

Comparing Clinical Outcomes Between Open Versus Percutaneous Approach for Spinopelvic Dissociation

Stevin Lu, Hania Shahzad, Shannon Tse, Augustine M Saiz, Devan Higginbotham, Josh Callaway, Jonathan G Eastman, Eric O Klineberg, Yashar Javidan, Hai Le

INTRODUCTION:

Spinopelvic dissociation has traditionally been managed with an open approach. More recently, spine surgeons have utilized percutaneous lumbopelvic fixation for these unstable injuries. This study aims to assess differences in postoperative surgical site infections (SSIs), reoperation rates, and neurologic recovery between open vs percutaneous approaches.

METHODS:

Patients aged ≥ 18 years old undergoing lumbopelvic fixation for spinopelvic dissociation between 2016 to 2024 were included. Patients were classified into 2 groups: open vs percutaneous. A retrospective review of medical records was conducted. Postoperative complications included SSIs and reoperations, while neurologic recovery was assessed based on ambulation status (independent, assisted, non-ambulator) at final follow-up and lower extremity (LE) motor strength test. T-tests and chi-square models assessed for significant differences ($p < 0.05$).

RESULTS:

This study included 32 patients who met the inclusion criteria: 21 in the open approach group and 11 in the percutaneous approach group. There were no significant differences in patient demographic variables between both groups including age, body mass index (BMI), sex, race, and smoking status ($p > 0.05$). The most common mechanism of injuries for both groups included motor vehicle crashes, motorcycle crashes, and ground level falls.

Patients in the open group (N=14; 66.7%) were significantly more likely to undergo decompressive laminectomy than patients in the percutaneous group (N=2; 18.2%; $p < 0.05$). Patients who underwent an open approach also had significantly longer operation times (296.7 mins vs. 216.2 mins) and greater blood loss (405.5 mL vs. 111.4 mL) than patients who underwent a percutaneous approach ($p = 0.025$ and $p < 0.05$, respectively). There were 13 patients (61.9%) in the open group and 3 (27.2%) in the percutaneous group who presented with initial preoperative motor deficits. Postoperatively, there were no significant differences between both groups in the number of patients who had improvement in lower extremity motor function and the majority of patients remained unchanged from preoperative deficits ($p > 0.05$). Additionally, the number of patients who achieved independent ambulation status postoperatively were statistically similar between both groups (N=9; 42.9% in the open group vs. N=3; 27.2% in the percutaneous group; $p = 0.39$). There were also no significant differences found between hospital length of stay, American Society of Anesthesiologists (ASA) score, staged procedures, use of transiliac-transsacral screws, morel lesions, surgical site infections, and reoperation rates between both groups ($p > 0.05$).

DISCUSSION AND CONCLUSION:

This study suggests both approaches did not yield clinically significant improvements in LE motor strength after surgery. Majority of patients who presented with preoperative motor deficits continued to have weakness postoperatively, regardless of the approach. Postoperative outcomes such as SSIs, reoperation rates, LOS, and achievement of independent ambulation between both approaches were statistically similar. Benefits of the percutaneous approach include shorter operation times and less blood loss.

	Percutaneous (N=11)	Open (N=21)	P-value
Decompression	2	14	0.009
Staged	2	7	0.365
Length of surgery (mins)	216.2 +/- 81.5	296.7 +/- 107.5	0.025
Mechanism of injury	5 MVC; 4 GLF; 2 Auto vs pedestrian	5 MVC; 5 MCC; 2 GLF; 3 auto vs pedestrian; 2 high level fall; 4 other	
EBL	111.4 +/- 76.1	405.5 +/- 430.4	0.006
Length of stay (entire hospitalization; days)	19.6 +/- 8.5	16.5 +/- 11.4	0.383
Length of stay (date of surgery to discharge; days)	18.1 +/- 7.0	12.0 +/- 10.1	0.712
Morel lesion	2	3	0.773
Post-op SSI	1	3	0.673
Reoperations	2	7	0.365

	Percutaneous (N=11)	Open (N=21)	P-value
Independent ambulation	3	9	0.387
Preoperative motor deficits	3	13	0.63
Postoperative motor improvement	1	2	0.968
Postoperative motor strength: stable (unchanged from preoperative)	2	11	0.472

	Percutaneous (N=11)	Open (N=21)	P-value
Age	56.8 +/- 15.3	43.5 +/- 21.3	0.052
BMI	23.4 +/- 7.8	26.4 +/- 7.5	0.299
Females	8	13	0.540
White	6	16	0.209
Hispanic/Latino	2	3	0.773
Ever Smoker (former/current)	4	11	0.388
ASA	3.3 +/- 0.6	2.9 +/- 0.7	0.101