A Prospective Patient Survey Reporting Outcomes of the Distal Ventral Iliac Pathway for Spinopelvic Fixation

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Disclosures: J.M. Panzone: None; P.D. Korytkowski: None; Z.R. Visco: None; C.I. Cady-McCrae: None; N.R. Ordway: 5; Stryker Spine; W.F. Lavelle: 5; 4-Web, Abryx, Cerapedics, DePuy Spine, Innovasis, Medtronic, Vertiflex, TruSpine; R.A. Tallarico: 5; Stryker Spine, Vertiflex.

INTRODUCTION: Patient pain and discomfort due to symptomatic iliac screws is a common complication of spinopelvic fixation (SPF) surgery and often requires additional management, including potential hardware removal. The distal ventral iliac pathway (DVIP) for SPF is a novel surgical approach theorized to reduce the prevalence of symptomatic iliac screws due to reduced tissue disruption and hardware prominence compared to traditional methods.[1] However, no data currently exists assessing the clinical outcomes of this technique. This study emulated a prospective survey of patients who received SPF surgery[2] to investigate patient reported outcomes regarding pain characteristics for the DVIP technique.

METHODS: 199 patients from a single academic medical institution who received spinopelvic fixation surgery between the years of 2013 and 2018 with at least 12 months follow up were called to participate in the survey. Patients who were unreachable after three attempted phone calls were sent a written copy of the survey and called once more for follow up. Survey questions pertained to patient pain and discomfort related to iliac screws and activities since their SPF surgery. Descriptive statistics, including means and frequencies, were collected and case control matching based on age (within 5 years) and gender was used to compare results from the DVIP and traditional iliac (TI) techniques. Chi-square analyses were utilized to assess the associations between cohorts and specific survey questions indicative of pain.

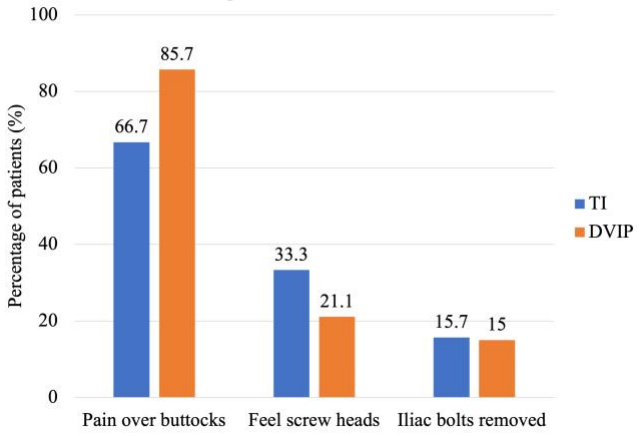
RESULTS: The results of the overall patient survey are summarized in Table 1. A total of 143 patients (71.9%) successfully completed the survey. The mean age of all respondents was 61.6 years (range 19-82). The results of the case control subgroup (n=21 pairs, TI and DVIP patients) are summarized in Figure 1. Chi-square analyses demonstrated no statistically significant difference in rates of patients reporting pain over their buttocks (p=0.147), rates of reporting feeling the metal iliac screws (p= 0.385), rates of screw removal via a revision surgery (p= 0.614), or degree of change in activity following the surgery (p=0.163).

Table 1. Primary patient reported survey outcomes for the overall group and case controlled subgroup

	Overall	Case control subgroup	
	Combined cohort (n=143)	Distal ventral iliac pathway (n=21)	Traditional iliac (n=21)
Age, mean (range)	61.6 (19-82)	62.4	62.7
Gender Male (n, %) Female (n, %)	- 66 (46.2) 77 (53.8)	- 7 (33.3) 14 (66.7)	- 7 (33.3) 14 (66.7)
Pain over buttocks, n (%)	98 (68.5)	18 (85.7)	14 (66.7)
Level of pain, (mean)	5.4/10	5.9	5.0
Feel screws, n (%)	50 (35.7)	4 (21.1)	7 (33.3)
Screws removed, n (%)	19 (14.1%)	3 (15)	3 (15.7)
Activity level since surgery, n (%) Decreased some/sig Remained the same Increased some/sig	- 68 (53.1) 7 (5.4) 53 (41)	- 11 (52.4) 3 (14.2) 7 (33.3)	- 13 (61.9) 0 (0.0) 8 (38)

DISCUSSION: This initial data suggests that the DVIP technique was non-inferior to standard methods regarding patient reported pain following surgery. Surgeons should be aware of the DVIP technique as a safe and reliable approach to SPF with potential surgical, biomechanical, and patient outcome benefits. These include a simplified technique, less tissue disruption, reduced intraoperative radiation exposure, and obviating the need for bulky lateral connectors which contribute to hardware prominence and add a potential failure point to the construct. Future research with larger sample sizes is warranted to further establish associations between surgical technique and patient pain levels. This study showed that screw head prominence was unlikely to be the sole contributary factor associated with pain in this region following spinopelvic fixation. Symptom generators in this location are multifactorial and can include tissue disruption related to exposure, inadvertent and/or deliberate sacroiliac joint violation, altered biomechanics across the sacroiliac joint, and stress loading associated with the implant/construct.

Figure 1. Case Control Subgroup: Comparison of TI and DVIP Patients



SIGNIFICANCE/CLINICAL RELEVANCE: The distal ventral iliac pathway was a safe and reliable approach to performing spinopelvic fixation which offers numerous potential advantages including improved biomechanical stability via obviation of lateral connectors, greater ease of installation, reduced tissue insult during dissection, and lower prevalence of symptomatic iliac screws due to maintenance of the posterior superior iliac spine, reduced hardware bulk, and decreased screw head prominence.

REFERENCES: 1. Cady-McCrea et al., Int J Spine Surg, 2021. 2. Kuklo et al., Spine, 2002.