Lumbar Diskal Cyst Containing Intervertebral Disk Materials

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abstract

The diskal cyst is a relatively new clinical entity and develops clinical symptoms of a unilateral single nerve root lesion. Although many cases of diskal cyst have been reported, the pathogenesis of diskal cyst remains unclear, and several theories regarding the pathogenesis have been proposed. This article presents 2 cases of diskal cyst communicating with an adjacent herniated disk. Magnetic resonance imaging findings showed diskal cysts in the epidural space of the lumbar spine. Surgical resection was performed, and apparent connections between the corresponding disk and cysts were found. Histopathologic examinations of the cyst wall demonstrated cartilaginous tissue including nucleus pulposus and annulus fibrosis. These patient’s symptoms improved remarkably postoperatively, and there was no recurrence of diskal cyst.

The hypothesis supported by many authors is hemorrhage from the epidural venous plexus. Diskal cysts arise first from an underlying intervertebral disk injury that causes an annulus fibrosis fissure in the posterior intervertebral disk. Hemorrhage from the epidural venous plexus with a rich blood flow then occurs in the space between the peridural membrane and vertebral body. However, in our cases, we confirmed that the diskal cyst could have developed from the resorption process of an intervertebral disk herniation. Only 5 cases of diskal cyst demonstrating the presence of cartilaginous tissue in the cyst have been reported. Our 2 cases are rare and support the hypothesis of resorption of intervertebral disk herniation.

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Figure: Sagittal T1-weighted lumbar vertebrae MRI with low-signal intensity (A), sagittal T2-weighted lumbar vertebrae MRI with high-signal intensity (B), and axial T2-weighted lumbar vertebrae MRI with high-signal intensity (C) showing a spherical extradural cystic mass behind the L5 vertebral body (arrows).
Several kinds of intraspinal cysts have been reported previously, including synovial cyst, ganglion cyst, perineurial cyst, and diskal cyst, and these cysts cause symptoms and signs resembling those of lumbar disk herniation. Diskal cyst is a relatively rare disease, and several cases have been reported. However, the pathogenesis of diskal cyst is unclear. This article describes 2 cases of lumbar diskal cyst.

**CASE REPORTS**

**Patient 1**

A 23-year-old man presented with a 3-month history of low back pain and numbness of the lateral right leg. He noted aggravation of these symptoms over the previous month. On physical examination, the straight leg raising test was positive at 70° in the right leg. Sensory and all muscle strength of the lower extremities were normal. Plain radiographs of the lumbar spine showed no remarkable findings. Magnetic resonance imaging (MRI) showed a spherical extradural cystic mass with a low-signal intensity on T1-weighted images and high-signal intensities on T2-weighted images behind the L5 vertebral body (Figure 1). Magnetic resonance imaging demonstrated that the L4/5 and L5/S1 intervertebral disk had mild degeneration. Although injection of the steroid and local anesthetic to the right L5 root was briefly effective, symptoms soon recurred.

We diagnosed right L5 root disorder by the diskal cyst, and right partial hemilaminectomy was performed at the L4-L5 level. A dark blue cyst compressing the right L5 root was visualized over the ventrolateral side of the dural sac (Figure 2A). Hemorrhage was encountered when ablation of the cyst from the surrounding extradural tissue was attempted. The cyst contained 1 mL of bloody serous fluid. A connection between the cyst and the L4/5 intervertebral disk was identified, and the cyst was removed. The apparent connection between the corresponding disk and the cyst was found (arrow). The cyst was removed (B).

Histopathologic examinations of the cyst wall demonstrated fibrous connective tissue with hemosiderin deposits without lining cell layers. Cartilaginous tissue including nucleus pulposus and annulus fibrosis was confirmed in the cyst wall.

The patient’s symptoms improved remarkably postoperatively, and there was no recurrence of diskal cyst at 2-year follow-up.

**Patient 2**

A 60-year-old man presented with a 2-year history of pain radiating from the left buttock to the posterior lower extremity and numbness of the lateral portion of the right dorsal forefoot. His symptoms had gradually deteriorated. On physical examination, sensory and all muscle strength of the lower extremity were normal. Plain radiographs of the lumbar spine showed narrowing of the L5/S1 intervertebral disk space. Magnetic resonance imaging showed a spherical extradural cystic mass with low-signal intensity on T1-weighted images and high-signal intensities on T2-weighted images at the ventrolateral side of the dural sac (Figure 1). Magnetic resonance imaging demonstrated that the L4/5 and L5/S1 intervertebral disk had mild degeneration. Although injection of the steroid and local anesthetic to the right L5 root was briefly effective, symptoms soon recurred.

We diagnosed right L5 root disorder by the diskal cyst, and right partial hemilaminectomy was performed at the L4-L5 level. A dark blue cyst compressing the right L5 root was visualized over the ventrolateral side of the dural sac (Figure 2A). Hemorrhage was encountered when ablation of the cyst from the surrounding extradural tissue was attempted. The cyst contained 1 mL of bloody serous fluid. A connection between the cyst and the L4/5 intervertebral disk was identified, and the cyst was removed. The apparent connection between the corresponding disk and the cyst was found (arrow). The cyst was removed (B).

Histopathologic examinations of the cyst wall demonstrated fibrous connective tissue with hemosiderin deposits without lining cell layers. Cartilaginous tissue including nucleus pulposus and annulus fibrosis was confirmed in the cyst wall.

The patient’s symptoms improved remarkably postoperatively, and there was no recurrence of diskal cyst at 2-year follow-up.
Case Report

On MRI, multiple intervertebral disks showed mild or moderate degeneration. We diagnosed left S1 root disorder due to diskal cyst, and left partial hemi-laminectomy was performed at the L5-S1 level. A dark blue cyst compressing the left S1 root was visualized over the ventrolateral side of the dural sac. The cyst contained a slight amount of serous fluid and a kind of cartilaginous tissue. A connection between the cyst and the L5/S1 intervertebral disk was identified, and the cyst, which adhered to the S1 root, was removed carefully. The obvious connection between the corresponding disk and the cyst was confirmed. Histopathologic examinations of the cyst wall demonstrated fibrous connective tissue with hemosiderin deposits without lining cell layers. The tissue-like cartilage included nucleus pulposus and annulus fibrosis (Figure 4).

The patient's symptoms improved remarkably postoperatively. Six months postoperatively, this patient had only a slight left buttock pain with no radiating pain to the lower extremity.

Discussion

Diskal cyst is a relatively new clinical entity that connects to the intervertebral disk. Chiba et al. first described a cyst with distinct connection to the intervertebral disk in a Japanese patient in 1997 and named this disease lumbar diskal cyst. We diagnosed left S1 root disorder due to diskal cyst, and left partial hemi-laminectomy was performed at the L5-S1 level. A dark blue cyst compressing the left S1 root was visualized over the ventrolateral side of the dural sac. The cyst contained a slight amount of serous fluid and a kind of cartilaginous tissue. A connection between the cyst and the L5/S1 intervertebral disk was identified, and the cyst, which adhered to the S1 root, was removed carefully. The obvious connection between the corresponding disk and the cyst was confirmed. Histopathologic examinations of the cyst wall demonstrated fibrous connective tissue with hemosiderin deposits without lining cell layers. The tissue-like cartilage included nucleus pulposus and annulus fibrosis (Figure 4).

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Discussion

Diskal cyst is a relatively new clinical entity that connects to the intervertebral disk. Chiba et al. first described a cyst with distinct connection to the intervertebral disk in a Japanese patient in 1997 and named this disease lumbar diskal cyst. Chiba et al. first described this lesion in English in 2001 and defined the features of the disease: (1) clinical symptoms of a unilateral single nerve root lesion; (2) occurring at a slightly younger age and at higher intervertebral levels than typical disk herniation; (3) minimal degeneration of the involved disk on imaging studies; (4) communication between the cyst and corresponding intervertebral disks on diskographs, with severe radiating pain in the affected leg during injection; (5) a cyst containing bloody-to-clear serous fluid; and (6) absence of disk materials or a specific lining cell layer on histological examination. In our cases, some findings did not correspond with the defined characteristics. Some patients, such as older patients or those with disk materials existing in the cyst, have been reported since the findings of Chiba et al. Therefore, we should re-evaluate the characteristics of this disease.

The pathogenesis of diskal cyst remains unclear, and several theories have been proposed. Chiba et al. proposed that diskal cysts arise first from an underlying intervertebral disk injury that causes an annulus fibrosis fissure in the posterior intervertebral disk. Hemorrhage from the epidural venous plexus with a rich blood flow then occurs in the space between the peridural membrane and vertebral body. This hypothesis is supported by other authors.

However, some authors have proposed resorption of a preexisting intervertebral disk herniation. Tokunaga et al. reported 2 cases showing transformation from intervertebral disk herniation to diskal cyst on MRI and confirmed the presence of cartilaginous tissue in the cyst wall. Kobayashi et al. reported 2 cases demonstrating absorption of cartilaginous tissue by macrophages in the cyst. Only 5 cases of diskal cyst demonstrating the presence of cartilaginous tissue in the cyst have been reported. Our 2 cases are rare and support the hypothesis of resorption of intervertebral disk herniation. Although many cases of diskal cyst have been reported to date, it is unknown why so few cases demonstrate the presence of cartilaginous tissue in the cyst. The study of more cases is required to clarify the pathogenesis.

Surgical removal has often been reported in the treatment of diskal cyst. Microendoscopic resection has also been reported in recent years. Although CT-guided puncture and steroid injection...
have recently been reported, we can assume that there are risks, such as dural puncture, adhesion, and adhesive arachnoiditis. Although 2 reports exist of symptom improvement with no surgical treatment, such reports are limited. In our cases, we obtained good results by surgical removal, although conservative treatment was not effective. Standard therapeutic guidelines for diskal cyst have not yet been established, but we recommend surgical resection for symptomatic lumbar diskal cyst.

REFERENCES