Outcomes of Open Pelvic Ring Fractures in Combat-Related Trauma

Louis Lewandowski, MD; Matthew Kluk, MD; Richard Purcell, MD; Steven Grijalva, MD; Wade Gordon, MD
[1]*Walter Reed National Military Medical Center, Rockville, Maryland, USA;*
[2]*Fort Hood, Harker Heights, Texas, USA;*
[3]*Walter Reed National Military Medical Center, Kensington, Maryland, USA;*
[4]*NH Jacksonville, Pace, Florida, USA;*
[5]*Walter Reed National Military Medical Center, Bethesda, Maryland, USA*

Background/Purpose: Since the beginning of the current conflicts in Iraq and Afghanistan, United States service members have been surviving combat-related injuries that previously would have been fatal. Resultant from this increased survival rate are high-energy traumatic injuries to the musculoskeletal system not seen in civilian trauma. Among the injuries that are dramatically different from civilian trauma are pelvic ring fractures. The mechanism of injury seen in combat-related pelvic ring injuries is more likely to be a penetrating injury such as a gunshot wound or blast injury. This leads to a higher percentage of open pelvis injuries, a greater degree of contamination, and more severe associated injuries.

Methods: We performed a retrospective review of the Department of Defense Trauma Registry into which all our combat-injured patients are enrolled, as well as local patient medical records, and radiologic studies from March 1, 2003 to April 30, 2012. 116 pelvic ring fractures were identified with 38 of those fractures being classified as open fractures. Information regarding mechanism of injury, fracture pattern, transfusion requirements, ISS, and presence of lower extremity amputations were analyzed. Results are presented as medians with interquartile ranges (IQR).

Results: The mechanism of injury was an explosive device in 92% of patients with an open fracture compared to 64% of our closed fracture group. Patients with open pelvic ring disruption required a median of 29 (IQR 14-40) units of PRBC (packed red blood cells) within the first 24 hours after injury. The mean ISS was 35 (IQR 29-42) in the open group compared with 30 (IQR 22-36) in the closed group. 23 patients (61%) sustained bilateral lower extremity amputations with 10 (43%) of those patients having either a hip disarticulation (n = 4) or hemipelvectomy (n = 6) as one of their final amputation levels in the open fracture group. It is also of note that 29% of the open group was positive for invasive fungal infection and the six who underwent hemipelvectomy all had positive cultures for mold. Furthermore, the open pelvic fracture group experienced an 8% fatality rate in patients that returned to the United States.

Conclusion: Pelvic ring injuries sustained in combat represent a major treatment challenge because of their high percentage of open injuries. Massive transfusions are frequently required and bilateral lower extremity amputations are common secondary to a high-energy mechanism of injury. Our series of 116 combat-related pelvic ring injuries with 38 open pelvic ring fractures is one of the largest series of open pelvic fractures on record. A mortality rate of 8% once these patients reach the United States compares favorably to mortality rates seen in civilian trauma. The mechanism of injury and constellation of associated injuries such as amputations lead to a significant challenge in both the resuscitation as well as long-term rehabilitation of these patients.