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CASE REPORT

Thoracic cord herniation and associated intra-operative nuances: a report

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Abstract
Background Thoracic cord herniation is a well-established entity in the literature. Majority of the published literature deals with its surgical management in terms of "mere" detethering of cord. However, not much is written about the degree of herniation and ectopic cord tissue and its management.
Case summary A 58-year-old male presented to us with progressive difficulty in walking. Imaging revealed a cord herniation at T7–8 level. Surgical detethering was planned. However, a significant amount of "ectopic" cord tissue was found outside the dural defect intra-operatively. Simple detethering and repositioning was difficult. Hence, the ectopic tissue was excised under neuro-physiologic monitoring and no major change was recorded intra-operatively/post-operatively.
Conclusions Thoracic cord herniation surgery may be more than simple detethering and cord repositioning. If encountered in similar situations intra-operatively, surgeons should be able to excise ectopic tissue without grave post-operative deficits. Neuronal plasticity probably plays an important role in the pathophysiology of long-standing cord herniation.

Keywords Thoracic cord herniation · Ectopic cord · Resection

Introduction

Ventral thoracic cord herniation (TCH) is a rare but well-described entity in the literature [1, 2]. Occasionally, herniations through the dorsal dura can also be encountered [3, 4]. However, none of the existing case reports available in the literature has dealt with the amount of cord herniated and its resultant intra-operative nuances. Ventral TCH usually presents with features of myelopathy where patients experience gradual progression in symptoms. Magnetic resonance imaging (MRI) is usually the investigation of choice with the most common finding being ventral displacement of cord with absence of anterior subarachnoid space. This usually makes dorsal subarachnoid space prominent and hence, flow artifacts are commonly seen at the involved level, which is most commonly between T5 and T7. Phase contrast MRI can further elucidate the dorsal cerebrospinal fluid (CSF) artifacts and may help in differentiating from the most common differential of dorsal arachnoid cyst.

Case summary

A 58-year-old male presented with progressive difficulty in walking over last few months. On examination, he had upper motor signs in lower limbs, right leg weakness and hemisensory changes in the left hemibody with an approximate level of T8–T10. An MRI of the spine suggested the diagnosis of TCH at the level of the disc space of T7–T8, with prominent CSF flow artifacts dorsally

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Fig. 1 Sagittal and axial sections of dorsal cord showing herniation of cord tissue and ventral displacement of cord. Note that the CSF artifacts are prominent dorsally, a key point of difference from arachnoid cysts

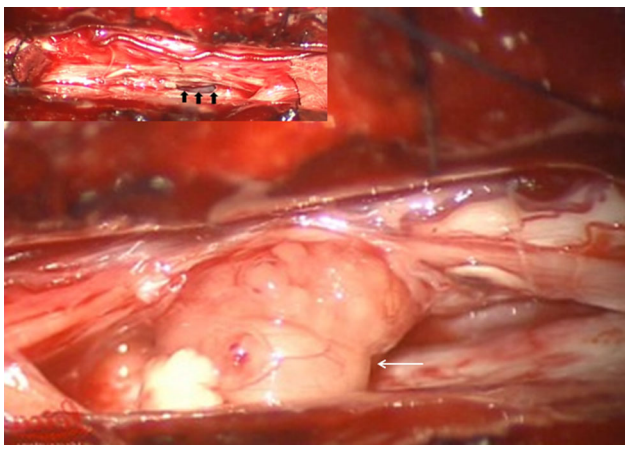

Fig. 2 Intra-operative image showing the large ectopic tissue (*white arrow*) coming out through the ventral dural defect seen after excision of the ectopic tissue (*black arrows in inset*)

(Fig. 1). On imaging, the diagnosis was straightforward. The patient consented for surgical "de-tethering" and underwent T7–T9 laminectomy. The surgery was done under neurophysiological monitoring where MEPs (Motor evoked potentials) and SSEPs (Somato-sensory evoked potentials) were being recorded. Novak et al. [5] have emphasized on role of MEPs in their series of 4 patients with TCH. They had a good correlation between intra-operative D wave amplitude drop and post-operative motor deficits confirming the role of MEPs in such surgeries.

Intra-operatively, the cord was flattened at the T7–T8 level and a large ventral dural defect was seen after the cord was partially released, with a large ectopic tissue mass (2×2 cm) arising from the ventral surface and herniating through it (Fig. 2). The relatively large size of the mass made it impossible to preserve it without causing cord compression, and as far as we know, this has not been an associated finding with TCH till date. Therefore, partial resection had to be done under close neurophysiological monitoring. Any point of drop in SSEPs/MEPs was considered as the endpoint of resection. No attempt was made to resect the whole mass, and a good margin was preserved adjacent to the cord. The ventral defect was covered with artificial dura and dorsal dural closure was done as usual. The patient improved neurologically and did not develop any new deficits. The histopathology confirmed normal Glial fibrillary acidic protein (GFAP)-stained neural tissue in the excised specimen (Fig. 3).

Large masses of ectopic tissue have never been reported along with TCH. Surgical details are usually not illustrative in published reports of TCH [6, 7], but the majority describes simple delineation and release from the surrounding arachnoid. The cord can be repositioned within the dural sac easily afterwards. In this situation, where a substantial ectopic tissue is found ventral to the cord, certain management-related dilemmas might arise. None of the reports has mentioned about the amount of ectopic tissue herniated till now. Although some reports suggest that the resection of ectopic tissue is not advisable [8], we feel that if intra-operatively simple repositioning may not be possible, resection can be attempted under neuro-monitoring. Some evidence in the literature also exists regarding long-standing giant nerve sheath tumors arising from eloquent roots rarely having function and being excised completely [9]. Neuronal plasticity probably helps

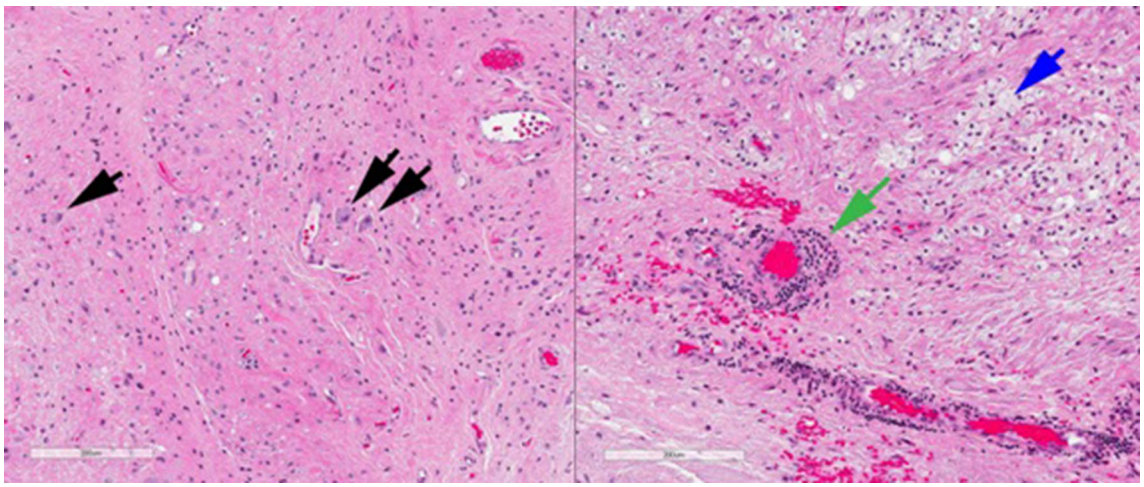

Fig. 3 Histopathology showing neural parenchyma including pyramidal neurons (*black arrows*). Also are seen focal macrophages (*blue arrows*) and perivascular inflammation (*green arrows*) within the resected cord tissue

in such cases where the long-standing ectopic cord substance can be resected if the sheer size of may not allow just repositioning within the thecal sac.

Conclusion

Thoracic cord herniation surgery may be more than simple detethering and cord repositioning. If encountered in similar situations intra-operatively, surgeons should be able to excise ectopic tissue without grave post-operative deficits under neuro-physiologic monitoring. Neuronal plasticity probably plays an important role in the pathophysiology of long-standing cord herniation.

Conflict of interest None of the authors has any potential conflict of interest.

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