Outcomes of Open Acetabular Fractures in Combat-Related Trauma

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Background/Purpose: Since the onset of the Global War on Terror, close to 50,000 United States service members have been injured in combat; many of these injuries would have previously been fatal. Among these injuries, open acetabular fractures are at an increased number due to the high percentage of penetrating injuries such as high-velocity gunshot wounds and blast injuries. Blast and ballistic injuries lead to a greater degree of contamination, and more severe associated injuries. There is a significantly smaller proportion of the classic blunt trauma mechanism typically seen in civilian trauma.

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. 85 acetabular fractures were identified with 33 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 (IQRs).

Results: The mechanism of injury was an explosive device in 60% of patients with an open fracture; the remaining 40% were secondary to ballistic injuries. Our closed injury cohort, however, reported a 34% blast injury rate with the remainder of the patients sustaining blunt injury from falls, motor vehicle collisions, or aircraft crashes. Patients with open acetabular fractures required a median of 18 (IQR 5-30) units of PRBC (packed red blood cells) within the first 24 hours after injury. The mean ISS was 31 (IQR 24-35) in the open group compared with 22 (IQR 9-30) in the closed group. Three patients were noted to have bilateral acetabular fractures in the open group with 24% of open fractures being classified as associated patterns. Nine patients (27%) sustained bilateral lower extremity amputations with 8 (89%) of those patients having either a hip disarticulation (n = 4) or hemipelvectomy (n =4) as one of their final amputation levels in the open fracture group. The open group required a mean of 10 procedures (IQR 4-13) to treat their fracture compared to a mean of 1 procedure (IQR 0-2) in the closed group.

Conclusion: Open acetabular fractures represent a major treatment challenge in the management of severe, combat-related injuries. High Injury Severity Scores and massive transfusions are common secondary to the mechanism of injury involved. Our series of 85 combat-related acetabular fractures including 33 open acetabular fractures is one of the largest series on record of open acetabular fractures. Open acetabular fractures frequently require massive initial transfusions and multiple procedures due to the severe soft-tissue injury seen in these patients. The dramatic increase in the percentage of open acetabular fractures at 39% in this review highlights the challenge in treatment of acetabular fractures in combat-related injuries.

See pages 47 - 108 for financial disclosure information.