

Lumbar discal cyst in an elite athlete

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Our patient, a 22-year-old starting wide receiver for an NCAA Division I football team, presented with low back pain and sciatica. A lumbar-spine MRI without contrast demonstrated findings suspicious for discal cyst. The patient was referred for surgery, and the lesion was resected. The rarity of discal cyst makes it difficult to diagnose because most radiologists are not aware of the entity. An organized approach to diagnosis can facilitate appropriate management.

Introduction

A discal cyst is a rare intraspinal extradural mass, so named because the cyst communicates with the corresponding intervertebral disc. The mass produces clinical symptoms that are indistinguishable from other causes of low back pain and radiculopathy, and its presence most commonly manifests as a unilateral single-nerve-root lesion, and rarely as a bilateral-nerve-root lesion (1). Only six cases of discal cyst have been reported in North America (2-6). This report concerns the seventh case.

There is limited information on the pathogenesis, natural course, and frequency of discal cyst. Thus, most radiologists are not aware of the entity. The purpose of our report is to raise awareness of the disease and its radiographic features, as the failure to consider discal cyst in the differential diagnosis of a physically active young patient presenting with sciatica and low back pain may result in unnecessary investigations, delayed treatment, and a more complicated clinical course.



Figure 1. 22-year-old male with lumbar discal cyst. AP radiograph of the lumbar spine shows slight curvature of the lumbar spine, six lumbar vertebral bodies (lumbarization of S1), and mild discogenic changes at L4-5.

Case report

The patient was a 22-year-old starting NCAA division I wide receiver. He was 6'5", weighed 225lb, and had a BMI of 26.7. After a 12-month history of intermittent low back pain, he presented to his team physician with a complaint of increasing generalized lumbar discomfort. He had been previously diagnosed with sacroiliac joint dysfunction,

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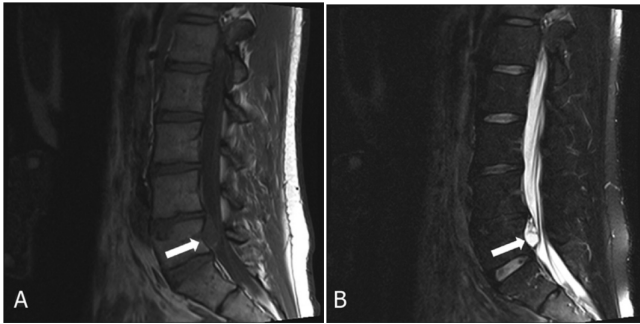


Figure 2. 22-year-old male with lumbar discal cyst. Sagittal T1- (A) and T2- (B) weighted images show a cystic structure extending from the L4-5 level inferiorly (arrows). The cyst demonstrates low signal on T1 and high signal on T2.

which had been managed with physical therapy until this recent exacerbation of symptoms. Physical examination revealed paraspinal muscle discomfort on forward flexion, tight hip flexors and hamstrings, and weak hip abductor muscles. Plain radiographs of the lumbosacral spine demonstrated six lumbarized vertebral bodies with lumbarization of S1 and mild degenerative disc changes at L4-5 (Fig. 1).

The patient was managed conservatively for almost 3 months, until he developed acute pain in his right buttock and upper posterior thigh, right-lower-leg numbness, and right-leg weakness. Physical examination revealed slightly diminished strength of knee flexion, ankle dorsiflexion, and plantar flexion in the right leg. A selective nerve-root block at L5 gave him sufficient pain relief to continue his football activities, but his leg weakness persisted over the next two months. A MRI scan demonstrated right paracentral herniation of the L4-5 disc, with a small annular tear associated with a cyst extending from the L4-5 level down to the L5-S1 level (Figs. 2-3). The patient was referred for surgery.

After a right L4-5 laminotomy, lateral recess decompression, and wide foraminotomy, retraction of the L5 nerve root exposed a disc herniation with an associated large discal cyst that extended into the right neural foramen and inferiorly behind the L5 vertebral body. The cyst was decompressed; it contained very thick fluid with several fragments of disc material. After the cyst was resected, microdiscectomy revealed only small amounts of herniated disc material. The disc space was then flushed out with an antibiotic solution, and no further disc material was identified. Postoperatively, the patient's symptoms resolved, and he presented with intact motor strength at his 12-day followup visit.

Discussion

Discal cyst was originally reported in the English-language literature in 1999. As of this writing, 65 cases have been documented in English (1-29), most of which involve young, physically active Asian males. Only six cases

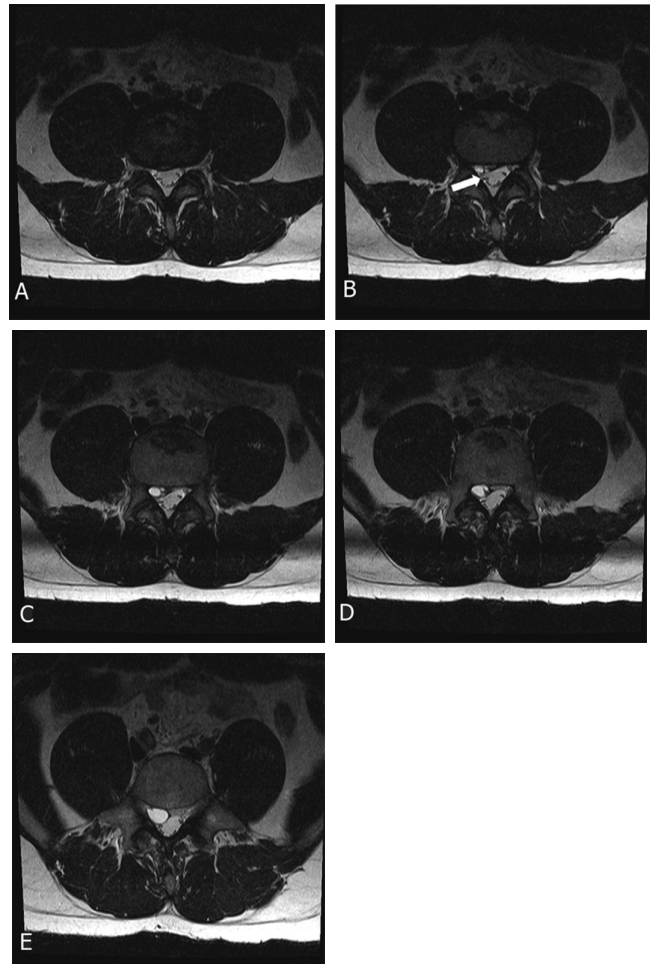


Figure 3. 22-year-old male with lumbar discal cyst. Sequential axial T2 images (A-E) demonstrate a high-signal extradural cyst in the right ventrolateral space that appears to communicate with a small annular fissure at the L4-5 level, resulting in significant distortion of the right lateral recess and mass effect on the traversing right L5 nerve root (arrow). There is only minor mass effect on the right S1 nerve root.

(excluding our patient) have been reported in North America.

Two theories purport to explain the etiology of discal cyst, both involving mechanical stress-induced trauma to the disc. Chiba et al. proposed that disc injury in the setting of mild disc degeneration causes an annulus fibrosis fissure in the posterior intervertebral disc, leading to hemorrhage of the epidural venous plexus, with subsequent formation of an epidural hematoma and a blood-filled or hemosiderin-containing cyst (28). Kono et al. proposed focal degeneration of the disc, with subsequent fluid production (29).

Our patient presented with mild disc degeneration, which can be accelerated by hereditary, developmental, and metabolic influences, as well as abnormal or excessive

mechanical stress. The patient's participation in college football implies a prior history of severe and repetitive mechanical stress (for example, bending, compression, torsion, and direct impact). But in addition to disc stress caused by his football activities, it is plausible that other factors present during the patient's initial visit (bony anomalies and weak hip muscles, existing disc degeneration, and so forth) contributed to further disc degeneration and/or disc stress, and by extension, to the evolution of the discal cyst. We mention this to highlight the fact that football is but one factor among several that may have contributed to our patient's disc stress and subsequent evolution of his discal cyst. Therefore, Chiba's hypothesis of trauma to a degenerative disc seems to offer a plausible explanation for the evolution of our patient's discal cyst; the patient likely experienced trauma during the followup period between his initial presentation and his re-evaluation with MRI studies that demonstrated discal cyst.

The signs and symptoms of discal cyst most commonly mimic those of disc herniation, with no distinguishing features between the two entities on history or physical examination.

The diagnosis is made by MRI, which demonstrates a well-defined ventral or ventrolateral extradural cyst attached by a connecting channel to a bulging or herniated lumbar disc. The cyst may deform the thecal sac and extend into the lateral recess, as with our patient. In some cases, the cyst may cause erosion of the adjacent vertebral body. The discal cyst commonly appears hypointense on T1-weighted images and hyperintense on T2-weighted images (11, 23), but a cyst containing hemorrhage may appear hyperintense on both T1- and T2-weighted images. Rim enhancement after gadolinium administration may also be present.

The differential diagnosis of discal cyst on MRI includes other intraspinal extradural masses such as synovial cysts, ganglion cysts, perineural cysts, extradural arachnoid cysts, and neuromas with cystic changes. Location can be a helpful discriminating factor, as synovial cysts develop from facet joints and are therefore usually located on the posterolateral aspect of the thecal sac. Although the origins of ganglion cysts are controversial, they too are usually thought to arise from the facet joints, and are also most commonly found along the posterolateral aspect of the thecal sac. Perineural cysts tend to be multiple and occur along the dorsal nerve roots. They do not show peripheral enhancement following contrast administration, which further distinguishes them from discal cysts. Extradural arachnoid cysts typically do not show rim enhancement and are more commonly found in the thoracic spine along the dorsal aspect of the thecal sac. Although a neuroma with cystic changes can appear similar to a discal cyst on MRI, the majority of such lesions demonstrate more nodular or thicker areas of enhancement after contrast administration.

Several authors have documented spontaneous resolution of discal cyst under conservative management (4, 8, 9, 13, 27), but surgery (endoscopic resection or laminotomy with cyst excision) is the most common treatment, especially in

the setting of persistent neurologic symptoms (12, 24). A number of reports document instant pain relief from CT-guided percutaneous drainage (3, 26, 30), but the long-term prognosis of discal cyst treated by this procedure has not been reported, and symptoms may recur if the cyst reaccumulates. Nevertheless, percutaneous drainage may be an option for patients wishing to avoid the risk or cost of more invasive spine surgery, and/or patients desiring a pain-free interval (for example, to finish a sports season). Percutaneous drainage was considered for our patient, but the ventral location of the cyst precluded safe percutaneous access. Discectomy may be performed to prevent recurrence of the cyst.

Although there is limited information on the pathogenesis, natural course, and frequency of this disease, it is important to be aware of it, to recognize its appearance on MRI, and to be able to distinguish its process from that of the much more common disc herniation. Although discal cyst is typically treated surgically, percutaneous treatment may be an option in selected patients.

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Lumbar discal cyst in an elite athlete

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