Risk Factors for Deep Infection and Total Hip Arthroplasty After Combined Pelvic Ring and Acetabular Fractures

Shane Strom, MD; Henry Vinson Bonner, BS; Kyle Cichos, BS; Elie S. Ghanem, MD; David Albert Patch, MD; ***Clay A. Spitler, MD***
University of Alabama at Birmingham, Birmingham, AL, United States

Purpose: The purpose of this study is to describe the risk factors for deep infection and conversion to total hip arthroplasty (THA) after operative management of combined pelvic ring and acetabular fractures.

Methods: A retrospective review of all combined pelvic ring and acetabular fractures was performed at a single Level I trauma center over a 5-year period (2014-2019). Inclusion criteria included operative management of both injuries and skeletal maturity. Primary outcomes included conversion to THA and deep infection as defined by positive cultures at the time of a secondary debridement or conversion to THA. A minimum of 3-month follow-up was included for infection analysis, while a minimum of 1-year follow-up was required for conversion to THA analysis. Demographic factors, injury characteristics, and surgical choices were assessed between those who developed a deep infection and those who remained infection-free.

Results: A total of 189 patients were identified from billing data. 149 patients had 3-month follow-up. Patients who developed a deep infection had significantly higher body mass index (36.1 vs 30.5 kg/m2; $P = 0.009$), higher estimated blood loss (1262 cc vs 561 cc; $P<0.001$), higher rates of hip dislocation (64.7% vs 40.8%, $P = 0.037$), and a higher rate of intraoperative transfusion (76.5% vs 48.8%, $P = 0.03$). There were no significant differences in age, sex, tobacco use, abdominal or genitourinary organ injury, pelvic artery embolization, length of stay, or discharge disposition (home vs facility). 83 patients had 1-year follow-up. Patients who underwent conversion to THA were significantly older (42.8 vs 36, $P = 0.03$), had higher rate of posterior wall involvement (87.5% vs 46.6%, $P<0.001$), higher rates of hip dislocation (52.5% vs 36.7%, $P = 0.031$), marginal impaction (45.8% vs 23.3%, $P = 0.042$), posterior wall comminution (66.7% vs 30.5%, $P = 0.002$), and higher estimated blood loss (913 mL vs 620 mL, $P = 0.02$), and longer operative time (324 min vs 256 min, $P<0.001$). There were no differences in type of pelvic ring injury (Young-Burgess) or acetabular fracture classification (Letournel), ISS, ICU stay, or tobacco or illicit drug use. There was no difference between the THA/no THA groups in the order of fixation (posterior ring fixation first vs acetabular fixation first).

Conclusion: Management of patients with combined injuries of the acetabulum and pelvic ring is particularly challenging. Higher body mass index, higher-complexity surgery (higher estimated blood loss and higher rates of transfusion), and hip dislocation were associated with infection. Hip survivorship is negatively associated with older age, and fracture characteristics like posterior wall involvement, wall comminution, and marginal impaction, but was not associated with pelvic ring injury type or acetabular fracture type. The order of pelvic ring versus acetabular fixation did not affect conversion to THA at 1 year.