

U shaped sacral fracture with neurological injuries- report of two cases

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ABSTRACT

U shaped sacral fractures are uncommon and serious injuries that can be accompanied by lumbar plexus neurological dysfunction. We report two unique and frequently missed cases of U shaped sacral fractures with associated neurological deficit (Cauda Equina) which stabilized using Sacropelvic fixation with spinal instrumentation. We also performed laminectomy to decompress the lumbar plexus and preserve neurological function.

Keywords: Neurological deficit, sacropelvicfixation, U shaped sacral fracture

Introduction

Traumatic sacral fractures are rare cases due to their mechanism of injury which involves high-energy blunt trauma. This characteristic makes them difficult to diagnose which results in increased rate of morbidity and mortality. Sacral fractures could lead to neurovascular injuries as well as mechanical instabilities. Treatment of sacral fractures could be challenging in terms of reduction and stabilization that can be treated operatively and non-operatively with different surgical techniques.^[1]

We present two rare and frequently missed cases of U shaped sacral fractures with associated neurological injury requiring decompression and spinopelvic stabilization. This case report describes the neurological, radiographic as well as functional outcomes in two patients with U shaped sacral fracture, after sacral laminectomy and spinopelvic fixation. Both patients were informed and consented for publication.

Case Report

The first case was a 23 year old male with history of fall from height and sustained a burst fracture of L2 along with a U shaped

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sacral fracture with Cauda Equina syndrome [Figure 1]. He also had a comminuted fracture of the left distal radius and left calcaneal fracture. He had incomplete neurological injury at L3 level with bowel and bladder incontinence. Spinal decompression was performed anteriorly at L2 level along with a sacral laminectomy. Long posterior spinopelvic fixation was done using the iliac bolt for fixation of the ilium and pedicle screws for the lumbar spine [Figure 2]. Fragment specific plates were used for the distal radius as well as a locking calcaneal plate for the calcaneum. Patient regained ambulatory capacity along with recovery of his bowel and bladder control in 3 month time.

The second case was a 19 year old female with history of fall from height. She sustained a compound left bimalleolar fracture and a U shaped sacral fracture with no neurological deficit [Figure 3]. An emergency debridement and fixation was performed for the bimalleolar fracture. Post trauma day 3 she developed radicular pain and numbness at right L5 nerve root with inability to move the right big toe. Her anal tone was lax. An emergency decompression and removal of bone fragment for the right L5 root, sacral laminectomy, and spinopelvic fixation was performed using a pedicle screw [Figure 4]. She regained her motor, sensory and anal sphincter power within the first week with return of bladder function in 6 weeks.

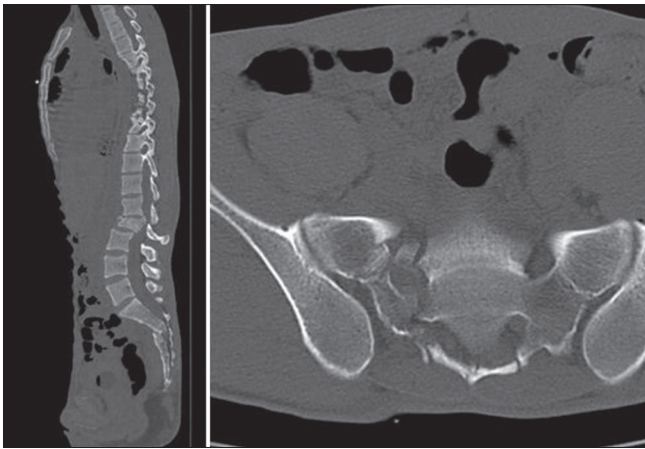


Figure 1: Pre-operative CT scan is demonstrating Bilateral transverse sacral fracture in Sagittal and Axial views

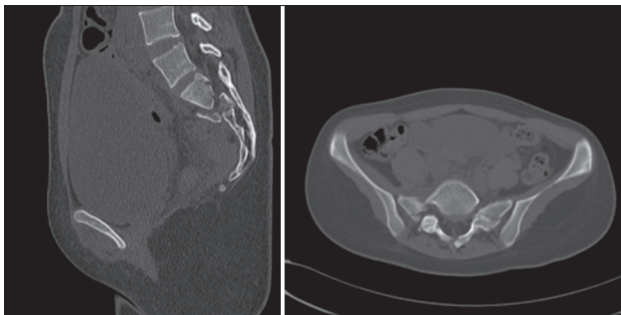


Figure 3: CT scan Sagittal and axial views are demonstrating bilateral transverse sacral fracture

Discussion

U shaped fractures are easily missed in majority of poly trauma cases during resuscitation. The routine radiography of pelvis is not a good option to identify these fractures and most of the time CT scan or MRI imaging modalities will be needed for definitive diagnosis. Some reports show 49% missed sacral fracture in initial hospitalization.^[2]

On the other hand, neurological deficit is commonly underdiagnosed during the initial assessment while neurovascular impairment associated with U shaped sacral fracture can be seen in a significant proportion of patients (33.0%) which is strongly influenced by the configuration and location of the sacral fracture.^[3]

In spite of the great variety of reports in treatment options of patients with bilateral sacral fractures, no proper report exists to offer a conclusive guideline in management of these injuries.

Closed reduction and conservative management of sacral fractures have been suggested; however, due to high instability of these fractures, risk of fracture displacement is high over the time in which, immediate decompression and stabilization may be needed.^[4] Proper reduction and maintenance of alignment for appropriate weight-bearing axis is highly recommended.^[5]

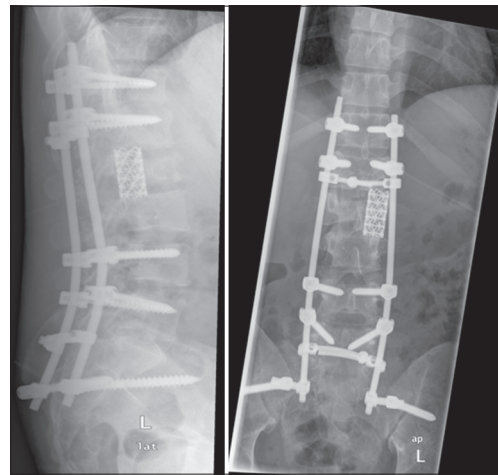


Figure 2: AP and lateral postoperative lumbosacral radiographs

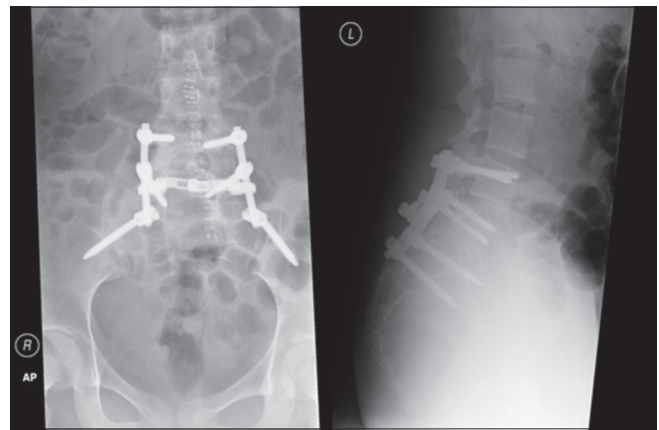


Figure 4: Postoperative radiographs including AP and lateral lumbosacral views

It is suggested to reserve lumbosacral laminectomy and decompression for the cases with neurological deficit.^[6] However, proponents of non-operative management believe that progressive functional restoration of spinal nerves may occur during a period of 12-18 months.^[7] Although it is clear that recovery of nerve root contusion, transection or neurotmesis cannot occur, the aim of laminectomy and decompression is to help recovery of potentially viable nerve roots.^[8]

U shaped sacral fracture is a multiplanar fracture comprised of bilateral, usually transforaminal, longitudinal fractures and a transverse fracture component which separates the upper central sacrum and remainder of the spine from the peripheral sacrum and the attached pelvis. The pattern of these fractures will lead to dissociation of the lumbar spine from the pelvic ring as well as lumbosacral instability.

In order to achieve stable fixation in our cases, spinopelvic fixation technique is used. This technique is considered as a stable option in transforaminal sacral fractures that was first developed by Kach and Trentz.^[9] The aim of the construct is to stabilize the hemi-pelvis through connecting it to axial skeleton

using screws and rods to lumbar vertebrae and ilium preventing vertical displacement.

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