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Research Article

Percutaneous Sacroiliac Screw Fixation: Preliminary Experience in a Country with Limited Healthcare Resources, Based on 26 Cases

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Abstract

Introduction: Enabling anatomical reduction and rigid fixation to facilitate early mobilization of patients, percutaneous sacroiliac screw fixation is currently the gold standard technique for treating unstable posterior pelvic ring injuries. We report on our experience with this technique.

Materials and Methods: This was a prospective analysis prospective analysis including all patients operated on in the neurosurgery unit of the orthopedics and traumatology department at Ignace Deen University Hospital for sacroiliac dislocation or fracture-dislocation using screws over a two-year period from January 2024 to December 2025, with a minimum follow-up period of six months postoperatively.

Results: Twenty-six cases were identified with a mean age of 34.5 years and a predominance of females (7M/19F). Sacroiliac arthralgia was the main symptom and was present in all patients, associated with functional impairment of the ipsilateral pelvic limb. The average time to consultation was 6 days. The average Visual Analogue Scale score was 8.5. Computed tomography of the pelvis was performed in all patients. The indication for surgery was based on the Tile classification. All patients underwent postoperative pelvic radiography. The outcome was favorable in 85% of cases, with a mean Visual Analogue Scale score of 1 to 6 months postoperatively. In terms of morbidity, we noted two cases of surgical site infection. There were no deaths.

Conclusion: Although the number of cases in this study is small, our positive results in terms of symptom improvement and satisfaction rates suggest that sacroiliac screw fixation is a relatively safe and effective way to treat traumatic injuries of the sacroiliac joint.

Keywords: Dislocation; Fracture-Dislocation; Percutaneous; Sacroiliac; Screw Fixation

Introduction

First described by Routt in 1993 [1], percutaneous sacroiliac screw fixation is now the gold standard technique for treating unstable posterior pelvic ring injuries. It allows anatomical reduction and rigid fixation to facilitate early mobilization [2].

It has the advantage of minimal disruption of fragile soft tissue, limited blood loss, and reduced infection rates [3].

However, this method is technically difficult and requires a learning curve and a solid knowledge of regional vascular and nervous anatomy.

Until the end of 2023, the management of traumatic pelvic ring injuries in our country was mainly orthopedic or by external fixator. The beginning of 2024 was marked by the arrival of young surgeons trained abroad, who introduced this technique into our therapeutic arsenal.

We are therefore reporting on our early experience with the aim of evaluating our results in anatomical and functional terms and comparing them with the current data in the literature.

Materials and Methods

We prospectively studied all patients operated on in the neurosurgery unit of the orthopedics and traumatology department at Ignace Deen University Hospital for sacroiliac dislocation or fracture-dislocation treated with sacroiliac screw fixation after informed consent over a two-year period (January 2024 to December 2025).

All our patients underwent a complete clinical examination and pelvic imaging, including X-ray and computed tomography (CT) scans.

We used the Tile classification [4] for surgical indication, with surgery performed for type C injuries.

All patients underwent standard postoperative radiography and clinical evaluation at 1 month, 3 months, and 6 months after surgery.

The parameters studied were: age, sex, time to consultation, clinical examination, visual analog scale (VAS), type of lesions on imaging, time to surgery, and progression. Functional outcomes were assessed after one year using the OWESTRY score.

Progress was assessed as:

- Favorable, based on complete regression of clinical symptoms and correct resumption of walking at 6 months;
- Average, based on persistence of residual clinical symptoms and resumption of walking with assistance;
- Unfavorable, based on lack of clinical improvement and lack of resumption of walking.

All data were expressed as means for continuous variables and as percentages for categorical variables. Data were analyzed using Epi Info software version 7.2.2. Patient anonymity was preserved, and the study was exempted from the obligation to obtain ethical approval by the ethics committee of Ignace Deen University Hospital.

Results

Twenty-six patients were included. There were 7 men and 19 women with a mean age of 34.5 years (range: 17 to 42 years). The clinical picture was essentially sacroiliac arthralgia in all patients, associated with functional impairment of the ipsilateral pelvic limb.

The average time to consultation was 6 days (range: 3 to 19 days). Physical examination revealed sacral spinal syndrome with positive Larrey and Verneuil maneuvers in all patients and relative functional impairment of the pelvic limbs in 20 cases and absolute impairment in 6 cases. The average VAS score was 8.5 (range: 6-10).

X-rays and CT scans performed on all patients allowed for an assessment of the injuries, which were dislocations (Figure 1) or sacroiliac fracture-dislocations (Figure 2) classified as Tile type C1-2, associated with symphyseal separation in one case and a fracture of the obturator frames in one case.

Surgery consisted of sacroiliac screw fixation with one screw for dislocations and two screws for fracture-dislocations.

The average time to surgery was 17 days (range: 11 to 29 days).

The average follow-up period was 6 months.

Among all 26 patients, we noted no cases of surgical site infection, neurological damage due to incorrect screw positioning, or operative mortality. The outcome was favorable in 22 cases (85%) with anatomical reduction, and average in 4 cases (15%). The average postoperative VAS score was 1 (range: 0-5) at 6 months postoperatively. The OWESTRY score at one year is summarized in Table 1. Five patients developed buttock pressure sores and 2 others developed urinary tract infections associated with urinary catheters.

	Effective	Percentage
No disability (0-4 points)	22	85%
Mild disability (5-14 points)	4	15%
Moderate disability (15-24 points)	0	00%
Severe disability (25-34 points)	0	00%
Total disability (35-50 points)	0	00%
Total	26	100,00%

Table 1: Distribution of cases according to the OSWESTRY disability index at 6 months.

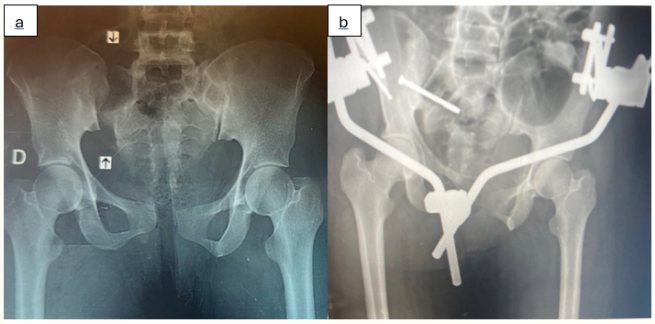

Figure 1: Pelvic X-ray (AP view): a. Right sacroiliac joint dislocation and pubic symphysis dislocation b. Sacroiliac joint fixation with a single screw and pubic symphysis reduction using an external fixator.

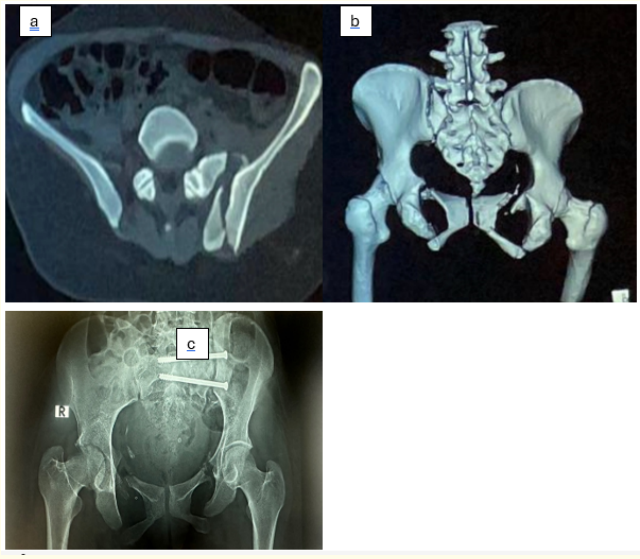

Figure 2: CT scan and X-ray of the pelvis (AP view): a. axial bone window section, b. 3D reconstruction: left sacroiliac fracture-dislocation, c. sacroiliac fixation with two screws.

Discussion

Patients with pelvic ring injuries suffer high-energy trauma with life-threatening injuries in 20% of cases [5]. Unstable pelvic ring fractures are a challenge in severe trauma. Sacroiliac screw fixation offers an elegant technical solution for stabilizing posterior injuries, which are often responsible for residual pain [6].

In 1978, Letournel proposed this open screw fixation in the prone position with direct digital control [7] for sacroiliac dislocations. Matta., *et al.* [2] extended the indications to sacral injuries and used the inlet, outlet, and frontal views described by Pennal., *et al.* [8]. In 1993, Routt and Mayo proposed performing this screw fixation strictly percutaneously on a patient in the supine position [1]. This made it possible to offer this treatment to frail, polytrauma patients without exposing them to superinfections of the access route. However, this screw insertion procedure is not without risk due to the vascular and nerve environment of the first sacral segments. The lumbosacral trunk at the top and front and the first sacral nerve at the bottom and rear of the sacral wing are exposed to an extraosseous screw path [9]. The main disadvantage of the percutaneous fixation technique is that it does not allow direct reduction of the fracture. It is therefore difficult to achieve anatomical reduction of the fracture. Poor functional outcomes

have traditionally been associated with non-anatomical reduction of posterior pelvic injuries [9,10], but this concept has recently been questioned [11,12]. In our series, we achieved anatomical reduction in 85% of cases.

In our series, there were no infectious or neurological complications and no deaths, which is comparable to data in the literature, with an infection rate ranging from 0 to 1% and neurological damage related to incorrect screw positioning ranging from 0 to 8% [10,13-15]. Most complications (buttock pressure sores and urinary tract infections) were related to the patient's condition and the long delay in treatment, rather than to the technique itself.

The main limitation of our study is that Majeed's [16] scoring scale for pelvic fractures is based on the characteristics of the fracture and associated injuries, rather than the stabilization method used. This is evident in the literature [10,13,14] and in our series, as patients with the most severe injuries and associated injuries consistently had poorer outcomes and more complications than patients with less severe injuries. We used the OWESTRY score to assess the functional outcomes of the patients in our series, noting a 85% favorable functional outcome, compared to 86% in the series by Elzohairy., *et al*. [17] and 91% in the series by Schweitzer., *et al*. [18].

In our context of a country with limited healthcare resources, all cases were treated using widely available standard osteosynthesis materials. No special materials were required. Simple fluoroscopic guidance was sufficient in all cases. It was not necessary to use a scanner for navigation.

Conclusion

Although the number of cases in this study is small, our positive results in terms of symptom improvement and satisfaction rates suggest that percutaneous sacroiliac screw fixation is relatively safe and effective for treating posterior pelvic ring injuries. However, the long delay in treatment in our setting exposes patients to complications from pressure ulcers even before surgery.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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