International Journal of Research in Orthopaedics
Chauhan LS et al. Int J Res Orthop. 2025 Mar;11(2):437-440
http://www.ijoro.org

Case Report

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20250470

Transthoracic discectomy for a rare presentation of calcified dorsal disc herniation

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Received: 23 January 2025
Accepted: 15 February 2025

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ABSTRACT

Thoracic disc herniation is rare entity, with incidence of 0.5%-4% of all disc herniation. Mostly are asymptomatic and does not need treatment if symptomatic cause intractable pain, intercostal neuralgia, persistent axial back pain and myelopathic symptom need surgical excision. We present a case of 74-year female with central calcified dorsal disc herniation at T11-12 level. surgical excision done by transthoracic discectomy.

Keywords: Transthoracic discectomy, Intercostal neuralgia, Thoracic disc

INTRODUCTION

Thoracic disc herniation is rare entity on compare to lumber and cervical disc herniation. The reported incidence of thoracic disc herniation is 0.5% - 4% of all disc herniation lower thoracic vertebrae (T9-10 and T11-12) are most commonly involved in thoracic disc herniation.[1,2] Most of thoracic disc herniation are asymptomatic but if symptomatic, symptoms are slowly progressive usually not closely related to localization, level and size of herniated disc. Surgery indicated for severe progressive myelopathy, persistent axial back pain, or intractable radiculopathy. Depending on type of disc herniation, size of disc and presence of calcification surgical approach involve either anterior (thoracotomy or video assisted thoracoscopic surgery) or posterior (costotransverse Tomy, minimally invasive discectomy). Here we describe the case of superiorly migrated calcified central thoracic disc herniation at T11-12 Level.

CASE REPORT

Preoperative presentation

A 74-year female present to our outdoor department with complain of lower mid back pain that radiating to right lower limb since, 5 months with difficulty in walking and sensory disturbance at anterolateral aspect of right thigh. symptoms start as radicular pain in right leg than gradually development of unstable gait. Clinically examination revels decrease motor power in right lower limb (MRC grade 3/5) and normal power in left lower limb. generalised spinal and paraspinal tenderness present. Exaggerated knee reflex and ankle reflex absent, positive Babinski reflex present. There is no involvement of bowl and bladder, no history of any chronic medical illness, no history of trauma and previous surgery. Plain X-ray show marginal osteophytes and decrease space between T11-12 (Figure 1). MRI scan show osteophytes, ligamentum flavum thickening and variable loss of T2 signal (disc desiccation) of intervertebral disc at multiple level and extrusion with superior migration of disc at T11-12 level (Figure 2).

Surgical technique

Under general anesthesia with patients lying in lateral decubitus position sterile painting and drapping done. The curvilinear incision extends from the posterior angle of the rib anteroinferiorly to approximately the nipple line or several centimeters beyond. The incision should be placed approximately two ribs above the level of the rib corresponding to the affected level. Verification of this localization may be made on the preoperative

anteroposterior chest X-ray film, on which a line drawn perpendicular to the axis of the spine at the level of the intended operative sight will cross the ribcage at the best incision site.

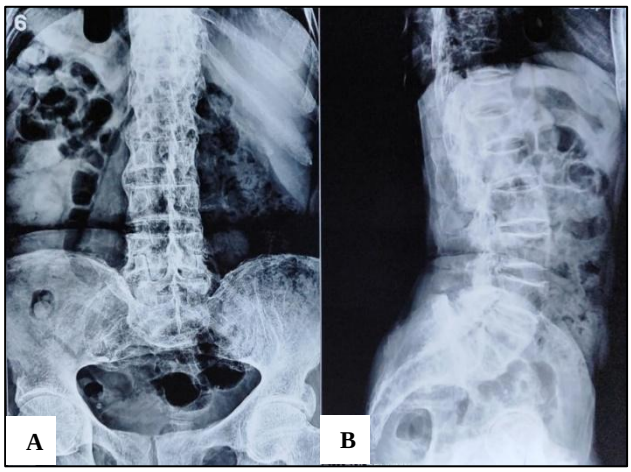

Figure 1 (A and B): X-ray.

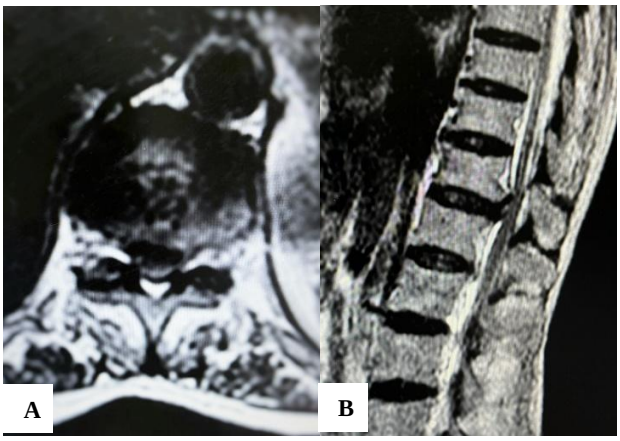

Figure 2: (A) Preopmri axial view, (B) preop MRI sagittal view.

The musculature is sequentially divided using the electrocautery. Once the latissimus dorsi muscle has been divided, the surgeon can slide his hand within the subscapular space and count the ribs, verifying the rib to be resected. Using Cobb and Doyen elevators, a subperiosteal rib dissection is then performed and the rib is then divided.

Care is taken to preserve the neurovascular bundle, as the nerve will guide the surgeon to the neural foramen. The bed of the rib is carefully opened, and the pleural cavity is entered. A rib spreader greatly facilitates the following operative procedure within the thoracic cavity. The lung can be deflated at this point and/or retracted using blades covered using moist lap sponges.

The ribs can again be counted, now from within the thorax, beginning with the second rib superiorly. The appropriate disc level is thus identified. This should be confirmed by obtaining intraoperative cross-table anteroposterior radiographs. As in the cervical region, the discs in the thoracic spine project into the thoracic cavity, whereas the VBs are actually concave. The parietal pleura is opened longitudinally, extending over both adjacent VBs, and a subperiosteal dissection performed until the disc space and VBs can be well visualized. The nerve can then be dissected from the pleura and used to verify the location of the neural foramen and pedicle.

A careful dissection allows for visualization of the segmental vessels lying on the midportion of the body and a posterior mobilization of the sympathetic chain. As a rule, the segmental vessels crossing at midbody are preserved, as is the sympathetic chain. The sympathetic chain is best mobilized dorsally, away from the VBs. If a segmental vessel requires ligation, then it is best performed away from the aorta (to allow for reasonable distance for manipulation and ligation) and at no more than three levels, so as to lessen the likelihood of spinal cord ischemia/infarction. The rib head can then be removed using a variety of techniques that give access to the posterolateral aspect of the disc and the intervertebral foramen.

After the radiate ligaments are incised, the rib head may be rongeured or drilled away. The margins of the disc, the ventral margin of the foramen, and the pedicles above and below are all identified. Using a high-speed diamond-tipped drill, the pedicle is thinned and removed to allow visualization of the spinal canal and the dura.

This quickly orients the surgeon to the location of the lateral and ventral aspects of the spinal cord. The posterolateral aspects of the vertebrae adjacent to the disc are then removed with the drill. In patients with large central herniations, the bone removal should extend to a point at least halfway across the ventral spinal canal. Once the disc is exposed in this manner, the lateral annulus is incised and removed using ronguers, thus creating a trough by which the dorsal annulus may be pulled (away from the thecal sac) using currettes.

The drilling and actual disc removal can be performed under the operating microscope for additional visualization. Once the thecal sac and nerve root are decompressed, meticulous hemostasis is obtained with gentle tamponade (Gelfoam or the equivalent) and bipolar electrocautery.

Closure procedure

Once the discectomy is complete and hemostasis obtained, closure may be initiated. The thoracic cavity is repeatedly irrigated with warm saline. Once the cavity is filled, the lung can be reinflated to check for any air leaks. The lung is again deflated to facilitate closure of the diaphragm and ribs. One or two chest tubes should be placed along the posterior thoracic wall and passed through separate incisions above or below the surgical incision.

The ribs are then reapproximated using heavy suture (No. 5 Ticron or similar suture) and tied in an interrupted fashion. The overlying muscular layers are closed with a running suture, maintaining separate muscular planes and a watertight suture line, both in the thoracic and abdominal regions. The subcutaneous tissues and skin may be closed in standard fashion. The chest tube(s) should be placed to water-suction and monitored for air leak and postoperative drainage

Postop follow-up

The patient had decreased power by grade 1. Postoperative steroids were given with physical therapy. At 3-month follow-up, patient showed motor power recovery. Postoperative MRI (Figure 3) shows good decompression compared to the preoperative status.

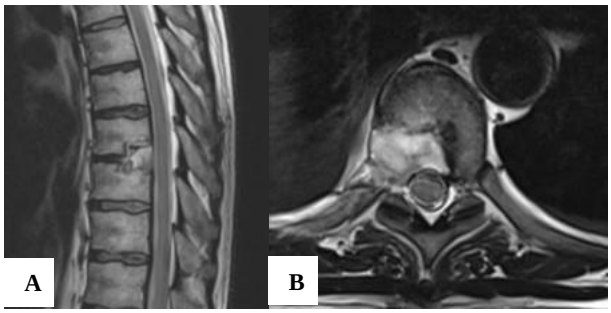

Figure 3: (A) Postop MRI sagittal view, (B) postop MRI axial view.

DISCUSSION

Thoracic disc herniation is an infrequent occurrence but can cause significant myelopathic symptom. Thoracic disc herniation (TDH) has an incidence of 1 per 1,000,000 persons and comprises 0.15% to 4% of surgical cases of disc herniation.[3] The lower incidence of disc herniation in thoracic region compare with cervical and lumber region is because of more stability and less mobility of thoracic spine.

Coronal orientation of thoracic facet and small size of disc are attributed to lesser mobility and additional support to stability is given by rib cage. more than 75% of thoracic disc herniation are occur below T8 level maximum at T11-12 level. Thoracic disc herniation is prevalent between 30-to-50-year age and equal distribution in both sex groups.[4]

Clinical symptoms are not specific for thoracic disc herniation most patients have pain in chest wall, usually in distribution area of thoracic nerve root or thoracic myelopathy involving lower extremities. sometime character of pain mimic cardiopulmonary, gastrointestinal or genitourinary disorders. myelopathic symptom and pain depend on vulnerability of thoracic spinal cord to multiple factors.

These include a greater diameter of the spinal cord relative to the thoracic spinal canal that leaves less space surrounding the spinal cord, a compromised thoracic intramedullary vascularization known as the watershed zone, the extent of potential intradural extension causing cord compression, the degree of thoracic kyphosis that bow-strings the cord against the disc, and the nature of the denticulate ligaments that reduce cord mobility.[5]

Degenerative change is primary cause of thoracic disc herniation. The role of trauma as cause of thoracic disc herniation is widely debated. Most series demonstrate trauma to not be a significant etiology of thoracic disc herniations, whereas others disagree and believe that the trauma may have been minor or too far in the past for the patient to recall. One study demonstrated that men under the age of 40 had a 53% incidence of traumatic disc herniation, whereas all others had a 17% rate.

Several surgical techniques have been described to decompress the thoracic spinal cord. The selection of surgical approach is influenced primarily by the location of the disc herniation (central vs. lateral), the nature of the herniation (hard vs. soft), the severity of symptoms, and the patients' ability to tolerate the procedure. Thoracic disc herniation can be approached by both anterior and posterior approach.

Posterior approach is associated with poor outcome and more chance of cord injury as more need to cord manipulation for disc removal. The first authors to report clinical data for this treatment were Mixter and Barr in 1934.[6] Their results and the results of other series reporting the use of a standard laminectomy approach were disappointing, yielding major morbidity rates of 18%–75% and mortality rates up to 50%.[7,8] As a result, many alternative surgical approaches, including the transpedicular, trans facet pedicle sparing, costotransversectomy, lateral extra cavitary, and transthoracic approaches, were developed. Anterior approach consists of thoracotomy, retro pleural thoracotomy or thoracoscopic removal of disc. Although thoracoscopy is less invasive and have low approach related morbidities but also less familiar approach for spine surgeon and provide less exposure for removal of calcified herniated disc so we did not use thoracoscopy in our case. we use retro-pleural thoracotomy as the herniated disc in lower thoracic spine region.[12]

There are limitation of anterior approach, it has its own approach related morbidities like pneumonia, pleural effusion, empyma, intercostal neuralgia commonly known post thoracotomy pain. For hard thoracic disc herniations (HTDHs), anterior approaches through thoracotomy or thoracoscopy are suggested factors that support the use of anterior transthoracic approach in our study are larger calcified centrally located disc that can be taken away from cord ventrally with minimal manipulation cord by anterior approach only besides this anterior approach provide

excellent visualization of dissection plane between cord and disc.[9-11]

CONCLUSION

For excision of central calcified disc there is always potential for intraoperative complication like CSF leak, spinal cord ischemia, and anterior spinal artery injury. In some case calcification of disc associated with calcification of posterior longitudinal ligament that is adherent to dura and manipulation of disc material cause unintentional dural tear.[12] We had neurological worsening by grade 1 power immediate postoperatively which could be due to manipulation of cord during removal of calcified disc but neurological function improves gradually and at 3 months postop patients have fully recovered from neurological deterioration.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Chauhan LS, Tak MS, Suthar L, Shreyas CS. Transthoracic discectomy for a rare presentation of calcified dorsal disc herniation. Int J Res Orthop 2025;11:437-40.