Tracking the Prehospital Course of Open Fracture Patients

Andrew John Rodenhouse, James D Brodell, Hashim Shaikh¹, Jeremy Cushman, John T Gorczyca¹

¹University of Rochester

INTRODUCTION:

Open fractures remain challenging injuries to treat not only due to the bony injury, but more so, arguably, because of the accompanying soft tissue insult, compromised vascularity, and introduction of microorganisms and foreign material into the wound, all of which contribute to an increased risk of infection and delayed healing. It is known that rapid administration of intravenous (IV) antibiotic prophylaxis in patients with open fractures decreases infection risk. However, there is a paucity of literature regarding the accurate time from injury until initial antibiotic administration for open fractures. Data is often estimated or calculated only from the time of arrival to the trauma center until antibiotic administration. A comprehensive documentation of the prehospital course of events for open fracture patients provides valuable insight into novel therapeutic opportunities in the modern trauma era, for example the utilization of prehospital antibiotic administration, to mitigate the risk of infection, and may prompt revision of existing protocols to determine appropriate policy changes to improve outcomes and decrease complications in the future.

This study was approved by our institutional review board (STUDY0006920). Patients were identified using current procedural terminology (CPT) codes for open fracture debridement. Patients at least 18 years of age with open fractures, complete in hospital documentation, and complete emergency medical services (EMS) prehospital documentation were included. Pediatric patients, patients with open facial fractures, and those with incomplete documentation were excluded. Data collected included demographic information, fracture description, Gustilo-Anderson classification, dispatch time, on scene time, enroute to hospital time, arrival at hospital time, and transfer of care. We also recorded modality of transport to the emergency department, as well as if IV antibiotics were administered prior to arrival at the hospital. RESULTS:

Seven hundred patient charts were reviewed. 73 patients were brought to the hospital via private vehicle, 44 patients were transferred from an outside hospital, 23 patients had open facial fractures, and 106 patients did not have EMS prehospital documentation available and were excluded. This left 454 patients for analysis in the study. All patients were transported to an urban level I trauma center. The average time to arrival on scene was 13.2 ± 12.4 minutes. The average time on scene was 20.3 ± 12.2 minutes. The average time transporting to the hospital was 24.1 ± 16.3 minutes. The average total time from dispatch to transfer of care was 68.7 ± 28.9 minutes. 239 patients (52.6%) had transfer of care greater than one hour after time of dispatch. 206 of the 239 patients (86.2%) were injured outside of the urban environment. There was a significant difference in time from dispatch to transfer of care at the hospital between patients originating within the city in which the level I trauma center was located, and those who were injured outside of the city (49.4 ± 17.3 vs. 82.8 ± 27.2 minutes respectively, p < 0.001).

Fifty-five patients were transported via helicopter, of which 17 (30.9%) received IV antibiotics. This represented only 3.7% of all open fracture patients included in the study.

DISCUSSION AND CONCLUSION:

A substantial portion of patients with open fractures arrive at the hospital greater than one hour after the time of dispatch. This delay in care for open fracture patients has not been previously described. Routine prehospital administration of IV antibiotics represents an underutilized opportunity to improve care for open fracture patients and deserves further attention.