Ganglion Cyst in the Lumbar Spine

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Epidural cysts, either synovial or ganglion, are an unusual cause of spinal epidural compressive syndromes. Ganglion cysts are a rare cause of lumbar radicular compression, especially in young people. The authors report two ganglion cysts located in the spinal canal of two patients. The lesions were demonstrated by a magnetic resonance imaging, and relief of symptoms was achieved with laminectomy and total removal of the mass. The clinical and radiological evaluation and treatment of these lesions are discussed.

KEY WORDS: Ganglion · Radiculopathy · Lumbar.

Introduction

Synovial or ganglion cysts are commonly located near peripheral joints and tendon sheaths, but are rarely found intraspinally. The cysts generally arise from the facet joint, but cases have been reported in which the cyst is attached to almost every structure in the spinal canal, including the ligamentum flavum and even the disc itself. As the cyst progresses, especially when it is associated with degenerative changes, it exerts a mass effect on the surrounding thecal sac or nerve root.

The authors analyzed two rare cases of spinal ganglion cyst that originated from the posterior longitudinal ligament of the lumbar spine and discussed clinical, radiological, and surgical findings.

Case Report

Case 1
A 43-year-old man was admitted to hospital for two months because of lower back and left leg pain. A straight leg-raising maneuver was positive at approximately 45 degrees on the left side and 80 degrees on the right side. There were no other motor, sensory, or reflex changes. MRI showed an intraspinal extradural space-occupying lesion just caudal to the lumbar 3-4 disc space on the left side. The round lesion was hypointense on a T1-weighted image and hyperintense on a T2-weighted sequence, suggesting a cystic lesion, with rim enhancement by gadolinium administration. A T2-axial image revealing a cystic lesion at the left side of the epidural space.

Fig. 1. Magnetic resonance images showing a cystic lesion at the lumbar 3–4 level in a T2-weighted sagittal image(A), and a T1-weighted sagittal image(B). This lesion shows rim enhancement by gadolinium administration(C). A T2-axial image revealing a cystic lesion at the left side of the epidural space(D).
no pain in the leg sixteen months after the operation.

**Case 2**

This 18-year-old man had lower back and right leg pain for one month. He had no history of trauma to his back. A straight leg-raising maneuver was positive at approximately 40 degrees on the right side and at 80 degrees on the left side. There were no abnormal motor, sensory, or reflex changes. On T1- and T2-weighted MRI, a typical cystic mass with ring enhancement was demonstrated at the level of the lumbar 4-5 disc space (Fig. 3).

Surgical exposure of the lumbar 4-5 area was achieved through partial hemilaminectomy on the right side. No abnormality of the lumbar 4-5 facet joint was found. After dissection and retraction of the right fifth lumbar nerve root, a dark brown colored cystic mass causing significant compression to the root was detected.

The mass was tightly adhered to the posterior longitudinal ligament and other adjacent structures. The mass was totally removed.

Histologically the resected tissue consisted of a thick fibrous capsule with myxoid degeneration. The inner wall of the cyst did not contain synovial lining cells (Fig. 4). There were no surgically related complications. The patient was ambulatory one day after the operation without leg pain. In addition, he had no right leg pain or back pain thirteen months after the operation.

**Discussion**

Synovial and ganglion cysts are commonly found in the region of peripheral joints and tendon sheaths. Intraspinal ganglion cysts are not common and have been rarely reported in the literature. The first report of intraspinal ganglion cysts was by von Gruker in 1880. In 1974, Kao and colleagues proposed the term juxtafacet cyst to describe synovial and ganglion cysts located in the spinal extradural space. In 1983, Pendleton and colleagues also grouped these cysts together in their report, recognizing that they arose at the joint capsule of the facet joint. Although it is believed that ganglion and synovial cysts can be differentiated with or without the presence of synovial lining and communication with facet joint, it is difficult to differentiate between them clinically. Both terms have been used interchangeably to describe cysts that develop from connective tissue of the spine. The cyst generally arises from the facet joint, but cases have been reported in which the cyst is attached to almost every structure in the spinal canal, including the ligamentum flavum and even the disc itself.

The proposed pathogenesis of synovial cysts includes rupture of the synovial membrane with extrusion of fluid and cells, nonspecific proliferation of mesenchymal cells, myxoid degeneration in collagen connective tissue, and increased production of hyaluronic acid by fibroblasts. The relationship to increased motion is strong, as most cysts arise at the lumbar 4-5 level. The ganglion cyst is believed to be distinguished from the synovial cyst by the lack of a synovial lining. The ganglion cyst is not connected to the synovial cavity, and is usually filled with viscous fluid. Ganglion cysts often contain an amorphous proteinaceous material and the cyst wall is composed of loose, but well-vascularized fibrous connective tissue. Soren described the developmental stages of ganglion cysts and stated that in the final stage fibrocytes form an incomplete lining that resembles the synovium of the joint capsule.

This makes distinguishing between the ganglion and synovial cyst difficult, as one must determine whether the lining is an advancing front or a retreating residual synovium.
There is no clinical significance in distinguishing between ganglion and synovial cysts because their treatment and prognosis are the same. The role of trauma has frequently been questioned and is likely to have played a role in some previously reported cases.

Synovial cysts can be considered indicators of degeneration of the spine because of their frequent association with degenerative spinal processes and their prevalence in the second half of an individual’s lifetime. However, most patients with ganglion cysts of the posterior longitudinal ligament are young men in the second or third decade of life. Case 2 in this report was an 18-year-old man. The pathogenesis of ganglion cysts of the posterior longitudinal ligament may have a different mechanism of development compared to the usual juxtafacet cyst genesis.

Symptom and differential diagnosis

The symptoms of ganglion cysts are variable. Ganglion cysts are more common on the dorsal aspect of the facet joints and are therefore asymptomatic and not clinically appreciated. Cysts found ventral to the facet joint cause nerve-root compression that is similar in presentation to nerve-root compression secondary to disc herniation. The cysts can be found incidentally without symptoms, but they usually cause back pain, sciatica when located in the lumbar region, or sometimes myelopathy in the thoracic or cervical location. Sometimes hemorrhage within the cyst may initiate acute back and radicular pain, or may dramatically increase existing pain. In all reported cases with ganglion cysts of the posterior longitudinal ligament, including our cases, the chief complaints were lower back pain plus radiculopathy.

Because the cysts were located ventral to the nerve root, the differential diagnosis of juxtafacet cyst included a herniated nucleus pulposus, especially a freely sequestered disc fragment. Neurofibroma, hematoma, meningioma, abscess, lipoma, perineural and arachnoid cysts may also be included in the differential diagnosis. The typical computerized tomography (CT) findings of juxtafacet cysts consist of a well-defined rounded mass with a calcified contour originating from the facet. MRI reveals a well-defined mass with variable intensity on T1-weighted images and hyperintensity on T2-weighted images; the contours of the mass may be enhanced after injection of gadolinium. Perineural and arachnoid cysts may be distinguished from juxtafacet cysts by myelography because there may be delayed filling of the cyst with contrast medium.

In our cases, ganglion cysts demonstrated the typical MRI findings of cystic mass. Therefore preoperative diagnosis of juxtafacet cysts was possible.

Management

In the management of juxtafacet cysts, different conservative options can be proposed, including bedrest, orthopedic corset, CT-guided needle aspiration, and intra-articular injection of corticosteroid drugs. Results are controversial, vary from good to poor, and are generally temporary. Surgical treatment is generally recommended in all cases of intractable pain or neurological deficit.

In surgical treatment, exposure is wide enough to provide access to the lesion and adjacent neural structures enabling careful dissection of the lesion from the nerves and dura whilst protecting important structures. Surgical exposure of juxtafacet cysts is often difficult because the cyst may have adhered to the dura. Additionally in our case the gangion cyst adhered tightly to the posterior longitudinal ligament making resection difficult. It is generally believed that a ganglion cyst is likely to recur when the cyst is only partially removed. In essence, surgical excision of the ganglion cyst should include the removal of a generous margin at the base.

The association of juxtafacet cysts and instability has been discussed in the literature. Sabo et al reported that the 15 of their 56 patients had spondylolisthesis and that seven of these 15 patients required fusion; seven of their patients also had scoliosis. Preoperative flexion/extension radiographs may demonstrate segmental instability and assist in identifying the need for fusion.

Some surgeons have advocated total inferior facetectomy, whereas others perform wide laminectomies with and without fusion. In reported cases, and in our cases, unlike lumbar synovial cysts, ganglion cysts of the posterior longitudinal ligament are poorly associated with significant facet degeneration. In ganglion cysts of the posterior longitudinal ligament, narrower exposure (e.g., simple laminectomy without facetectomy) allows clear identification of the cyst, excision of the cyst base, and prevention of postoperative instability.
Conclusion

It is important to consider the possibility of ganglion cysts of the posterior longitudinal ligament in cases with lumbar radiculopathy. Cysts compressing a nerve root must be surgically removed.

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References