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## Case Report

# A Rare Scenario of Acute Traumatic Thoracic Disc Herniation and Review of the Literature

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## ABSTRACT

**Background and Importance:** Sequestrated thoracic disc herniation after a traumatic event without an apparent spinal fracture or dislocation is an extremely rare scenario.

**Case Presentation:** Evaluation of an elderly female with acute paraparesis secondary to a fall down to the ground revealed a right-sided extruded disc at the level of T10-T11. At 6-month follow-up, she made a dramatic recovery following an appropriate surgical intervention.

**Conclusion:** With occurrence of acute paraparesis following a traumatic event, MRI of the vertebral column is necessary, even in the absence of tomographic evidence of fracture-dislocation.

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## Highlights

• Acute Thoracic Disk Herniation (TDH) after a traumatic injury is a relatively rare scenario, with few cases reported in the literature.

• In presence of neurological deficit after traumatic events, total spine MRI (Magnetic Resonance Imaging) is justified, even in the absence of fracture-dislocation in plain radiographs or total spine multi-directional CT scan.

• In the case of sequestrated thoracic disc herniation, transfacet pedicle-sparing is the method of choice for discectomy.

## Plain Language Summary

An old woman with acute paraparesis secondary to a falling down had a right-sided extruded disc at the level of T10-T11. After 6 months, she recovered very well after an appropriate surgical intervention. Following an acute paraparesis after a traumatic event without evidence of fracture-dislocation, thoracic MRI should be performed to rule out the possibility of epidural hematoma or a sequestrated disc.

## 1. Background and Importance

An acute traumatic disc herniation without a serious fracture or dislocation is a rare medical event and most often occurs within lumbar and cervical regions [1-8]. However, its occurrence in the thoracic spine is extremely rare [9-12]. This can logically be attributed to the support and protection afforded by the rib cage.

Herein, we present a new case with traumatic sequestrated disc at T10-T11 level documented with Magnetic Resonance Imaging (MRI) who was surgically managed with success. After a thorough review of the published medical literature, we found that currently presented case is the 5$^{th}$ reported case with this specific scenario (Table 1).

## 2. Case Presentation

A 72-year-old female was presented to a local hospital after suffering a fall injury because of losing balance in the bathroom. She slipped and then fell to the ground on her buttock and backbone. While trying to stand up, she immediately became aware of an apparent bilateral lower limb weakness which was more prominent on the right side. She was subsequently transferred to a local hospital where she was conservatively managed after clinically diagnosed with spinal shock considering her normal thoracolumbar radiographs (Figure 1). Two days later at the request of her relatives, she was referred to our facility (Pars Hospital, Tehran, Iran). On admission, we faced an obese woman with high Body Mass Index (BMI: 36Kg/m$^2$). Neurologically, the weakness of both lower extremities (Frankel Grade C) was more

**Table 1.** Information about the traumatic thoracic discs reported in the literature including: age sex ,etiology, level of injury ,clinical picture, surgical procedure and outcome

| Author | Year | Sex | Age | Cause | Clinical Presentation | Level of Injury | Surgical procedure | Outcome |
|---|---|---|---|---|---|---|---|---|
| Fuentes, et al. [12] | 2001 | M | 39 | Motor cycle accident | Paraplegia | T9-T10 | Costotransversectomy | Poor |
| Ogrenci, et al. [11] | 2019 | M | 24 | Car accident | Paraplegia | T12-L1 | Facetectomy & laminectomy | Good |
| Rahimizadeh, et al. [14] | 2016 | M | 75 | Fall | Paraparesis | T10-T11 | Transfacet pedicle sparing | Good |
| Valluzzi, et al. [9] | 2021 | M | 53 | Fall | Paraparesis | T9-T10 | Spontaneous regression | Good |
| Current case | 2022 | F | 72 | Fall | Paraparesis | T10-T11 | Transfacet pedicle sparing | Good |

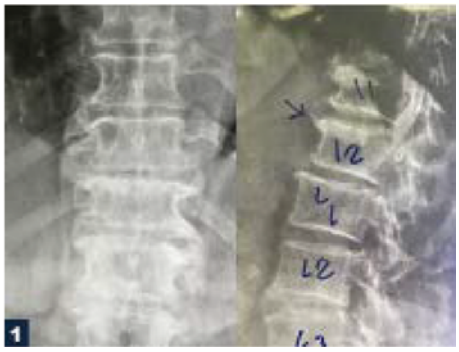

**Figure 1.** Thoracolumbar Anteroposterior (AP) and latera radiographs. Note that there is no sign of fracture-dislocation.

prominent on the patient's right side. This was associated with hyperactive reflexes and right Babinski sign. A vague sensory deficit at the level of the umbilicus was found.

An MRI undertaken as the second diagnostic tool showed a relatively large right-sided mass anterolateral to the dural sac with mixture of high and low Signal Intensity (SI) on T2-weighted axial images (Figure 2a). Sagittal T2-weighted MRI indicated an isointense mass with upward migration at the level of T10-T11 compatible with sequestrated disc fragment (Figure 2b).

In surgical intervention, the initial step involved a right T10 and T11 segmental pedicle screw insertion. In the next step, subsequent to T10-T11 interlaminar laminectomy, the corresponding disc space and the sequestrated fragments were approached via the right transfacet pedicle-sparing corridor. There, one large and several smaller sequestrated disc fragments embedded below the dura mater were discovered and successfully re-

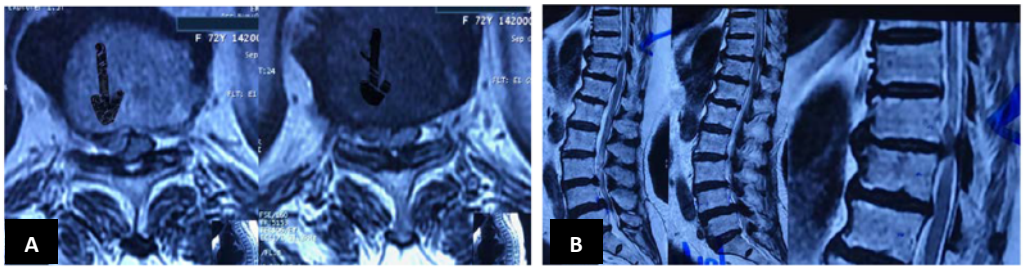

**Figure 2.** MRI of the patient 3 days after trauma

A: Axial T2-weighted image, note an extradural right-sided mass with high and low signal intensity, compatible with sequestrated disc fragment; b: T2-weighted sagittal MRI demonstrating T10-T11 sequestrated disc fragment migrated up, note severe spinal cord compromise

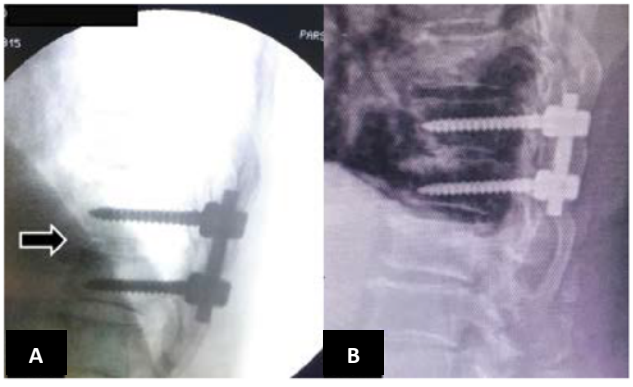

**Figure 3.** X-ray results

A: Intraoperative fluoroscopy, note interbody graft (black arrow); B: lateral thoracolumbar lateral X-ray 5 days after surgery

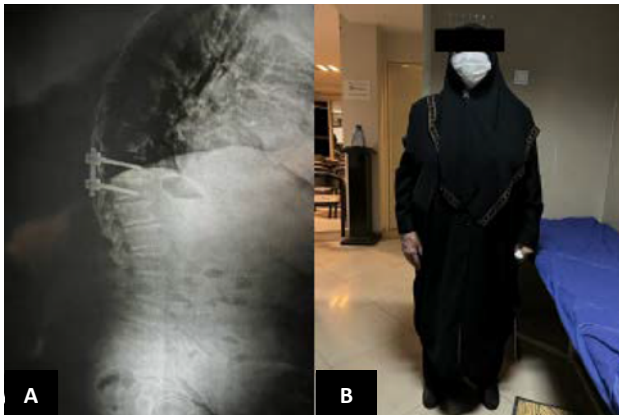


**Figure 4.** Evaluation at 6-month follow-up

A: lateral thoracolumbar standing radiograph; B: Photograph of the patient after her return to normal activities

moved. This was followed by discectomy and interbody fusion with an iliac allograft. Assembling the rods and thightening the nuts in compression were concluding steps of surgical intervention (Figure 3a).

Postoperative thoracic spine plain radiographs showed the integrity of the metal construct and interbody graft (Figure 3b). At 3-wek follow-up, she could hardly ambulate with walker. Hopefully, at the 6-month follow-up, she could walk normally (Frankel Grade of E) and her standing lateral radiograph was acceptable (Figure 4).

## 3. Discussion

Thoracic disc herniations account for roughly 0.25%-075% of all disc ruptures [13]. Within this region of spinal column, the offending pathologies are generally the formation of the hard discs and the osteophytes which are the final and detrimental consequences of a chronic degenerative scenario [13, 14]. Such pathological anomalies stand in stark contrast to sequestrated soft disc herniations which occur less frequently and within a relatively short period of time [9-12]. On extremely rare occasions, a pure sequestrated soft disc herniation might occur subsequent to a traumatic event without an apparent vertebral fracture or dislocation [1-8]. The occurrence of traumatic disc herniations in thoracic spine is extremely rare and confined to only four previously published cases [9-12].

On MRI, acute traumatic disc Signal Intensity (SI) depends on the water content of the sequestrated disc. The signal intensity of the disc fragment varies from low to high on T2-weighted images. The SI of a traumatic sequestrated disc might be so high that easily be misdiagnosed as an epidural hematoma [5, 8].

Historically, spontaneous regression of a sequestrated thoracic disc herniation has been advocated for the patients with mild neurological deficit [9]. However, for acute Thoracic Disc Herniation (TDH) with neurological deficit, surgery via transfacet pedicle-sparing approach seems to be the most appropriate option [10, 13-15]. Favorable outcomes depend on early diagnosis and timely surgical intervention.

## 4. Conclusion

This case highlights the value of emergency MR imaging for patients who have sustained a traumatic spinal cord injury. With consideration of the sequestrated texture of the disc in traumatic TDH; the transfacet pedicle-sparing approach is the choice for removal of the offending pathology.

## Ethical Considerations

### Compliance with ethical guidelines

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for the images and other clinical information to be reported in the journal.

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### Authors' contributions

All authors equally contributed to preparing this article.

## Conflict of interest

There are no conflict of interest.

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