Thoracic Disk Herniation With Paraparesis Treated With Transthoracic Microdiskectomy in a 14-year-old Girl

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Abstract
Herniated thoracic intervertebral disk causing spinal cord compression with paraparesis is uncommon in adults and rare in children. This article describes a case of pediatric thoracic disk herniation with paraparesis treated surgically.

A 14-year-old girl presented with a 4-month history of diffuse back pain and sudden onset paraparesis. Motor strength was 4/5 in both legs, and she had lost the ability to ambulate. Magnetic resonance imaging revealed spinal cord compression due to a herniated intervertebral disk at T5-T6. Computed tomography scan after myelogram demonstrated anterior dural sac compression at T5-T6 but no intervertebral disk calcification. She underwent transthoracic microdiskectomy. The herniated disk was removed, and the thoracic spinal cord was decompressed. No fusion was performed after microdiskectomy. The postoperative course was uncomplicated, and neurologic deficit resolved within 2 weeks postoperatively. The patient was pain free with no neurologic deficit at 24-month follow-up, and computed tomography scan showed remodeling of the T5 and T6 vertebral bodies.

Most cases of thoracic disk herniation are asymptomatic. If no compression of the spinal cord exists, the natural history of the disease justifies conservative management. Although the treatment of choice is conservative, surgery is required in patients who develop progressive neurologic deficit or severe radicular pain. Transthoracic microdiskectomy without fusion is considered a treatment in similar cases.

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Figure: Preoperative T2-weighted sagittal magnetic resonance image showing an extradural mass in the spinal canal at T5-T6 (A). Axial magnetic resonance image showing a herniated intervertebral disk compressing the spinal cord at T5-T6 (B).
A herniated thoracic intervertebral disk causing spinal cord compression with paraparesis is rare in children. The symptoms of thoracic disk herniation usually subside spontaneously, and conservative treatment is sufficient. Surgical treatment should be reserved for significant neurologic problems. Methods of operative treatment for thoracic disk herniation in children include decompressive laminectomy,1-4 posterior discectomy,5,6 and laminoplasty.7 In the current study, a 14-year-old girl presented with an intervertebral disk herniation at T5-T6 that was causing paraparesis. To the authors’ knowledge, this is the first report on this disease that was treated by transthoracic microdiscectomy without fusion.

CASE REPORT

A previously healthy 14-year-old girl presented with a 4-month history of diffuse back pain and sudden-onset paraparesis after running up stairs. She reported listlessness and numbness of the bilateral lower extremities and had lost the ability to ambulate. She reported no history of trauma, fever, weight loss, or other constitutional symptoms, including skeletal dysplasia. On examination, she had tenderness on percussion of the spinous processes of the middle thoracic spine. Motor strength was 4/5 in both legs. Bilateral tendon reflexes of the lower extremities were hyperactive, and knee and ankle clonus were positive. Hypoesthesia existed at T6 and below. No bowel or bladder dysfunction existed. Chemistry, hematology tests, and urinalysis were normal.

Plain thoracic spine radiographs showed no abnormal findings. T2-weighted magnetic resonance imaging (MRI) revealed spinal cord compression due to a herniated intervertebral disk at T5-T6 (Figure 1). Computed tomography (CT) scan after myelogram demonstrated anterior dural sac compression at T5-T6 and no intervertebral disk calcification (Figure 2).

A decompressive transthoracic microdiscectomy was performed at T5-T6. The patient was placed in the lateral decubitus position with her left side up. A 6-cm skin incision was made, and the left transthoracic approach was used on the left fifth costectomy. The fifth and sixth segmental vessels were ligated and divided. After resection of the left sixth rib head, the superior pedicle of T6 and the posterior portion of the T5 and T6 vertebral bodies were removed. After injecting dissolved indigo carmine dye into the T5-T6 disk space, the posterior portion of the disk and the posterior longitudinal ligament were removed. This exposed the underlying dura mater and revealed the herniated disk as viewed under high magnification using the surgical microscope. The herniated disk was removed with a pituitary rongeur, and the thoracic spinal cord was decompressed. No fusion was performed after microdiscectomy. The size and shape of the removed disk material are shown in Figure 3.

The postoperative course was uncomplicated, and the motor and sensory neurologic deficits resolved within 2 weeks postoperatively. The patient was allowed out of bed after chest tube removal on postoperative day 3, and she was able to walk independently on postoperative day 14. Magnetic resonance imaging 1 month postoperatively revealed no spinal cord compression at T5-T6 (Figure 4). At 2-year follow-up, she was symptom free and had normal neurologic function. Three-dimensional CT scan at 2-year follow-up revealed remodeling of posterior portions of the vertebral bodies excised intraoperatively.

DISCUSSION

Thoracic disk herniation is uncommon in adults and rare in children. A high percentage of herniated thoracic disks in children show calcification of the affected nucleus pulposus. Calcification in the nucleus pulposus increases the risk of disk rupture.2,5,8 This calcification is usually self-limited and disappears spontaneously.4 The etiology of disk calcification remains uncertain. In the current case, no major trauma occurred, the patient reported no severe back pain, and no calcification of the intervertebral disk existed.1,4,6,7

Most cases of thoracic disk herniation are asymptomatic.3,8,9 If no spinal cord compression exists, the natural history of the disease justifies conservative management. Symptoms of spinal cord compression associated with posterior disk protrusion are rare but important.3 Although the treatment of choice is conservative, surgery is required in patients who develop progressive neurologic deficit or
severe radicular pain. In the current case, the development of paraparesis was a factor in our decision to operate, and spinal cord decompression enabled a complete return of function. Surgical management for thoracic disk herniation in children was first described by Peck2 in 1957. To the authors’ knowledge, 7 cases have been reported in children. The surgical procedures included decompressive laminectomy,1,4 posterior diskectomy,5,6 and laminoplasty.7 Laminectomy and posterior disectomy may decompress the spinal cord effectively, but progressive kyphosis, which is thought to be secondary to the laminectomy, is common.4,10 Pressure on the spinal cord by posterior disectomy carries the risk of permanent spinal cord damage.11 In the current case, disk herniation was localized centrally, and transthoracic disectomy was performed to decompress the spinal cord.

CONCLUSION

A technique for the transthoracic approach and removal of a prolapsed intervertebral disk should provide adequate exposure without the need for spinal cord retraction or pressure on the dura mater.12 The technique described in this article provides full vision of the dura mater and makes performing the safe and accurate decompression of the spinal cord and nerve root possible. Fusion has been advocated after thoracic disectomy because of compromise in the stability of the spinal column.13 However, excellent clinical outcomes are usually obtained using transthoracic disectomy without fusion. Broc et al14 described thoracic microdisectomy that had little effect on the mechanics and kinematics of the thoracic spinal column. Prophylactic fusion is not recommended after thoracic microdisectomy unless clinical evidence of instability exists. In the case of thoracic disk herniation with neurologic deficits, such as paraparesis, transthoracic microdisectomy without fusion should be considered as a treatment option.

REFERENCES

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