

Infection Rates of Isolated Low-Energy Extremity Gunshot Injuries

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Purpose: Extremity involvement is common among non-fatal gunshot wounds (GSWs). Despite their frequency, no standard treatment algorithms exist regarding the administration of antibiotics in this population. The goals of the study were (1) to determine the incidence of infection in isolated low-velocity GSWs to the extremity, presenting to an urban trauma center, and (2) to develop an institutional guideline for antibiotic treatment of these injuries.

Methods: A retrospective review of a prospectively collected database was performed at a Level I trauma center. 502 consecutive, skeletally mature patients with isolated extremity GSWs were treated over 4 years. Treatment was recorded including type and duration of antibiotics and details of operative and nonoperative management. Superficial and deep (defined as requiring intravenous antibiotics or surgical debridement) infections and complications were evaluated.

Results: There were 469 lower extremity injuries (79.2%) and 123 upper extremity injuries (20.8%) in 502 patients. Mean age was 30.4 ± 11.6 years, and 95.0% of patients were male, 27.1% had multiple injuries, and 54.4% had associated fractures. 69% received prophylactic antibiotics, most commonly a first-generation cephalosporin (90.0%). Age, gender, and injury location were similar between the groups that did and did not receive antibiotic prophylaxis. In patients with follow-up for wound assessment, 437 patients (87.1%), the overall infection rate was 5.72% (25/437 patients) and deep infection rate was 1.14% (5/437 patients). Regarding soft-tissue-only injuries, antibiotic prophylaxis lowered the rate of infection versus no antibiotics (2.08% vs 10.13%, $P = 0.04$); however, multiple doses of antibiotic did not reduce the rate of overall infection further when compared to a single dose (5.31% vs 3.85%, $P = 1.00$). There was no difference in deep infection with or without antibiotic prophylaxis (0% vs 2.53%, $P = 0.20$) in soft-tissue-only injuries. No deep infections occurred in patients with nonoperatively treated fractures, regardless of antibiotic administration (0/112 patients); 31 (27.7%) of these patients did not receive antibiotic prophylaxis. All operatively treated fractures ($n = 150$) received antibiotic prophylaxis, after which the overall infection rate was 8.00%, and the deep infection rate was 2.00%.

Conclusion: Infection after low-energy extremity GSWs is infrequent. In nonoperatively treated fractures and in soft-tissue injuries without fracture, a single dose of intravenous antibiotics in the emergency room appears to be safe and cost-effective, with no discernible advantage to additional antibiotics or surgical debridement. Fractures treated operatively with fixation and perioperative antibiotic prophylaxis also have a low rate of infection.