underwent ankle ORIF. Of these, 5,523 (11.7%) patients visited the ED for a total of 8,223 ED visits within 90 days of surgery, with one visit for 3,338 patients, two visits for 1,442, three visits for 439, and four or more visits for 304. More than twice as many patients visited the ED as were readmitted in the 90-day period (5,523 vs. 2,248). The greatest incidence of visits (27% of total ED visits) was in the first two weeks (Figure 1).

Statistically significant predictors of ED utilization (Figure 2) included younger age (OR per 10-year decrease 1.20; 95% CI 1.18-1.22; p<0.001), greater ECI (per 2-point increase 1.56; 1.53-1.59; p<0.001), living in the Midwest (1.25; 1.18-1.33; p=0.05), and insurance plan (relative to Medicare, Medicaid [2.49; 2.21-2.80; p<0.001] and commercial [1.65 (1.55-1.75; p<0.001)].

Of all the primary diagnoses for ED visits, 47% were related to the surgical site and 53% were not. Of the reasons related to the surgical site, pain was the most common (29.7% of total diagnoses). Those who visited the ED without being readmitted had median 90-day reimbursement of 164% compared to 90-day reimbursement for patients with no ED visits.

DISCUSSION AND CONCLUSION:
Following ankle ORIF for fractures, 11.7% of patients visited the ED in the 90 days following surgery, while only 4.7% were readmitted. ED visits were most likely in the first two postoperative weeks but remained elevated compared to calculated baseline rates through week twelve.

Predictive patient factors and common reasons for ED visits were defined, suggesting that targeting high-risk populations and common issues could have a meaningful impact on patient care and the associated increased costs. As with any retrospective database study, limitations of the current study include those of coding inaccuracy and inability to examine individual-level information.

The incidence, timing, risk factors, and cost of ED visits following orthopaedic procedures, such as ankle ORIF, are important to define at risk times and issues that can be addressed to improve patient care and reduce healthcare cost, on the individual and system levels.
Figure 1. Number of patients with and without ED utilization (pie chart). Weekly incidence of visits after surgery (bar graph).

Figure 2. Odds ratios and 95% confidence intervals from multivariate analysis of patient characteristics.