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Case Report Open Access

Traumatic Disc Herniation Following Flexion-Distraction Injury of the Thoracolumbar Spine: A Rare Presentation

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Abstract

Objective: To report a rare presentation of Flexion-distraction injuries.

Summary of background data: To the best of our knowledge, traumatic disc herniation following non translated flexion distraction injuries of the thoracolumbar spine has not been reported in the English literature.

Methods: Description of the clinic and radiological presentation of a 35-year-old male who sustained a flexion distraction injury of the thoracolumbar spine following an assault.

Results: The intraoperative findings confirmed the presence of a large herniated disc fragment displacing the thecal sac. This was removed, the canal was decompressed and a hybrid screw-laminar hook construct was used to stabilize the fractured level while preserving uninjured motion segments.

Conclusions: MRI provides useful information to help define the pathology and management strategies in patients with discordance between their clinical presentation and imaging. It helped define a rare presentation of disc herniation and alerted us to the need for a formal decompression in this case of a non-translated flexion-distraction injury.

Keywords: Flexion-distraction; Thoracolumbar fracture; Disc herniation; MRI; Cauda-equina syndrome

Introduction

Flexion-distraction injuries of the thoracolumbar spine represent failure of both the middle and posterior column under tension [1]. The injury may extend through bone (Chance Fracture) [2], through the posterior ligaments, or a combination of the two [1]. Rupture of the posterior longitudinal ligament and annulus fibrosis with disc herniation in this injury type is very rare [2]. While herniated discs are commonly associated with cervical jump facet injuries, similar herniated discs have not been reported in associated with similar injuries in the lumbar spine. We report a patient with a flexion distraction injury of the thoracolumbar spine who presented with a large disc herniation producing urinary retention. We draw attention to the importance of the Magnetic Resonance Imaging (MRI) in the diagnosis and pre-operative planning of this patient [3].

Case Report

A 35-year-old male sustained a closed injury to his back following an assault during which he fell down a flight of stairs. He presented with severe back pain and the inability to void urine. His motor, sensory and deep tendon reflex examination of the lower limbs was normal. Rectal examination demonstrated intact perianal sensation and rectal tone. His post void residual urine volume was 1000 mL. A Computed Tomogram (CT) demonstrated an L1- L2 flexion-distraction injury with the fracture extending through the left pedicle and proximal body of L2. There was widening of the interspinous distance (Figure 1). MRI demonstrated injury to the posterior ligamentous complex (PLC) between L1-2, T12- L1 and a mass occupying the right side of the spinal canal at the level of L1-L2, displacing the conus to the left side (Figure 2). The patient was taken for emergency decompression and instrumented fusion. Intra-operative findings confirmed the disruption of the PLC at T12 -L1 and L1-L2 levels. A laminectomy of L1 was performed and a large sequestrated disc fragment on the right side of

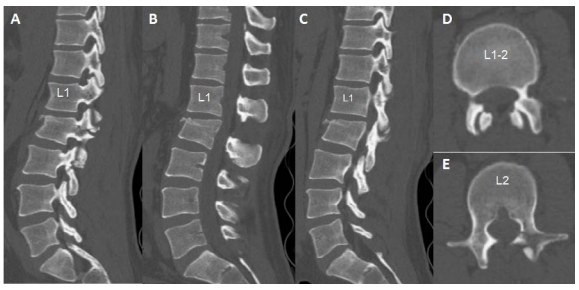

Figure 1: CT sagittal reconstructions of the left (A), midline (B) and right (C), and axials (D, E) of the thoracolumbar spine demonstrating a non-translated flexion-distraction injury of L1-2. Note the left L2 pedicle fracture (A, E), the splaying of the spinous processes of L1 and L2 and the subluxation of the right L1-2 facet joint (D).

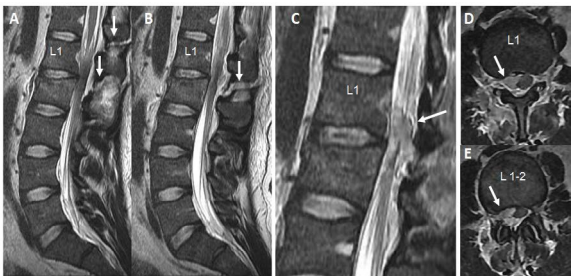

Figure 2: MRI T2 sagittals (A, B, C) and axials (D, E) of the thoracolumbar spine. Posterior ligamentous injuries are noted at T12-L1 and L1-2 (see arrows, figures A and B). A large sequestered disc herniation (see arrows figures C, D, E) is noted with displacement of the thecal sac to the left.

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Figure 3: Large sequestered disc herniation demonstrated on MRI (Figure 2) was removed during posterior decompression and stabilization of the injury.

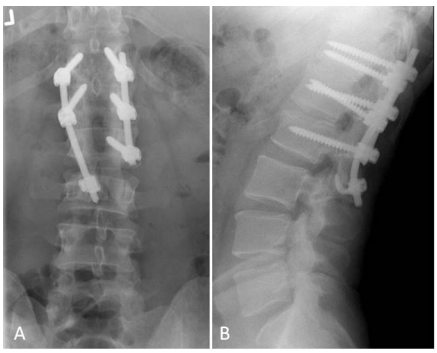

Figure 4: Post-operative standing anteroposterior (A) and lateral (B) radiographs demonstrating posterior T12 to L2 instrumented fusion. An upgoing infra-laminar hook was used on the left at L2 to bypass the fractured left L2 pedicle, obviating the need to extend the construct to L3.

the spinal canal was removed (Figure 3). Pedicle screws were placed at T12, L1 and the intact right L2 pedicle. An upgoing infra-laminar hook was placed on the left side at L2. Local bone graft harvested from the spinous processes and laminae were placed in a bone mill and impacted into the decorticated facet joints. The patient had an uneventful post-operative period. He ambulated on the first post-operative day and the urinary catheter was successfully removed on the second post-operative day with normal bladder function. The patient was reviewed 28 months (Figures 4A and 4B) post-op and has resumed full activities, rating his back pain as 2/10, leg pain 0/10, and Oswestry Disability Index at 8%. He has normal bladder and lower extremity function.

Discussion

Post-traumatic disc herniation causing neurological impairment is a well described entity associated with flexion-distraction injuries of the cervical spine [4-10]. In the thoracolumbar spine, however, this is the first described case of a herniated disc associated with bladder retention following a flexion-distraction injury without vertebral translation. Kreichati et al. reported a patient with a lumbar spine fracture dislocation of L4-5 who developed Cauda equina syndrome following reduction and stabilization. The authors speculated that this was due to the presence of an unrecognized disc herniation. Unfortunately they had not done an MRI prior to surgery to confirm the presence of the disc [11].

While it is extremely rare to have neurological compromise in non-translated flexion-distraction thoracolumbar injuries (seat-belt injury according to Denis) [1], the discordance between the clinical history and the CT imaging provided an indication to obtain an MRI in this case. Besides providing information on the level of the conus and the status of the ligamentous structures [12], the MRI confirmed the need for a formal decompression in this case. This is important as this injury pattern generally can be treated through a percutaneous approach [13-16] or through a formal posterior fusion where a decompression is often not required. The axial MRI clearly demonstrated the right displacement of the thecal sac at the level of injury, either secondary to a hematoma or disc. This demonstrates an uncommon injury pattern of the flexion distraction injury where the injury entered the middle column through bone on the left side and through the annulus fibrosis on the right side.

To preserve lumbar motion segments in this case, we chose a construct with pedicle screws on the right side. On the left, an upgoing infra-laminar hook was used to bypass the broken left L2 pedicle and avoid extending the construct to L3. Compression across the construct provided reduction of the fracture and correction of the focal kyphotic deformity. Excellent healing was demonstrated at greater than two years follow-up.

This case demonstrates that the MRI provides useful information to help define the pathology and management strategies in patients with discordance between their clinical presentation and imaging. It helped define a rare presentation of disc herniation and alerted us to the need for a formal decompression in this case of a non-translated flexion-distraction injury.

Conclusion

We report a 35-year-old male with a non-translated flexion-distraction injury of the thoracolumbar spine associated with urinary retention. MRI confirmed the presence of a large disc herniation. This case demonstrates the utility of MRI in defining the pathology in patients with discordance between their clinical presentation and imaging. The use of an upgoing infra-laminar hook was successfully used to bypass the fractured pedicle and preserve valuable lumbar motion segments.

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