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Case Report

Diagnosis and management of thoracic intradural extra-arachnoidal disc herniation

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ABSTRACT

Background: Intradural extra-arachnoidal disc herniations (IEDHs) are rare. Here, we reviewed the clinical features and magnetic resonance (MR) diagnostic features of IEDH.

Case Description: A 58-year-old male presented with mid-thoracic back pain radiating to the left leg associated with ipsilateral leg weakness. The thoracic MR documented T8-T9 focal spinal canal stenosis and a ventral disc herniation. Thoracic spine computed tomography scan confirmed the diseased level and did not show any calcification. The patient underwent a right-sided transpedicular extracavitary approach for disc excision. At surgery, IEDH was identified with soft cartilaginous consistency and was morcellated to remove in piece meal while preserving the integrity of the arachnoid layer.

Conclusion: IEDH poses a significant challenge for its diagnosis and management. A careful preoperative MR imaging review with a high index of clinical suspicion may ensure a good clinical outcome.

Keywords: Disc, Extra-arachnoidal, Herniation, Intradural, Spine, Thoracic

INTRODUCTION

In intradural extra-arachnoid disc herniations (IEDHs), the discal tissue detaches the arachnoid layer from the dura mater and invades this potential space but does not reach the rootlets and the cerebrospinal fluid (CSF) space.[4,6] Here, we report a 58-year-old male with a T8-T9 intradural extra-arachnoidal disc herniation diagnosed with magnetic resonance (MR) and resected utilizing a right-sided transpedicular extracavitary approach.

CASE DESCRIPTION

A 58-year-old male patient presented with 1-week duration of mid-thoracic and left hip-thigh-knee pain. On examination, he had left-sided iliopsoas/quadriceps (2/5) and dorsiflexion/extensor hallucis longus weakness (0/5) along with the left lower limb clonus and a bilateral Babinski response. The thoracic MR imaging (MRI) documented an anterior dural/epidural, central, and rounded ventral nodule of 3–4 mm at the T8-T9 level. The lesion was isointense on T1 and hypointense on T2 (i.e., on short-term inversion recovery) sequences. On axial sections, the lesion compressed the cord but was surrounded by a hyperintense signal consistent with CSF [Figures 1a-c and 2]. The postgadolinium images showed very faint peripheral enhancement

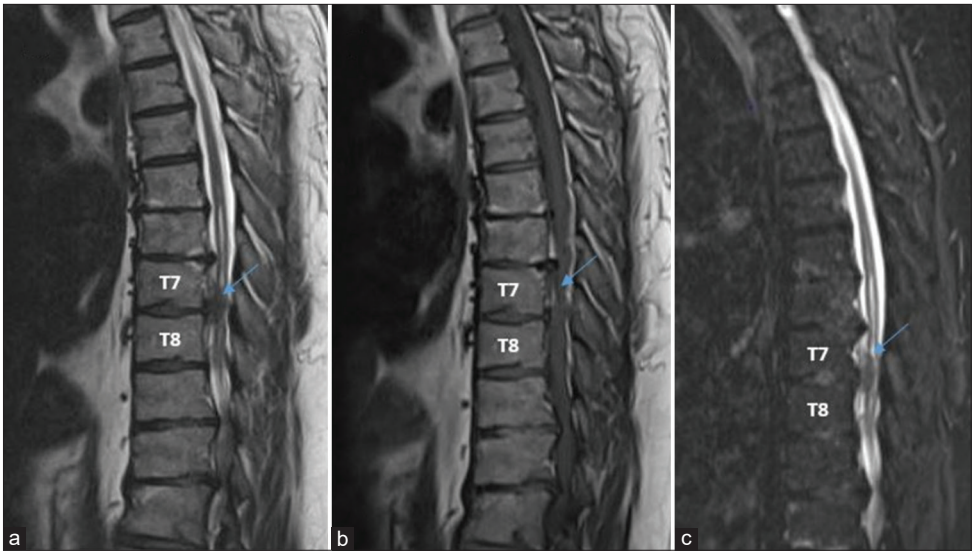

Figure 1: Magnetic resonance imaging of the thoracic spine with T2-weighted sagittal image (a). It is showing an anterior dural/epidural rounded nodule of 3–4 mm (blue arrow) of low signal intensity at the disc level between vertebra 8 and 9 with features of secondary compressive myelopathy. It includes attenuated caliber, central hyperintensity, and syringohydromyelia. It is isointense in T1 weighted (b) and hypointense in short-tau inversion recovery sequence (c).

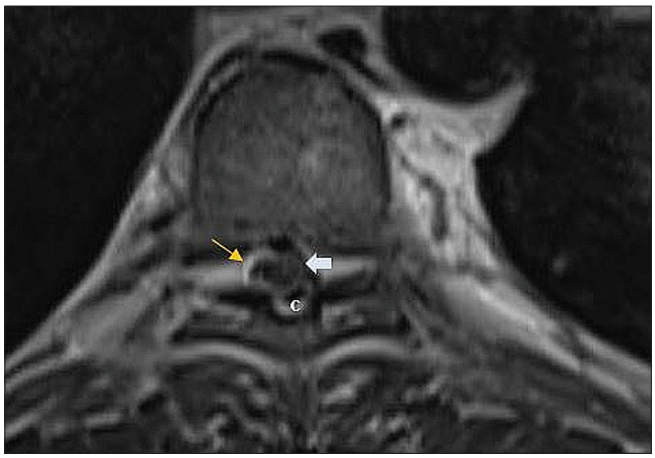

Figure 2: T2-weighted axial section shows the hypointense nodule (white broad arrow), compressing the cord © with surrounding hyperintense signal (yellow arrow) that corresponds to the cerebrospinal fluid cleft.

[Figure 3]. On MR, therefore, the cord was markedly compressed/attenuated in caliber and demonstrated a central syringohydromyelia [Figure 1a]. The differential diagnosis included benign dural calcification (calcified pseudoneoplasm – CAPNON), calcified part of a protruded intervertebral disc, or a tiny burnt-out meningioma. A preoperative computed tomography (CT) [Figure 4] of the whole spine ruled out any calcification and confirmed the diseased level.

The patient underwent a right-sided transpedicular extracavitary approach to the T8-T9 level. As no epidural lesion was encountered, a small dural incision revealed a pinkish-white extra-arachnoidal smooth disc fragment which was cartilaginous in nature that was readily delivered utilizing a dissector [Figures 5 and 6]. The small dural defect was stitched and sealed with artificial dura and sealant. At a 6-month follow-up, the patient showed significant neurological improvement (motor in the left leg of 4/5) and could walk independently. The histopathologic examination revealed a cartilaginous degenerated disc.

DISCUSSION

The pathogenesis of IDH is variously attributed to adhesions occurring between the posterior longitudinal ligament (PLL), disc annulus, and dural interface.[3] Penetration of disc fragments in the subdural or subarachnoid space can occur acutely. The preoperative diagnosis of intradural extradural disc herniation has been challenging, and may include CT scans, discography, myelography, and MR imaging. Differential diagnostic considerations include neurofibromas, lipomas, meningioma, epidermoid tumor, arachnoid cyst, metastasis, and hematoma. Here, we anticipated that the lesion was a benign intradural disc herniation that might be partially calcified or a small burnt-out meningioma.

MR diagnosis of thoracic disc herniation

MR diagnostic features for thoracic intradural discs typically demonstrated either a "hawk-beak sign" (i.e., sharp compressive lesion with a beak-like appearance to the dural sac/abrupt loss of PLL or "Y-sign" (i.e., one line of dural

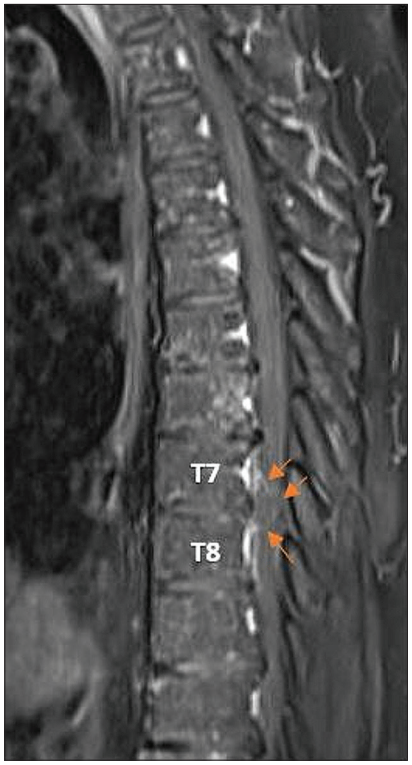

Figure 3: Postgadolinium image shows a faint peripheral enhancement (orange arrows).

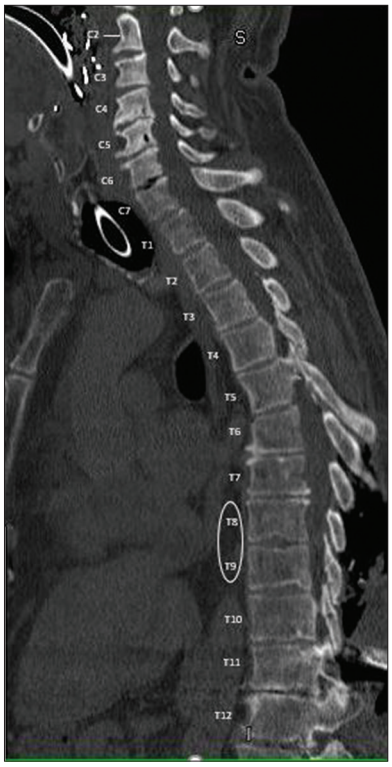

Figure 4: Preoperative whole computed tomography spine sagittal view confirms the diseased level of T8/T9, and it also does not show any hyperdensity, ruling out any calcification in the herniated disc.

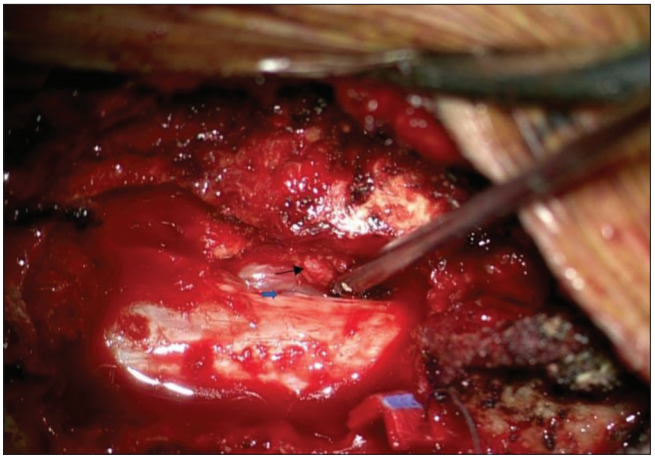

Figure 5: Intraoperative view shows the extracted intradural disc fragment (black arrow) and the small dura opening which was done (blue arrow).

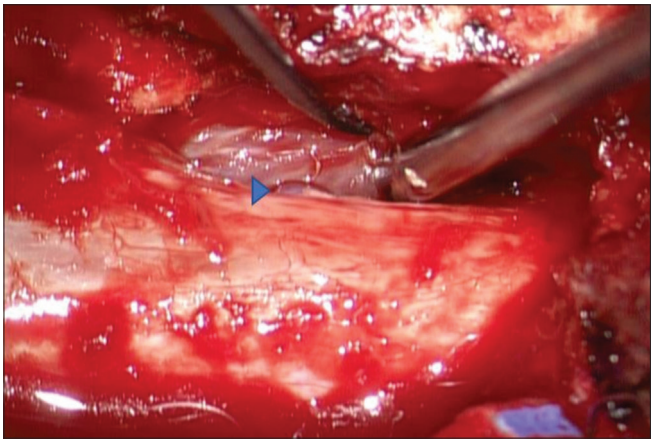

Figure 6: Intraoperative magnified view shows the intact arachnoid layer that bulged out after dura opening and extraction of the disc fragment (blue arrowhead).

arachnoid layer splits into two lines due to disc herniation in the potential extra-arachnoidal intradural space).[8] Here, we found the "Y" sign on the preoperative MR images (i.e., presence of the CSF cleft on axial T2 studies as in [Figure 2]). On postgadolinium MR studies, there may be some peripheral contrast enhancement due to surrounding chronic granulation tissue/neovascularization. In this case, it was absent due to the acute nature of the disc herniation (i.e., no chronic inflammation).[7]

Surgical options

Different surgical approaches have been used to remove intradural extra-arachnoidal disc herniations.[2,3,5,9] We used a right-sided transpedicular approach to expose the interface of the dura and posterior vertebral body.[9] There was nothing extradurally, therefore, we opened the dura and found the

disc contained within the dura but anterior/beneath an intact arachnoid. After opening of the dura, we removed a soft cartilaginous disc fragment clearly separating it from an intact dorsal arachnoid layer.

Postoperatively, the patient nearly fully recovered over the next 6 months. Other cases of thoracic disc excisions reported similar findings or no improvement and had long-standing irreversible postoperative neurological deficits.[1,3,9]

CONCLUSION

Thoracic intradural extra-arachnoidal disc herniations are rare and should optimally be diagnosed preoperatively utilizing both MR (i.e., optimizing soft tissue) and CT (identifying attendant ossification/calcification and confirming the correct level).

Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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