A Comparison of Open Versus Percutaneous Approaches to Spinopelvic Dissociation: Presentation, Complications, and Outcome

Justin P. Moo Young, MD*; Jonathan Savakus, MD; Daniel E. Pereira, BA; Jeffrey Hills, MD; Byron F. Stephens, MD; Phillip Mitchell, MD*
Vanderbilt, Nashville, TN, United States

Purpose: Spinopelvic dissociation is a rare and potentially devastating injury. Displacement, neurologic compromise, surgeon preference, and institutional protocols all factor into the treatment decision on the appropriate approach. Most commonly, either an open approach with lumbopelvic fixation, or percutaneous approach with iliosacral and / or transiliac-transsacral screws, is utilized. There is limited literature to guide a surgeon's decision on approach, and significant variability exists in the treatment of these injuries. We sought to compare the complication rates of open and percutaneous treatments for spinopelvic dissociation.

Methods: We reviewed all cases of sacral fractures treated operatively over a 20-year period at our busy Level I trauma center. Patients with a U-, H-, Y-, or lambda-type sacral fracture treated operatively were identified. All imaging was reviewed for associated fractures about the pelvic ring, pre- and postoperative kyphosis, fixation construct, and evidence of postoperative hardware complication. ISS, Charleston Comorbidity Index (CCI), and other demographic data were collected. Clinical outcomes, including wound complication, infection, and reoperation were identified through chart review. Minimum follow-up was 3 months.

Results: We identified a total of 96 patients that underwent fixation for a traumatic spinopelvic dissociation over a 20-year period. 63 patients (66%) were repaired using a percutaneous-only approach (*P*) and 33 patients (34%) were repaired with open lumbopelvic fixation (LP) or a combined approach. There was no difference in age ($P = 0.6$) or the incidence of associated pelvic ring fractures ($P = 0.13$) between the two groups. The patients treated percutaneously were an overall more injured cohort when compared to the lumbopelvic patients (mean ISS of 28 vs 19, $P = 0.003$) Patients treated with open lumbopelvic fixation had more kyphosis (25° vs 14°, $P = 0.009$) and a higher incidence of preoperative neurologic injury (51% vs 11%, $P<0.0001$) when compared to patients in the percutaneous cohort. We found a statistically significant increase in wound complications in the LP cohort compared to the percutaneous cohort (20% vs 0%, $P<0.0001$). There were no cases of hardware failure in either cohort with no cases of nonunion. There was no difference in the rate of hardware removal (9% LP vs 3% *P*, $P = 0.22$).

Conclusion: Open and percutaneous treatments for spinopelvic dissociation yield a high rate of union without hardware complication. Patients with increased kyphosis and neurologic compromise were more likely to undergoing open repair of their injuries. In patients undergoing an open approach, a higher rate of wound complication and infection was seen when compared to a similar cohort undergoing percutaneous fixation.