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Correlation of Geriatric Ankle Fractures and All-Cause Mortality

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Summary
The incidence of ankle fractures is increasing in the elderly population. Low short-term complication rates have been demonstrated for both operative and non-operative management but little data is available on long term outcomes. In contrast, geriatric hip fractures have been shown to increase all cause mortality. Our retrospective review of part A Medicare claims data demonstrates an increased one year mortality associated with geriatric ankle fractures in all age cohorts, with this effect becoming more pronounced with increased patient age.

Introduction
Ankle fractures are the third most common geriatric fracture. The incidence of ankle fractures is increasing overall, mostly accounted for by an increase in elderly females. Previous work has shown low complication rates during treatment. However, little is known about the association of these injuries and overall mortality. It is now accepted that hip fractures in the elderly population can be a cause or sign of impending morbidity and mortality. This knowledge has led to significant efforts to streamline care for geriatric hip fractures, focusing on early surgical intervention and mobilization. However, the burden of immobility and lack of immediate mobility restored after surgery for ankle fractures prevents hip fracture protocols from being applied to these injuries. We hypothesized that geriatric ankle fractures would be correlated with increased mortality and utilized geriatric hip fractures as a benchmark comparison group.

Methods
Following IRB approval we retrospectively assessed 2007 part A inpatient claims from the Medicare database. We then queried diagnosis codes for both hip fractures and ankle fractures. We excluded patients’ whose age was less then 65 and who had admission for either hip fracture or ankle fracture during the previous year. We then compared these two datasets for specific variables including over all mortality, length of stay, age distribution, and biographical characteristics. Mortality comparisons were then performed in specific age ranges 65-69, 70-74, etc.. Groups were compared with Elixhauser scores to determine the level of co-morbidities in each. Groups were compared using statistical methods setting significance at p<0.05

Results
Following query of database with inclusion and exclusion criteria a total of 19,648 ankle fracture and 193,980 hip fracture claims were identified. Hip fractures were older with an average age of 83.6 years compared to 77.5 for ankles. The ankle fractures distribution was more common in younger subsets while hip fracture were most common in 80-84 and 85-89 year ranges. The mean length of stay for ankle was 4.6 days for ankles compared to 6 days for hips. The overall
one-year mortality for ankle fractures was 11.9% compared to 28.2%. Subgroup mortality is provided in table 1; demonstrating increasing mortality in all age groups more profoundly seen in ankle fracture subsets. Elixhauser co-morbidity scores were 2.3 for ankle fractures and 2.5 for hip fractures.

Conclusions
Ankle fracture incidence is increasing with previous investigations demonstrating a low rate of early complications. This work demonstrates that despite the low incidence of complications associated with geriatric ankle fractures, there is a substantial increase in mortality at one year. While the mortality increases with each subsequent age group, the effect is still statistically less than that of hip fractures until age greater than 95. A number of factors account for these differences. Regardless, this work provides the orthopedic foot and ankle specialist with information for counseling patients about the implications of their geriatric ankle fracture and provides a basis for further research.