ABSTRACT

Idiopathic spinal cord herniation is a rare and often missed cause of thoracic myelopathy. The clinical presentation and radiological appearance is inconsistent and commonly confused with a dorsal arachnoid cyst and often is a misdiagnosed entity. While ventral spinal cord herniation through a dural defect has been previously described, intravertebral herniation is a distinct entity and extremely rare. We present the case of a 70-year-old man with idiopathic thoracic transdural intravertebral spinal cord herniation and discuss the clinico-radiological presentation, pathophysiology, and operative management along with a review of the literature of this unusual entity.

Keywords: Idiopathic, spinal cord herniation, spine, thoracic, ventral

INTRODUCTION

Idiopathic spinal cord herniation is an uncommon cause of thoracic myelopathy. The presentation can vary from back pain to spastic paraparesis with bowel and bladder dysfunction. The clinical presentation and radiological appearance are inconsistent and commonly confused with a dorsal arachnoid cyst and often is a misdiagnosed entity.[1] While several cases of idiopathic spinal cord herniation have been described in the literature, to the best of our knowledge, only three previous reports specify idiopathic transvertebral herniation.[2‑4] With this report, we add to the existing knowledge of this rare pathology.

CASE REPORT

We present the case of a 70-year-old male patient with 1-year history of ataxia and several months history of new urinary urgency and occasional incontinence. On physical examination, he had 5/5 strength, normal sensation, and subtle spasticity with exaggerated lower limbs reflexes.

Magnetic resonance imaging revealed a T6 ventral cord herniation through a dural defect with enlargement of the dorsal thoracic subarachnoid space [Figure 1a and b]. There was a significant erosion of the posterior vertebral body of T6. A cerebrospinal fluid (CSF) cleft was present between the spinal cord and the vertebral body. Computed tomography myelogram confirmed the diagnosis and ruled out an arachnoid cyst. It clearly demonstrated the bony defect within the dorsal vertebral body [Figure 1c and d].

Due to the patient’s progressive symptoms, surgery was offered, and the patient underwent a T6 laminectomy, intradural exploration and repair of the ventral spinal cord herniation. Intraoperative ultrasound was used after the laminectomy to examine the intradural contents and confirm adequate exposure to address the spinal cord herniation. A midline durotomy was performed, and with gentle elevation of the dentate ligament, the ventral spinal cord was visible. The herniated portion of the spinal cord...
was evident emanating through a dural defect, and the vertebral bony erosion seen on pre-operative imaging was visualized [Figure 2a and b]. A small piece of a dural substitute (Durepair, Medtronic, Minneapolis, MN, USA) was then cut into an appropriate size and carefully placed into the ventral intradural space, to cover the dural defect [Figure 2c and d]. The dorsal durotomy was then closed using a running 5-0 Gore-Tex suture (Gore Medical, Flagstaff, AZ, USA). The wound was closed in layers. He was ambulatory on postoperative day 1 and was discharged on postoperative day 2. At follow-up, he had substantial improvement of his preoperative symptoms with normalization of urinary function and steady gait.

**DISCUSSION**

Most cases of idiopathic spinal cord herniation occur either anteriorly or anterolaterally between T2 and T8.[1] While the diagnosis of idiopathic ventral spinal cord herniation is a challenging one, involvement of the vertebral body can confound the diagnosis even further. The CSF cleft ventral to the cord causing erosion of the posterior cortical margin can occasionally be mistaken for a bony cyst.[4] If diagnosis is delayed the focal area of transdural migration can cause incarceration of the cord and result in paraplegia.[10] Barbagallo et al.[5] suggested that in this subset of patients with vertebral body involvement, the presentation is more atypical, the outcome unpredictable and probably worse than in more typical cases.

The etiology of this entity remains unclear and is thought to be due to either a congenital dural defect or an acquired defect secondary to erosion of the dura from a thoracic disc. While direct trauma can result in a pseudomyelomeningocele eroding into the vertebral body, its occurrence in an idiopathic fashion is rare.[5] Najjar et al.[6] hypothesized that herniation occurs as an acquired phenomenon due to an inflammatory process resulting in adherence between the spinal cord and the dura. Continued erosion of the vertebral body occurs due to CSF pulsations and a dural defect forms. This is followed by herniation of the spinal cord into the vertebral body occurring with CSF pulsations.

Surgical strategies have evolved over time in the treatment of ventral spinal cord herniations. Closure of the dura has been attempted by either primarily suturing the dura or by layering the defect with various artificial dural patches. Some authors have described simply widening the dural defect to prevent strangulation of the cord.[6] We prefer to simply place a piece of artificial dural replacement intradurally over the dural defect that is fashioned to a size just larger than the defect. This “patch” acts like a sling preventing the spinal cord from re-herniating through the defect. We have not seen any recurrences using this technique in the past 10 years. While we did not see any reason to address the bony defect, Sadek et al.[7] describe packing it with bone wax amalgamated with vancomycin powder.

Transvertebral spinal cord herniation is a rare entity and distinct from the typical ventral spinal cord herniation. Accurate diagnosis and work-up are essential for appropriate surgical planning. Along with the presented clinical case and radiographic imaging, our intraoperative photos provide a resource for surgeons to visualize what is to be expected intraoperatively.
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Conflicts of interest
There are no conflicts of interest.

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