

Redefining the Evolution of Spinal Discal Cyst Under Percutaneous Endoscopy: Report of Two Cases

Abstract

Discal cyst has been recognized as a distinct cause of back pain and radiculopathy. The clinical features are similar to other pathologies as disc prolapse and stenosis. Various treatment modalities have been described, ranging from nerve blocks to surgical excision. There are scarce reports on the endoscopic appearance of discal cysts. The present paper based on two cases operated by transforaminal and interlaminar endoscopy at our institute demonstrates the explicit intraoperative view and different pathological components of discal cysts.

Keywords: *Discal cyst, discectomy, endoscopy, percutaneous endoscopic interlaminar lumbar discectomy, percutaneous endoscopic lumbar discectomy, percutaneous endoscopic transforaminal lumbar discectomy*

Introduction

Discal cysts are a rare pathology of low back pain and radiculopathy, most commonly affecting the young Asian population.^[1-4] It is defined as an intraspinal extradural cyst with distinct communication with the corresponding intervertebral disc.^[1,3,5] It is imperative to recognize intraspinal discal cysts as a source of back pain and radiculopathy, especially in young adults with no other degenerative features.^[6] This report on two patients managed at our institute, describes endoscopic view of the discal cyst with a mention of all the layers including the capsule, the hard and melting part of the cyst as well as rent within the underlying disc, thus reinforcing the origin of such rare entity. Percutaneous endoscopic lumbar discectomy (PELD), a recently described technique for discal cysts is the treatment of choice due to the explicit intraoperative vision of the pathology as well as early recovery with minimal morbidity.

Case Reports

Case 1

A 31-year-old man complained of low back pain and left leg pain for 3 months. On examination, straight leg raising test (SLRT) was positive on the left side and left great toe had planter flexion

Grade 4 weakness. Magnetic resonance imaging (MRI) [Figure 1] showed a small left-sided L5-S1 disc herniation and a cystic mass in the left lateral aspect of the ventral extradural space from the level of the herniated disk down to the S1 vertebra displacing the dural sac dorsally. The mass was homogeneous and isointense compared with cerebrospinal fluid (CSF). The patient was initially given a trial of conservative management with analgesics and nerve root block. However, the response was transient, and so a definitive surgery was planned. The patient underwent percutaneous endoscopic interlaminar lumbar discectomy at L5-S1 from the left side. A cyst was seen adjacent to the left posterior surface of the S1 vertebra, compressing the left S1 nerve root dorsally [Figure 2]. Intraoperatively, we could identify the adhesions surrounding the discal cyst. After meticulous dissection, the capsule was identified and so was the hard and inside melting consistency material. After complete excision of disc, a rent was visible in the underlying disc, which was the probable site of origin of the discal cyst. Histopathology [Figure 3a] showed cyst wall devoid of epithelial lining and being formed by fibrocollagenous tissue with focal myxoid areas and few areas of fibroblastic proliferation with inflammatory cells. The patient had significant pain relief immediately after surgery and continues to remain pain free at 6 months' follow-up.

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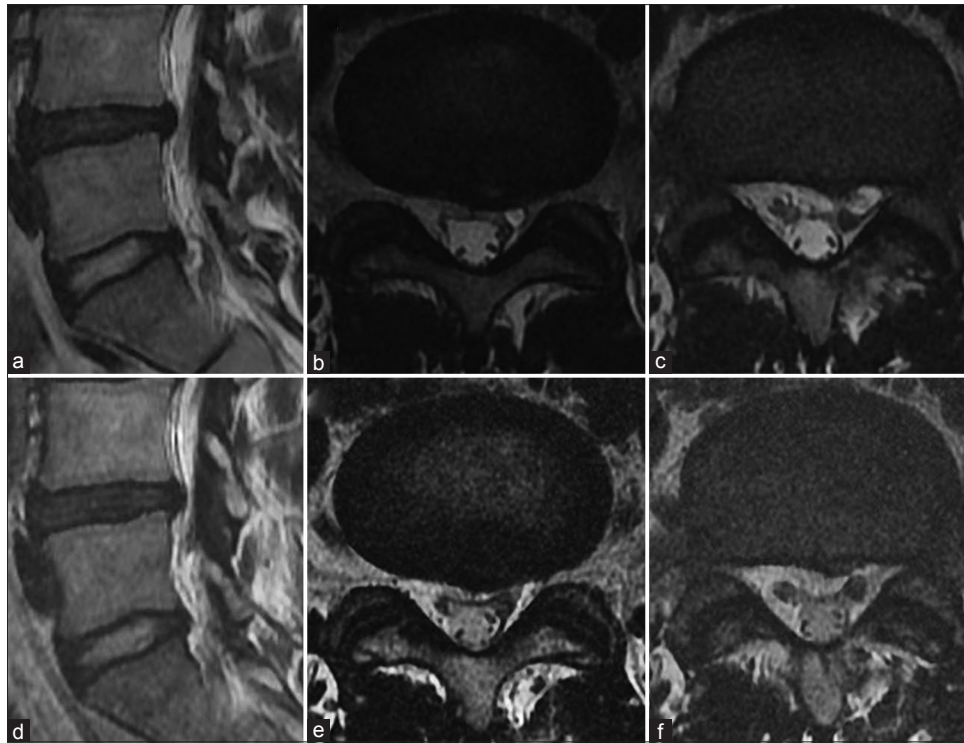


Figure 1: Magnetic resonance imaging of case 1: (a) Sagittal T2-weighted image (left paramedian). A small L5S1 herniated disc is seen. Just below the herniated disc, a cystic mass is depicted with homogeneous high signal intensity. (b and c) Axial T2-weighted image showing cystic lesion that displaces the dural sac and impinges on S1 nerve root. (d-f) Postoperative T2 sagittal and axial images showing decompression and complete excision of the cyst

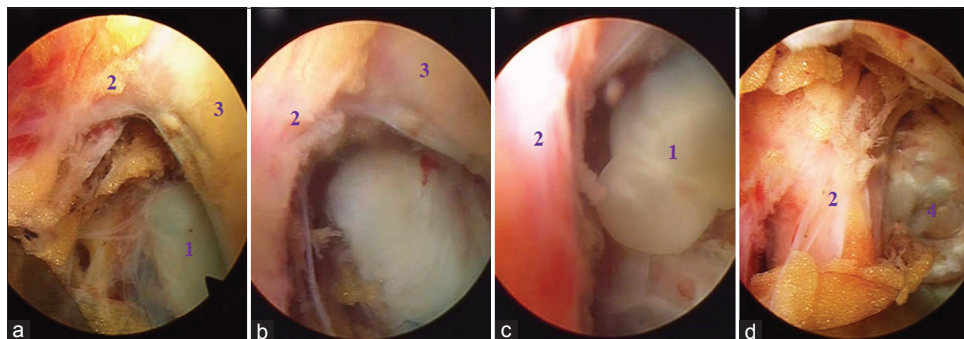


Figure 2: (a) Intraoperative percutaneous endoscopic interlaminar lumbar discectomy image showing the axillary area with discal cyst (1), S1 nerve root (2), and the dural sac (3). (b) View after excising the capsule of cyst showing hard consistency lesion. (c) Melting stage ruptured disc, visible after removing the hard consistency outer part. (d) Crater of the ruptured disc: Clearing the operative field after moving the working channel toward dorsal part of the intervertebral space, the crater within the ruptured disc was exposed

Case 2

A 54-year-old male presented with low back pain and right leg pain for 4 months. On examination, SLRT was positive on the right side and had right ankle flexion weakness of Grade 3 and great toe dorsiflexion weakness of Grade 1. MRI [Figure 4] depicted a small right-sided L4–L5 disc herniation and a cystic mass in the right lateral aspect of the ventral extradural space from the level of the herniated disk down to the L5 vertebra displacing the dural sac. The mass was homogeneous and isointense compared with CSF. A discogram was performed which showed communication of cyst with the underlying disc. Since the patient had already been on medications for the past 2 months, an option

of definite surgery was given. A percutaneous endoscopic transforaminal lumbar discectomy was performed at L4-L5 from the right side. The cyst was localized, dissected carefully from surrounding and completely excised with partial discectomy. The histopathology [Figure 3b] suggested focal mucoid degeneration with disc material mainly composed of nucleus pulposus. The patient was relieved of pain immediately after surgery and continues to be symptom free at 3 months of follow-up.

Discussion

Discal cysts, first described by Chiba *et al.*^[7] in 2001, are believed to be originating from the disc material and

a consequence of degenerative changes. The pathology usually affects young adults, more commonly males, and has a symptom complex similar to disc herniation and stenosis. The pathogenesis of discal cyst remains unclear. Histopathological findings are predominantly fibrous connective tissue without synovial lining cells.^[1,3,8] Cyst content varies from serous to mucinous. Various different theories have been proposed to explain the pathogenesis of discal cysts. While the vascular theory by Chiba *et al.*^[7] considers it to be a sequel of hemorrhage from epidural venous plexus, the more recent degenerative theory by Kono *et al.*^[9] discusses about the degenerative changes within disc. The resulting inflammation causes the formation of a pseudomembrane with cystic softening of collagen. The spilling of fluid from within the disc adds to it. Finally, in the chronic stage, a pseudocapsule is formed with fibrous tissue and nonvascularized vessels, leading to adhesions in the surrounding area.^[9,10]

MR imaging continues to be investigation of choice to diagnose discal cyst as it demonstrates the nature of the cystic lesion and its relationship to the corresponding disc.^[7,11] Like a normal intervertebral disc, a discal cyst

reveals a low signal on T1-weighted imaging and a high signal on T2-weighted imaging. In addition, the surrounding rim and contents of a cyst may show enhancement in a contrast-enhanced magnetic resonance (MR). Other investigations for a suspected discal cyst may include discography and computed tomography (CT) discography, which shows a flow of contrast into the cyst through connective channels, which is pathognomic feature as it is not demonstrated in intervertebral disc herniation and other intraspinal cysts.^[12-14] We performed discography in both patients followed by MR. We advocate intraoperative discography as it helps in identifying occasional hidden discal cysts as well as in confirming complete excision.^[5]

Various treatment modalities for discal cyst have been described. A close observation in the initial period with analgesics is advised hoping for spontaneous resolution. Conservative management as CT-guided aspirations and steroid administration have been reported^[11,15-17] but a high recurrence rate precludes its widespread use. PELD is a minimally invasive approach performed under local anesthesia without resection of bone or ligament.^[5,18] The operating time is short, and postoperative rehabilitation is fast. These advantages make it the more preferable approach for discal cysts compared with other conventional techniques.^[5,17]

Ha *et al.* suggested an additional partial discectomy to reduce the total volume of nucleus pulposus and radiofrequency coagulation to make the nucleus pulposus more stable. This procedure could help to prevent reherniation of nucleus pulposus, and additional partial discectomy would prevent the postoperative discal pseudocyst occurrence.^[5] Young *et al.* also supported complete excision of the pseudocapsule of cyst with partial discectomy.^[19] We believe excising any herniated part of disc is helpful to prevent similar symptoms in future.

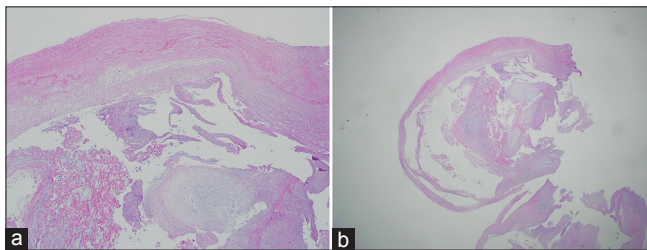


Figure 3: (a) Histologic section of the cyst wall (hematoxylin and eosin) of case 1 showing cyst wall devoid of epithelial lining and being formed by fibrocollagenous tissue with focal myxoid areas and few areas of fibroblastic proliferation. (b) Histologic section of the cyst wall (hematoxylin and eosin) of case 2 showing focal mucoid degeneration with disc material mainly composed of nucleus pulposus

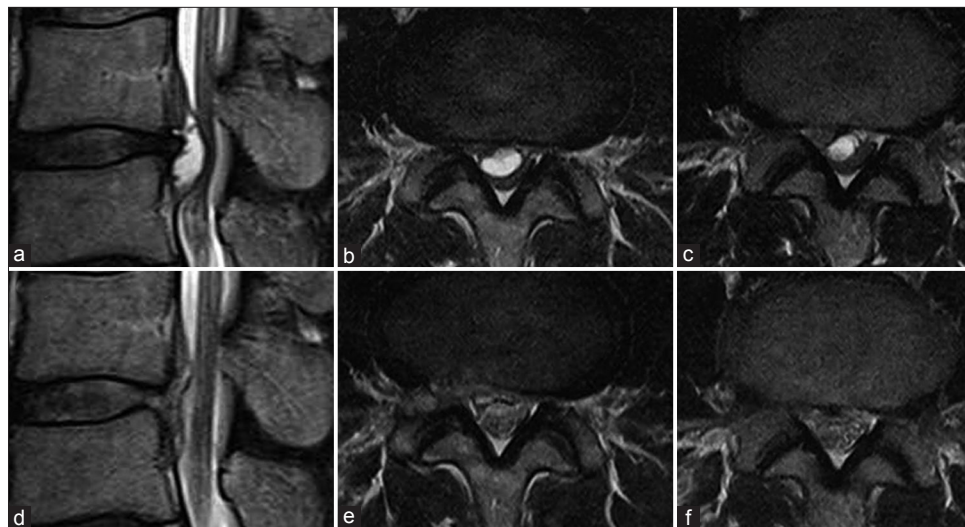


Figure 4: Magnetic resonance imaging of case 2. (a) Sagittal T2-weighted image (right paramedian) showing a small L4-L5 herniated disc with underlying well-defined cystic mass with homogeneous high signal intensity. (b and c) Axial T2-weighted image at the cranial portion of the L5 level. The cystic lesion can be seen compressing the L5 nerve root on the right side. (d-f) Postoperative T2 sagittal and axial images showing decompression and excision of cyst

In our cases, we have excised the discal cyst by percutaneous endoscopic approach. The adhesion between discal cyst and dura and disc material were severed, and the vasculatures were coagulated. In order to prevent the recurrence, the stalk of the cyst and its capsule were removed with an additional partial discectomy in both the cases. This case report supports the degeneration theory of discal cyst.^[9] We could witness the pseudocapsule, the hard outer layer, melting consistency inner part of cyst as well as crater in the underlying disc. The different pathological components seen intraoperatively support its origin from resolution state of herniated disc. We advocate endoscopic excision of discal cysts, as it provides the explicit view of the pathology intraoperatively and helps in excision along with the capsule. Any herniating fragment of the disc can be handled simultaneously. Meticulous dissection along capsule to detether any adhesions, while safeguarding the nerve root remains key to a successful endoscopy approach.

Conclusion

Despite numerous reports, the explicit pathophysiology of intraspinal discal cysts remains obscure. Our endoscopic operative finding supports the origin of cystic membrane by degenerative changes during the resolution stage of a herniated disc and is the first report demonstrating different components of discal cyst in the endoscopic view.

Consent

Both the patients have given informed consent for submission of the manuscript.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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