A Descriptive Study of Sacral Fractures Reported at Tertiary Care Institute

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Research Article

Abstract: **Introduction:** Sacral fractures are commonly associated with pelvic ring fractures due to high-energy mechanisms of injury. There are very few long-term studies of pelvic fractures worldwide documenting the behavior of these injuries in the long run. **Aims and Objectives:** To study different types of sacral fractures and sacro-iliac joint injuries on the basis of Dennis three Zone classification and Young and Burgess Classifications. **Methodology:** in the current study total 32 patients were enrolled. Details about demographic data, mode of injury, co- morbid condition and radiological findings were noted. **Results:** it was observed that sacral fractures were common in male, and were due to road traffic accidents. 50% study population suffered from type 1 classification of denis classification. As per young and burgess types classification 25 % patients had suffered from vertical shear injury. **Conclusion:** sacral fractures common in male population and due to road traffic accidents.

Keywords: sacral fractures, Denis three type classification, young and burgess types classification.

Introduction

Pelvic fractures constitute 3% of all skeletal injuries.[1] Among polytrauma patients the incidence is about 25%.[1] The diagnosis, management, early morbidity and high mortality in pelvic fractures have been discussed at length. There are very few long-term studies of pelvic fractures worldwide documenting the behavior of these injuries in the long run. Sacral fractures are usually considered in conjunction with pelvic fractures and pelvic ring injuries. Sacral fractures occur in approximately 45% of all pelvic fractures. Biomechanical testing of the sacrum has proven difficult because of the complexities of load transfer from the mobile lumbar spine to the hips and the added variables of regional ligamentous and muscle supports. The sacrum is the mechanical nucleus of the axial skeleton[2], serving as the base for the spinal column as well as the keystone for the pelvic ring. Despite its mechanical importance, the transitional location of the sacrum between the spine and the pelvis has resulted in it being relatively neglected by both spine surgeons and traumatologists and in both specialties having incomplete experience with treatment of this spinal region.

Aims and Objectives

To study different types of sacral fractures and sacro-iliac joint injuries on the basis of Dennis three Zone classification and Young and Burgess Classifications.

Materials and Methods

Present descriptive study was intended to study various types of Scral fractures and sacro-iliac joint injuries. All patients with pelvic injuries admitted within the period of study were identified from the trauma registry and hospital records. Immediate post injury and post-operative and follow-up antero-posterior, inlet, and outlet radiographs for a minimum of 6 months post-injury were examined. The radiographic parameters and patient based outcomes of cases with sacral fractures and sacro-iliac joint injuries were evaluated in the operated and non operated groups.

Inclusion criteria

- All patients 18 - 80 years of age with sacral fract ures and sacro-iliac joint injuries with or without associated posterior pelvic ring injuries.

Exclusion criteria

- Those who were haemo-dynamically unstable and those with open thoracic or abdominal wounds.
- Also patients with degloving pelvic and perineal injuries.
- Patients with associated fractures of the acetabulum were also excluded to avoid confounding influence on outcome analysis.

Sample Size

Thus with respect to above inclusion and exclusion criteria total of 32 patients with sacral and sacro-iliac joint injuries were enrolled during the study duration.

Data collection

Basic demographic data of patients such as age, sex, residential address were recorded the details about

modes of injury, associated co morbid conditions were also recorded. Radiographic data was also collected. Denis three zone types classification[3] was used to classify according to anatomical location, whereas the associated pelvic injuries were classified using Young and Burgess Classification[4]. While analyzing data two groups of patients were formed. One who had received conservative treatment and other who had received surgical treatment.

Results

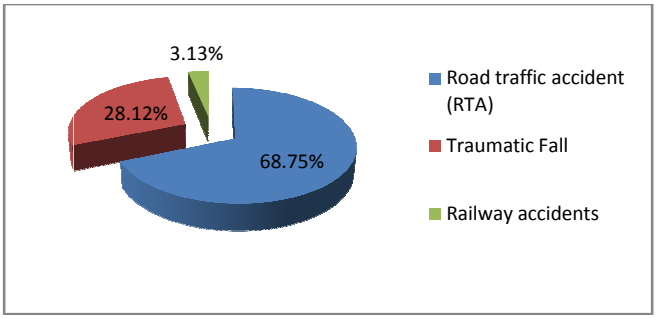
Table 1: Demographic data

Parameter		No. of cases (total 32)	
		Conservative (14)	Surgery (18)
Age(yrs)	Mean ± SD	38.86 ± 17.51	30.28 ± 10.86
	Range	19 – 73 yrs	18 – 55 yrs
Sex	Male	12 (85.7)	13 (72.2)
	Female	02 (14.3)	05 (27.8)

Out of the total 32 patients of Sacral fractures 14 patients were managed conservatively and 18 were managed surgically. The mean age of patients managed conservatively was 38.86 ± 17.51 and of those managed surgically was 30.28 ± 10.86. In the study there were total 25 male and 7 female (Table 1).

Table 2: Distribution of Scral fractures according to mode of injury

Modes	Conservative (N=14)	Surgery (N=18)	Total (N= 32)
Road traffic accident (RTA)	07 (50%)	15 (83.3%)	22 (68.75%)
Traumatic Fall	07 (50%)	02 (11.1%)	09 (28.12%)
Railway accidents	00	01 (05.6%)	01 (3.13%)



Graph 1: Distribution of Scral fractures according to mode of injury

It was observed that road traffic accident was the major mode of injury in this study followed by traumatic fall (Table 2).

Table 3: Distribution of co-morbid conditions present

Co morbid condition	Conservative	Surgery	Total
Head Injury	01 (07.1%)	02 (11.1%)	03 (9.38%)
Blunt Abdomen	02 (14.3%)	00	02 (6.25%)
Urethral injury	01 (07.1%)	00	01 (3.13%)
Limb injuries	00	01 (05.6%)	01 (3.13%)

We also studied the associated co-morbid conditions along with sacral fractures. It was observed that only 7 patients suffered from co-morbid conditions and head injury was the common co-morbid condition.

Table 4: Distribution of Sacral fractures according to Denis three Zone classification

GRADES	Conservative (N=14)	Surgery (N=18)	Total (N=32)
01	07 (50.0%)	09 (50.0%)	16 (50%)
02	04 (28.6%)	06 (33.3%)	10 (31.25%)
03	01 (7.1%)	01 (05.6%)	02 (6.25%)
Isolated SI Joint injuries	02 (14.2%)	02 (11.1%)	04 (12.5%)

Sacral fractures were classified using Denis three Zone classifications. It was observed that ***Zone-I*** fractures were the most common, accounting for 50% of the total cases. Isolated SI joint injuries were also seen in 4 cases.

Table 5: Distribution of Sacral fractures according to Young and Burgess types classification

Types	Conservative (N=14)	Surgery (N=18)	Total (N=32)
AP Compression	05 (35.7%)	07 (38.9%)	12 (37.5%)
Lateral Compression	06 (42.9%)	06 (33.3%)	12 (37.5%)
Vertical Shear	03 (21.4)	05 (27.8%)	08 (25%)

After classifying the sacral fractures using Denis three Zone classifications, associated pelvic injuries were classified using Young and Burgess Classification. It was observed that 37.5% of cases had AP compression and lateral compression each. Whereas vertical shear was diagnosed in 255 of cases.

Discussion

Present study was conducted to study different types of sacral fractures and sacro-iliac joint injuries on the basis of Dennis three Zone classification and Young and Burgess Classifications. It was observed that male suffers most commonly from sacral fractures as compared to female. Sacral fractures can result from a range of injury mechanisms. While sacral fractures typically result from high-energy injuries, there is increasing identification of low-energy fractures of the sacrum and pelvis in elderly and osteoporotic patients[5]. Stable nondisplaced fractures are usually treated nonoperatively, while significantly displaced fractures require reduction and internal fixation. The pattern, location, and stability of the fracture also vary greatly. In this study Road Traffic Accidents (RTA) proved to be the most predominant mode of injury and the overwhelming majority of which occurred in males. As male are most commonly exposed to outdoor activities and prone to road traffic accidents, hence this may be the cause for more cases in male population as compared to female population. As most of cases were due to RTA, co-morbid conditions were also seen in some cases. The pattern of the associated pelvic fracture has a significant impact on the location, stability, and treatment of the sacral fractures. The sacral fractures associated with lateral compression pelvic fractures are usually stable, since there is impaction of the sacrum. In contrast, sacral fractures associated with vertical shear pelvic fractures are usually unstable patterns. Sacral fractures may involve injury to the lumbosacral junction and result in varying degrees of lumbosacral instability or even lumbosacral dissociation. When **Denis three Zone classification**[3] was used to classify the cases of sacral fracture, type 1 was the most common type. Few cases of isolated SI joint injuries were also noted in this study. To classify associated pelvic injuries Young and Burgess Classification was used. It was seen that AP and lateral compression was more common type.

Conclusion

In the end we can conclude that sacral fractures are more common in male as compare to female. And most common reason for sacral fracture is road traffic accidents. Sacral fractures, though, a rare type of injury often occur in association with pelvic ring disruptions and cannot be considered as a separate entity.

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