

A Multicenter Assessment of Ballistic Pelvic Fractures: Does Bullet Trajectory Through Bowel Prior to Bone Result in Higher Deep Infection Rates?

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Purpose: Gunshots that enter the bowel prior to bone may implicate gastrointestinal flora seeding of the pelvis, increasing the risk for osteomyelitis or hardware infection. The objective of this study was to compare deep infection rates among bullets that travel through bowel then bone versus bone then bowel.

Methods: This was a retrospective cohort study from seven Level I trauma centers. Patients 18 years and older with gunshot wounds (GSW) resulting in ballistic iliac fractures presenting between 2018 and 2024 with a minimum of 6-month follow up were included. Deep infection was characterized by any patient who required repeat or delayed irrigation and debridement of the pelvis after initial operative or nonoperative management. Analyses determined from CT scans were conducted among patients with gunshot wounds that went from the abdominal cavity first then through bone (GSWG) versus those that went through bone first then the abdominal cavity (GSWB).

Results: In total, 128 patients with ilium fractures from GSWs were included. There were 42 (32.8%) patients in the GSWG cohort, 49 (38.3%) in the GSWB cohort, and 37 (28.9%) with an unclear bullet trajectory or one that did not involve the abdominal cavity. In the GSWG cohort, six (14.3%) patients subsequently underwent irrigation and debridement of the bony pelvis for deep infection compared to one (2.0%) patient in the GSWB cohort ($p = 0.029$). Initial irrigation and debridement were performed in 10 (23.8%) GSWG patients within 1 week of injury versus six (12.2%) GSWB patients ($p = 0.091$). Each cohort had three (7.1% GSWG, 6.1% GSWB) patients with superficial infection that resolved with antibiotics ($p = 0.847$).

Conclusion: Prior literature has not assessed the impact of the theoretical risk of bony pelvis bacterial contamination for projectiles that travel from the abdominal cavity into bone. This multicentered study demonstrates that bullets that traverse the abdominal cavity prior to entering the bony pelvis are at higher risk of a deep infection developing that requires subsequent irrigation and debridement.