Percutaneous Fixation of the Posterior Pelvic Ring for Vertically Unstable Injuries: How Much Is Enough?

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Purpose: Vertically unstable pelvic ring injuries (OTA 61C.1-3) have high rates of reported fixation failure when the posterior pelvic ring is treated with percutaneous screw fixation. The purpose of this study was to assess risk factors for failure in vertically unstable pelvic ring injuries. We hypothesized that constructs with multiple screws at multiple sacral levels (MLF) would be associated with a lower rate of failure when compared with single-level fixation (SLF).

Methods: We performed a retrospective review of posterior pelvic ring injuries treated at a Level I trauma center over a 20-year period. Inclusion criteria were skeletally mature patients with sacral fractures, sacroiliac (SI) dislocations, or SI fracture-dislocations with ≥1 cm of vertical displacement on pelvis radiographs with a minimum 6-month follow-up. Failure of fixation was defined as 1 cm of vertical displacement when compared to postoperative films or screw breakage/backout. Fixation configurations were divided into 2 groups. SLF was defined as sacroiliac and/or transsacral screws applied at a single sacral level; MLF was defined as a construct with fixation at multiple levels, including at least 1 transsacral screw.

Results: 49 patients met inclusion criteria. The majority of cases were sacral fractures (n = 29, 59%), the remaining were SI dislocations or SI fracture-dislocations (n = 20, 41%). Mean initial vertical displacement was 1.8 cm. 8/49 (16%) were treated with open reduction of their posterior pelvic ring injury. The overall rate of fixation failure was 27% (13/49). SLF was significantly associated with fixation failure compared to MLF (57.9% vs 6.7%, $P<0.01$). When only considering sacral fractures, findings were similar (60% vs 7.1%).

Conclusion: In the treatment of vertically unstable pelvic ring injuries, percutaneous screw fixation of the posterior pelvic ring can be an effective technique if “multiple screws at multiple levels” can be achieved. When a multilevel construct with a transsacral screw is utilized, the success rate was 93%. SLF is associated with a high failure rate of 60%. These findings may inform the decision to perform adjunctive lumbopelvic fixation in the treatment of these injuries.