

Single-Dose IV Antibiotic for Low-Energy Extremity Gunshot Wounds: A Prospective Quality Improvement Care Pathway

*Jonathan Carr Savakus, BS; Mai P. Nguyen, MD; Natasha Simske, BS; Joseph F. Golob, MD; Amy Ann McDonald; John J. Como, MD, MPH; Heather A. Vallier, MD
MetroHealth System, Cleveland, OH, United States*

Purpose: Low-energy gunshot wounds (GSWs) are common, and no established standard of care exists for infection prophylaxis. Recent data have demonstrated efficacy of a single dose of intravenous (IV) antibiotics in the emergency department (ED) for infection prophylaxis. We implemented a care pathway to standardize antibiotics after low-energy isolated extremity GSWs. A single dose of cefazolin is administered (clindamycin for penicillin allergy), and tetanus immunization status is updated. The purpose of this project isto describe our results after implementation.

Methods: All patients presenting with GSW to our trauma center over 35 months were prospectively assessed; 87 with subacute presentation and 478 with GSW to nonextremity regions were excluded. High-energy injuries (n = 7), injuries from BB guns (n = 6), graze wounds (n = 8), and injuries requiring revascularization (n = 39) were excluded. Patients with fracture undergoing fixation (n = 51) received a single dose in the ED plus an additional 24 hours of perioperative antibiotics. No antibiotics were prescribed subsequently. Infection and administration of subsequent antibiotics were recorded.

Results: 1197 patients presented with GSWs; 572 had isolated, low-energy extremity injuries, and 389 (68%) had >4 weeks of follow-up and/or developed infection prior. This included 356 men (92%) with mean age 30 years. Most common sites were the upper leg (43%), lower leg (24%), and upper arm (15%); 140 (36%) had associated fractures, 54% of which had fixation. Overall, 127 patients (33%) did not receive the recommended single dose of antibiotics. 60 received extra IV and/or oral antibiotics. 67 received no antibiotics. Our overall infection rate was 11% (44 of 389), primarily superficial wound infections (27 of 44, 61%), with 6 patients (1.5%) requiring surgical debridement. Patients initially treated with the single-dose pathway had a 9% infection rate. Conversely, 19% of patients receiving no antibiotics developed an infection (P = 0.03). The single-dose pathway reduced infections compared with a group of similar patients treated in our hospital previously for GSWs (15.7%, P = 0.03). No benefit was seen to routine supplemental IV or oral antibiotics in addition to the pathway (12% infection rate, P = 0.63).

Conclusion: A standardized care pathway of single-dose IV antibiotic is simple and inexpensive and appears safe. It is associated with a low risk of infection after GSW to the extremities. Prospective evaluation demonstrated that this protocol reduced infection versus our historical cohort and versus those receiving no antibiotics.