

Risk for Delayed Diagnosis of Orthopaedic Injury in the Polytrauma Patient: An Observational Epidemiological Study

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Purpose: Evaluation of the polytrauma patient is a demanding task and, despite trauma protocols, missed injuries still occur. The objective of this study was to determine incidence and risk factors for orthopaedics-related delayed diagnoses in polytrauma patients.

Methods: Patient charts from January 1, 2000 through December 31, 2014 in the trauma registry of a Level I trauma center were reviewed to identify patients who met our study inclusion criteria, ie, admission for greater than 24 hours and an ISS >15. We determined the incidences of delayed diagnosis of injury according to the type and anatomic location of the injury; delayed diagnosis was defined as injury noted after the primary survey and 24 hours after admission. For delayed diagnosis of orthopaedic injury, we used *t* test/ANOVA (analysis of variance) or χ^2 /Fisher's exact test to assess the relationship between incidence and the potential risk factors of age, sex, race, ISS, Glasgow Coma Scale (GCS) score, ICU length of stay, intubation status, mechanism of injury, total injuries and fractures, resident daily shift change, and the beginning versus end of the academic year.

Results: The inclusion criteria were met by 2247 patients. Delayed diagnosis of an injury of any type occurred in 121 of them. A delayed-diagnosis orthopaedic injury occurred in 101 patients (4.5%), who accounted for 83.5% of those with delayed diagnosis of any type. Among the 101 patients, 27.8% had two or more orthopaedics-related delayed diagnoses. Scapula and tibial plateau fractures were the most common orthopaedics-related delayed diagnoses in the upper (18.2%) and lower (21.9%) extremities, respectively. Delayed orthopaedic diagnoses occurred largely in motor vehicle collisions in white males aged 31-50 years, although mechanism of injury, race, sex, and age were not significant predictors of delayed diagnosis. ISS, GCS, intubation on arrival, and days in the ICU were also not significant risk factors. There was no difference in delayed orthopaedic diagnosis incidence for the beginning versus end of the academic year or during resident shift change. However, as the number of delayed diagnoses incurred per patient increased there was a concomitant increase in associated injuries and fractures. Patients with delayed orthopaedic diagnosis had on average 11.4 concomitant injuries and 6.7 fractures.

Conclusion: In our population, most of the delayed diagnoses in polytrauma patients were orthopaedic in nature. Risk for delayed diagnosis of orthopaedic injury in these patients was significantly associated with total number of concomitant injuries and fractures.