



CWIS Chest Wall Injury Summit 2023

Oral Presentation Abstract Submission

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Title of Presentation Increasing Rates of Adult Rib Fracture Injuries and Changing Hospitalization Practice Patterns

Background

Musculoskeletal chest wall injury and rib fractures are common after blunt thoracic trauma. Management of rib fracture injuries remains an evolving issue. We identified significant trends related to rib fracture injuries, factors related to hospitalization, and hospitalization practice patterns based on hospital sizes in the United States (US).

Methods

We queried the National Electronic Injury Surveillance System (NEISS) database between 2012 and 2021 for all patients 18 years of age and older with rib fractures who presented to a nationally representative sample of 100 US emergency departments (ED). These data were extrapolated to provide national estimates. We performed regression analysis to identify trends for injury. Multivariate regression analysis was utilized to identify factors associated with hospitalization. Multivariate analysis was also performed to determine the effect of year and hospital size, defined by the number of ED visits, on hospitalization practices. Statistical significance was set at $p < 0.05$.

Results

We identified 32,233 patients with rib fractures in the NEISS database, which extrapolated to a national estimate of 1,430,270 patients with rib fractures during the 10-year period (Table 1). Between 2012 to

2021, there was a 65% increase in annual cases ($R^2=0.95$, $p<0.001$) and a 52% increase in the incidence rate per 100,000 persons ($R^2=0.94$, $p<0.001$). Males accounted for 58% of patients with rib fractures, and 50% of patients analyzed were 65 years or older (Figure 1). For patients in whom the incident location was reported, 76% of the injuries occurred at home, and 15% were associated with stairways. Hospitalization was required in 38% of patients, and we identified a 96% increase in the hospitalization rate during the study period ($R^2=0.96$, $p<0.001$). A significantly increased rate of hospitalization ($p<0.005$) was associated with males, age above 45 years, farm accidents, public area and street accidents, bed-related injuries, bicycle accidents, ladder falls, stair falls, motor vehicle accidents, multiple fractures, year of presentation, and patient presentation to larger hospitals (>28,150 annual ED visits). Black/African American patients had a decreased odds for hospitalization following injury compared to White patients ($p<0.001$) (Table 2). In comparing hospitalization practice patterns, there was a 20% greater increase in the odds of hospitalization over time among patients presenting to larger hospitals compared to smaller hospitals (Figure 2).

Conclusion

The incidence of rib fractures and the associated hospitalization rates are both increasing nationally, and half of these patients are elderly. Practice patterns are also changing, in that larger hospitals are more likely to hospitalize patients than smaller hospitals. Our findings emphasize the need for preventive measures, instituting established care guidelines, and an increasing caseload of patients with rib fractures that surgeons may encounter.