Accuracy Of Sacroiliac Screw Placement In Dysmorphic Sacra: Is Navigation The Answer?

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INTRODUCTION:

Percutaneous sacroiliac (SI) screw fixation is commonly performed for posterior fixation of pelvic ring fractures. Screw insertion is challenging, with significant risks of both cortical and sacral foraminal breaches. There is now increasing recognition of the relatively high incidence of sacral dysplasia [1] which impairs and often precludes safe S1 screw insertion despite the more widespread use of nagivation. This study aimed to assess the clinical impact of dysmorphic sacra on the accuracy of SI screw insertion, and the role of adequate pre-operative CT assessment of the sacral corridors.

METHODS:

All patients who underwent SI screw fixation – for sacral or posterior pelvic ring fractures – at our institution over a 6-year period were identified and their medical records perused. Their pre- and post-operative CT scans were analysed to determine the presence of sacral dysmorphism and to assess screw placement.

RESULTS:

A total of 68 SI screws were inserted in 36 patients. There were three breaches of the S1 sacral foramina. Two occurred in dysplastic sacra despite the use of fluoroscopy-assisted navigation. The third sacral breach occurred without navigation being used, with a normal S1 corridor for screw placement. None of these breaches resulted in any neurovascular deficit, and none were revised.

Table 1 showing the demographics of our study population.

Gender		
	Male	30
	Female	6
Mechanism of injury		
	Road traffic accident	18
	Fall from height	13
	Other blunt trauma	5
Fracture classification (Tile)		
	B1	2
	B2	13
	B3	5
	C1	13
	C2	3
Fracture classification (Young-Burgess)		
	Anterior posterior compression	6
	Lateral compression	19
	Vertical shear	11
Surgical approach		
	Percutaneous	31
	Open	5
Navigation used		
	Yes	17
	No	19

DISCUSSION:

There was a marked prevalence of sacral dysplasia with narrow or absent S1 corridors in our study population, consistent with current literature. The insertion of SI screws in these patients resulted in a higher incidence of sacral foraminal breaches despite the use of intra-operative navigation. Simple reconstructions of pre-operative CT scans allow assessment of these corridors to guide decision-making regarding level of screw placement.

CONCLUSION:

True coronal and axial reconstruction cuts of the sacrum obtained on pre-operative CTs can be used to assess their suitability for screw insertion. In patients with dysmorphic sacra, due caution should be given to the absence of an S1 corridor despite conventional wisdom regarding the safety of S1 corridor screw insertion.

REFERENCES:

1. Goetzen M, Ortner K, Lindtner RA, Schmid R, Blauth M, Krappinger D. A simple approach for the preoperative assessment of sacral morphology for percutaneous SI screw fixation. Archives of Orthopaedic and Trauma Surgery. 2016 Sep 1;136(9):1251-7.