Prehospital Antibiotics for Infection Prophylaxis in Open Fractures

INTRODUCTION/STUDY QUESTION: Previous studies have shown that earlier administration of antibiotics for infection prophylaxis in open fractures decreases the incidence of infection. We sought to decrease the time to antibiotic administration for patients sustaining open fractures through implementation of a protocol in our regional EMS system, where EMS providers give antibiotics in the field when there is a suspected open fracture. We aimed to determine whether prehospital antibiotics reduced the incidence of all unplanned treatment for deep or superficial infection.

METHODS: Our institutional protocol for antibiotic administration for open fractures was extended to EMS providers in our region. This protocol was then approved at our regional EMS medical directors meeting. Inclusion criteria were: (1) patients that presented to our Level 1 academic trauma center initially, and (2) had an operative diagnosis of an open fracture. Exclusion criteria included: (1) digit injuries, and (2) patients transferred from outside hospitals. EMS providers administered the appropriate weight-based dose of cefazolin (Ancef ®, SmithKline Beecham – USA) when patients were determined to have an open fracture. We documented all open fractures from 2016 to 2018 and compared them in a case-control fashion.

RESULTS: There were 68 patients that received Ancef by EMS providers prior to arrival. There were 65 that did not receive Ancef prior to arrival. In the prehospital antibiotic cohort, there were 3 Type I fractures, 29 Type II fractures, 30 Type 3A fractures, 3 Type IIIB fractures, and 3 Type 3C fractures. One patient had bilateral Type 3A femurs. In the control group, there were 19 Type I fractures, 31 Type 2 fractures, 14 Type 3A fractures, one Type IIIB, and no Type IIIC fractures. Outcomes of the prehospital antibiotic group include no Type I fractures received unplanned treatment, 20% (6/30) of the Type II fractures required a course of antibiotics and 3% (1/30) required surgery, 16% (5/30) of the Type IIIA fractures required a course of antibiotics and 23% (7/30) required a surgery, and 33% (1/3) of the Type IIIB fractures required a course of antibiotics. Outcomes of the control group include 5% (1/19) of the Type I fractures requiring antibiotics and 5% (1/19) required a surgery, 19% (6/31) of the Type II fractures required a course of antibiotics and 10% (3/31) required a surgery, and 21% (3/14) of the Type IIIA required a course of antibiotics and 21% (3/14) required a surgery. No statistical significance was found with a p value of 0.675127.

DISCUSSION: We were able to implement a prehospital antibiotic protocol with a capture rate of greater than 50% of patients arriving directly to our institution. There was a propensity for more severe fractures such as Type II and Type III to receive prehospital antibiotics than the Type I fractures. A chi square test was used to determine whether the population that got prehospital antibiotics to the population that didn’t had a lower rate of intervention; however, this was not statistically significant. To evaluate infection, we will need a larger study population to achieve an adequate study power but the number represented in this study is adequate to determine the efficacy and safety of protocol implementation.