

Infection Rate and Antibiotic Administration for Urban Gunshot Wounds

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Purpose: Infection after fracture fixation is a devastating complication, associated with delayed healing, amputation, sepsis, and mortality. Traditionally, open fractures and ballistic fractures are considered risk factors for infection. However, no consensus exists on the utility of infection prophylaxis specifically for low-velocity ballistic fractures. While approaches have been adapted from other practice settings or injury mechanisms, high-quality evidence for their efficacy in urban ballistic populations is lacking. This study evaluates infection rates after single-extremity, low-velocity ballistic fractures and analyzes trends in prophylactic antibiotic administration at a Level I academic trauma center. We hypothesize that antibiotics administered within 3 hours of injury will reduce rates of associated infection.

Methods: A retrospective cohort study was conducted on patients over 16 years old with ballistic fractures between May 2018 and December 2020. Outside hospital transfers and non-extremity fractures (spine, pelvis) were excluded. Medical records were reviewed for demographic information, anatomic location, antibiotic administration, comorbidities, OTA classification, and infection treatment or surgery within 90 days. Antibiotic administration within 3 hours of presentation was defined as early appropriate antibiotic administration (EAA), keeping with traditional open fracture evidence.

Results: Of 821 identified ballistic fractures, 596 were analyzed after exclusions. Of these, 65% received EAA, and 35% did not. Infections were observed in 4.6% of patients who received EAA and 3.9% of those who did not. There was no significant association between EAA and infection, nor between fracture location and infection. Visceral injury and operative treatment were independently associated with higher odds of infection. Tibial shaft fractures had the highest infection rate at 23%. Ancef was the most commonly administered antibiotic.

Conclusion: This study suggests that EAA does not significantly reduce odds of infection in patients with urban extremity ballistic fractures. This is contrary to prevailing military treatment protocols and the established efficacy of EAA in open fractures, which have been extrapolated to inform current practices. These contrasting findings underscore the complex nature of infection risk mitigation. Treatment paradigms must be tailored to specific injury context. There is evident need for data-driven recommendations for infection prophylaxis in urban ballistic injuries.