

Circumferential Dural Resection Technique and Reconstruction for Removal of Giant, Calcified, Transdural, Herniated Thoracic Disc

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Introduction

Giant, calcified, transdural thoracic central disc herniations remain a formidable pathology for spine surgeons. While relatively rare lesions, the transdural nature requires opening of the friable dura for appropriate decompression, which results in dural defects requiring closure to prevent cerebrospinal fluid leakage. In most cases, primary dural repair is unable to be achieved. Here, we present a novel method of using a transthoracic multidisciplinary approach to circumferentially resect the disc herniation and repair the resultant dural defect.

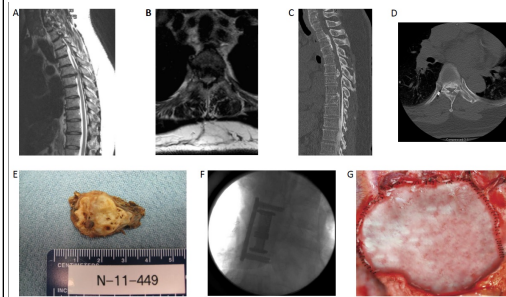
Methods

This was a retrospective study reporting on the technique and outcomes in cases of transdural central thoracic calcified herniated discs treated at our institution from 2012 to 2015. All patients were treated with circumferential dural resection technique and closure. Magnetic resonance imaging (MRI) and computed tomography (CT) findings confirmed the diagnosis and fit the patient's clinical symptoms. Thoracic disc herniation occurred in spinal levels T6-T11 in all patients. No patient with multiple thoracic discs requiring operation was included. Intraoperative neuromonitoring was conducted in all cases. Preoperative and postoperative Frankel grades were recorded.

Results

Seven patients (mean age, 56.1 years) presented to our service with clinical symptoms consistent with thoracic myeloradiculopathy during the study period. In all cases, corpectomies of the involved levels were combined with circumferential resection of the dura and complete decompression of the spinal cord. The dural defect was repaired with an onlay dural patch, and a large piece of AlloDerm (LifeCell Corp, Bridgewater, NJ) graft was sewn to close the pleural defect. Every patient had a lumbar drain for cerebrospinal fluid diversion perioperatively. There were no recorded losses of neuromonitoring responses during any case per our review of the operative reports. No patient suffered neurological decline related to the surgery, and 3 patients had clinically significant improvement in function. Two patients developed early postoperative cerebrospinal fluid leaks requiring operative revision to oversee the defects.

Figure 1



(A) Sagittal and (B) axial T2-weighted magnetic resonance images reveal an anterior compressive pathology effacing the spinal cord at T6-T7, with smaller areas of disc herniation at other thoracic levels. (C) Sagittal and (D) axial computed tomograms demonstrate a disc or osteophyte complex obliterating more than 50% of the spinal canal at the level of T6-T8, with myelographic block. Intraoperatively, a giant, calcified, transdural disc was noted to be compressing the spinal cord. The disc or osteophyte complex was resected circumferentially and removed. (E) After a large cage was used to fill the corpectomy defect, (F) a large piece of AlloDerm (LifeCell Corp., Bridgewater, NJ) was sewn to the pleura to cover the site of the dural defect and to prevent egress of cerebrospinal fluid into the pleural cavity (G, intraoperative photograph of the graft-sewing process).

Conclusions

This novel technique for decompression of the spinal cord by dural resection for removal of giant, calcified, transdural, herniated thoracic discs is safe and results in excellent decompression of the spinal cord. The technique becomes necessary when primary repair of the dura is not possible, and it can be used in cases in which the resection of pathology includes the dura.

Learning Objectives

1. Understand the limitations of current surgical approaches in treating giant, calcified, transdural herniated thoracic discs
2. Learn a novel anterior approach that involves circumferential resection of the disc, and measures taken to reduce the risk of CSF-pleural fistula formation

References

1. Hott JS, et al.: Surgical management of giant herniated thoracic discs: analysis of 20 cases. *J Neurosurg Spine* 3:191-197, 2005.
2. Gille O, et al.: Analysis of hard thoracic herniated discs: review of 18 cases operated by thoracoscopy. *Eur Spine J* 15:537-542, 2006.
3. Ayhan S, et al.: Transthoracic surgical treatment for centrally located thoracic disc herniations presenting with myelopathy: a 5-year institutional experience. *J Spinal Disord Tech* 23:79-88, 2010.