

Case Report

Clinical Outcomes of Full Endoscopic Thoracic Discectomy in Acute Disc Herniation: A Case Report from Khyber Pakhtunkhwa

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ABSTRACT

Objectives: Thoracic disc herniations are rare relative to lumbar and cervical spine herniations and account for 0.25% to 0.75% of cases in the general population. This case report presents a rare case of a 65-year-old male diagnosed with thoracic disc herniation and managed through full endoscopic thoracic discectomy.

Clinical Presentation: A 65-year-old wheelchair-bound male presented to OPD with complaints of paresthesia and sensory symptoms along with motor weakness from the past 2 weeks. No Symptoms of bowel and bladder dysfunction were present.

Diagnosis/Intervention: Sagittal and axial MRI findings revealed disc herniation at the T11 – T12 level. Full endoscopic thoracic discectomy through a transforaminal approach was performed to decompress the spinal cord.

Conclusion: Acute thoracic disc herniations although rare, can present with variable clinical manifestations. Full endoscopic thoracic discectomy through a transforaminal approach is a safe and effective surgical procedure associated with improved patient outcomes, increased satisfaction scores, and decreased chances of complications.

Keywords: Acute thoracic disc herniation, endoscopic discectomy, full endoscopic thoracic discectomy.

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INTRODUCTION

Symptomatic thoracic disc herniation is a rare disabling clinical entity that represents only a smaller percentage of intervertebral pathologies and is challenging while at the same time unfamiliar for many surgeons to treat.¹ Thoracic disc herniations are rare relative to lumbar and cervical spine herniations and account for 0.25% to 0.75% of cases in the general population.²

However, due to the increased use of MRI for spine pathologies, the number of diagnosed cases of thoracic disc herniation may rise.³ It is more common in males and tends to occur more frequently in the fourth and sixth decades of life.⁴ Studies suggest that only a smaller proportion (4%) of thoracic disc herniation occurs above the level of T3 – T4 while in the majority of cases, the level below T7 – T8 is involved (75%). Owing to the increased mobility, the most prone level to disc degeneration which ultimately leads to herniation is T11 – T12.⁵

A surgical procedure is indicated if conservative measures such as physical therapy, medications, and epidural steroid injections fail. Progressive symptoms, neurological deficits, and myelopathy are absolute indications for surgical intervention.⁶ An increased risk of spinal cord compression exists with progressive and severe herniation causing the surgery more complicated due to the proximity of the thoracic spine to the spinal cord and it's hard to treat complications.⁷

Different surgical techniques have been described in the literature for thoracic disc herniation such as laminectomy, transsternal, transpedicular, costotransversectomy, transthoracic, or thoracoscopic approach. Due to the increased rate of complications and risk associated with these procedures, minimally invasive surgical techniques have gained attention in the past few decades as they are associated with less morbidity and improved patient outcomes.⁸⁻⁹

Full endoscopic spine surgery has strong evidence in the management of lumbar disc herniations as it is associated with smaller incisions and improved patient outcomes along with fewer complications.¹⁰ Endoscopic approaches in thoracic disc herniations are also reported in the literature to be effective and safe with decreased approach-related complications and faster recovery.¹¹

This case report presents the first-ever case of thoracic disc herniation treated through full

endoscopic discectomy in Khyber Pakhtunkhwa along with the clinical presentation, examination, and patient outcomes.

CASE DESCRIPTION

History of Present Illness

A 65-year-old wheelchair-bound male presented to OPD with complaints of paresthesia and sensory symptoms along with motor weakness from the past 2 weeks. No Symptoms of bowel and bladder dysfunction were present. The patient was hypertensive and diabetic for the past 15 years.

Examination Findings

The kyphotic spine was observed along with tenderness at the mid and lower thoracic spine. Movement analysis demonstrated that flexion and extension were 1/3rd and restricted while the rotations to both sides were the most troublesome movements in terms of pain. Sustained flexion increased the radicular symptoms. Prone segmental Posteroanterior glides were painful at the mid and lower thoracic spine. When the patient was asked to hold their breath or cough, distal symptoms were exaggerated. Upon neurological examination, the patient had sensory disturbances at the anterolateral thigh bilaterally. Overall, the lower limb demonstrated weakness when manual resistance was applied. Deep tendon reflexes such as the patellar tendon and Achilles tendon showed hyperreflexia. Babinski sign was positive. Passive lower limb movements were spastic with increased resistance in passive movements. T2 weighted sagittal and axial MRI demonstrated central disc herniation at the level of T11 – T12 with compression of the spinal cord at the same level (Figures 1 and 2). X-rays of the patient demonstrated significant findings (Figures 3 and 4).

Pre-operative Radiological Findings



Figure 1: Sagittal View: (Image added with patient consent).

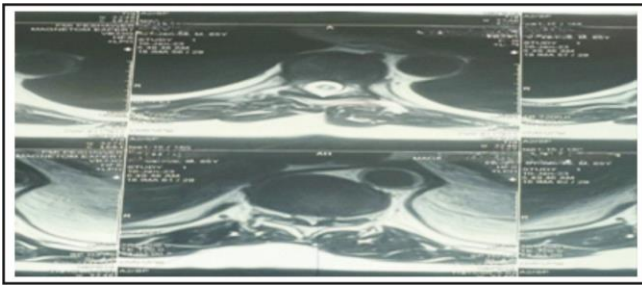


Figure 2: Axial View:(Image added with patient consent).

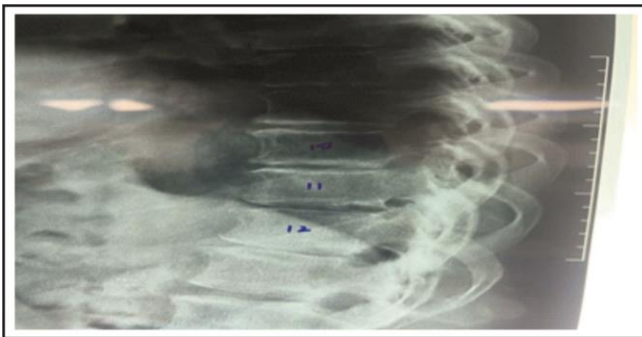


Figure 3: X-Ray Lumbar Spine: (Image added with patient consent).

Diagnosis and Management

The diagnosis of acute disc herniation at the level of T11 – T12 was made as confirmed by the subjective, objective, and investigation findings. By looking at the extent of disc herniation and spinal cord involvement, it was decided by the

Neurosurgeon who is well trained to perform endoscopic spine surgeries to perform full endoscopic thoracic discectomy through a transforaminal approach. Pre-operative measurements of pain, sensory symptoms, and motor weakness were noted on a proforma.

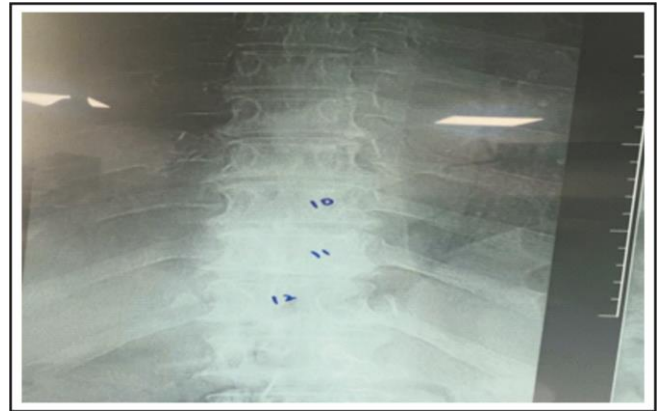


Figure 4: X-ray Lumbar Spine: (Image added with patient consent).

Surgical Procedure

Under general anesthesia, the patient was placed in a prone position with the abdomen free by placing a bolster under the chest and hip. With the help of C-arm guidance the desired level of T11 – T12 was marked with a marking pen and 7cm lateral to the midline point was selected for making the incision (Figure 6). Skin and fascia were incised at the desired level after which a 14cm cannula was introduced under fluoroscopic guidance. The guide wire was also inserted along with the needle. For final confirmation of endoscopic cannula location, anterior-posterior, and lateral images on a fluoroscope were taken. The cannula was entered into the disc and confirmed through the discography. The posterior longitudinal ligament was removed and disc fragments were excised through endoscopic forceps and the thoracic spinal cord was decompressed. The endoscope was removed, and the wound was closed conventionally (Figures 7-10).

Post-Operative Outcome Assessment

Immediately after post-op, the neurological status was assessed. The patient reported symptoms of lower limb paresthesia and numbness immediately disappeared. MRI was performed on the follow up which confirmed the decompressed spinal cord and herniated disc material. (Figure 5) On manual muscle testing, major muscles of the lower limbs showed improvement of almost one grade e.g., from grade 2 to 3 and from grade 3 to 4. MRI was repeated after 5 weeks post op which was also satisfactory. Pain also showed significant improvement on the Visual analog scale.

Post-Operative MRI

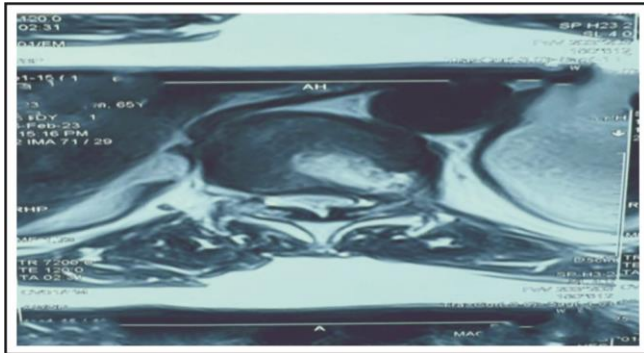


Figure 5: Axial View taken post-operatively indicating the level of improvement: (Images added with patient consent).

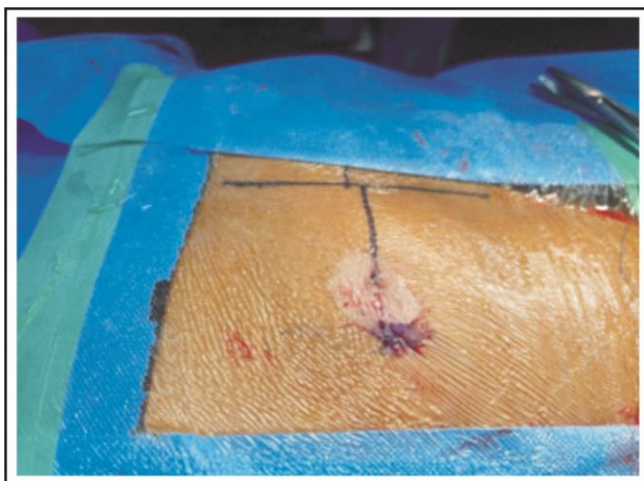


Figure 6: Skin Incision point 7cm lateral to the midline on the more symptomatic side: (Image added with patient consent).



Figure 7: Dilator confirmation at disc level on lateral fluoroscopy: (Images added with patient consent).

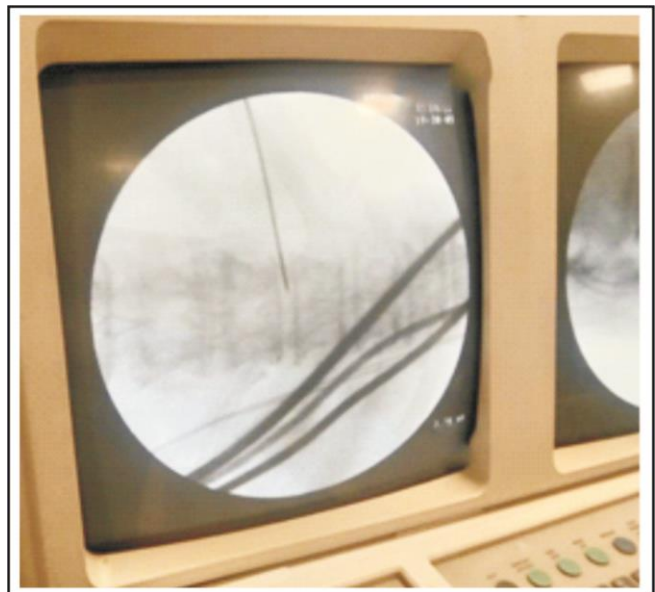


Figure 8: Position of guide wire confirmed under AP Fluoroscopy: (Images added with patient consent).

DISCUSSION

Thoracic disc herniation has demonstrated a significant increase in its prevalence and incidence due to the advancement and routine examination through new and improved investigation techniques.¹² As thoracic disc herniations can manifest a variety of clinical presentations depending on the level and severity of herniation, therefore care should be taken in selecting the appropriate surgical procedure with

Table 1: Patient outcomes Pre and Post Operatively.

Variables	Pre-Operative Values	Post-Operative Values (Immediately)	Post-Operative Values (After 6 Weeks)
Pain (VAS)	8	2	1
Disability (ODI)	33	7	5
Sensory Symptoms	Anterolateral thigh and non-specific	None	None
Motor weakness (MMT)	Major lower limb muscles in grade 3	Grade 4 and 4+	Grade 4 and 4+



Figure 9: Guide wire insertion confirmed by lateral fluoroscopy: (Images added with patient consent).



Figure 11: Skin Closure after the procedure: (Images added with patient consent).

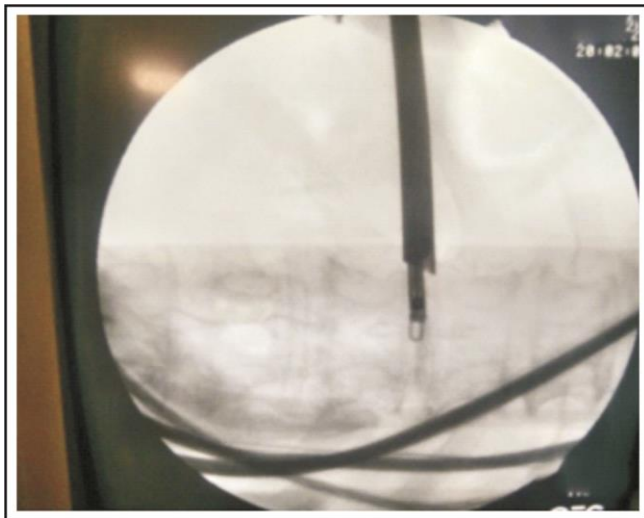


Figure 10: Pre-operative image showing grasping forceps in disc space: (Images added with patient consent).

fewer rates of morbidity and associated complications.¹³ Owing to the scarcity of thoracic disc herniation diagnosed cases and unfamiliarity with the complex anatomy of the thoracic spine along with surgical inexperience has made it difficult to establish an accepted gold standard method of surgical intervention.¹³⁻¹⁴ Therefore the choice of surgical intervention is based on the surgeon's clinical expertise, training, and preferable choice.³ In our case report, as the surgeon was well-trained in performing endoscopic procedures and familiar with the benefits and decreased complication rate, so full endoscopic thoracic discectomy was carried out through a transforaminal approach.

Different conventional surgical approaches

have been used in thoracic disc herniation such as open thoracotomy through the anterior approach, but these are associated with higher incidence of complications and morbidity and in some cases mortality in patients with comorbid conditions.¹⁵ Posterior approaches have the disadvantage of poor visualization of the fragmented disc material as well as iatrogenic destabilization. On the other hand, transforaminal full endoscopic discectomy is associated with improved visualization and none to minimize complications.¹⁶ Minimal damage to the surrounding structures, more natural and safe access to the disc material along with the incorporation of small working channels are associated with transforaminal thoracic endoscopic discectomy.^{13,17} Endoscopic procedures in thoracic disc herniations were first reported by Mack et al¹⁸ and Horowitz et al.¹⁹

A study conducted by Karlo Houra to evaluate the outcomes of transforaminal discectomy and foraminotomy for thoracic disc herniation demonstrated excellent results in which 15 out of 16 patients had a significant reduction in their pain levels of more than 50% postoperatively measured on the visual analog scale. Oswestry Disability Index (ODI) scores also showed promising results.²⁰ The patient in our study reported pain of 2 on VAS postoperatively (Pre-op 8) with no complications. These findings show promising results of full endoscopic discectomy in thoracic herniations. Clinicians should be aware of the advances in surgical techniques along with incorporating these procedures in their practice as these are associated with the best patient outcomes.

The 65-year-old patient in our study demonstrated excellent satisfaction scores immediately postoperatively and in follow-up. The findings are consistent with a study conducted on 92 participants to evaluate patient satisfaction after full endoscopic thoracic disc herniation demonstrated that 90% of the patients exhibited good satisfaction regarding the

procedure and outcomes.²¹

A case report presented by Adrian Kelly in South Africa presented the case of a 53-year-old male with symptoms of lower limb weakness and clumsiness. The patient was a known hypertensive. Spastic paraparesis was observed upon examination.²² These findings are also following our study in terms of patient symptomatology, gender affected and age of onset along with spastic weakness of the lower limb. As is evident from different studies, there is gender predisposition with males affected to a greater extent than females.²³

Results of different papers have demonstrated that the complications associated with full endoscopic thoracic discectomy are dural tears, sepsis of the surgical site, and hematoma. The most common complication is associated with decreased visualization which results in incomplete decompression.²⁴ No complications were observed in our patient both intra and post-operatively.

In this paper surgical outcomes of a single patient were assessed and outcomes were assessed at two points (immediately after the procedure and after 6 weeks of follow-up) which is the limitation of the study. Future studies incorporating an increased number of patients and using higher study designs need to be carried out to increase our knowledge of the subject.

CONCLUSION

Acute thoracic disc herniations although rare, can present with variable clinical manifestations. Full endoscopic thoracic discectomy through a transforaminal approach is a safe and effective surgical procedure associated with improved patient outcomes, satisfaction, and decreased chances of minor complications.

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Additional Information

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Ethical Review Board Approval: The study was conformed to the ethical review board requirements.

Human Subjects: Consent was obtained by all patients/participants in this study.

Conflicts of Interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

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AUTHORS CONTRIBUTIONS

Authors Contributions:

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Muhammad Farooq & Ikram Alam	1. Study design and methodology
2.	Muhammad Farooq & Mumtaz Ali	2. Paper writing
3.	Muhammad Farooq & Muhammad Zubair	3. Data collection and calculations
4.	Abdul Haseeb Sahibzada & Haider Ali	4. Analysis of data and interpretation of results
5.	Muhammad Farooq & Syeda Farwah	5. Literature review and referencing
6.	Muhammad Farooq	6. Editing and quality insurer