Spontaneous Hemorrhage in an Upper Lumbar Synovial Cyst Causing Subacute Cauda Equina Syndrome

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abstract

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Lumbar spine synovial cysts are becoming more frequent, and they are generally associated with degenerative lumbar spinal disease. They are common in lower lumbar lesions but rare in upper lumbar lesions. Several cases of hemorrhage into lower lumbar juxtafacet cysts after trauma or anticoagulation therapy have been reported in the literature. This article describes a case of subacute cauda equina syndrome resulting from spontaneous hemorrhage into an upper lumbar synovial cyst.

A 65-year-old man presented with a 3-month history of intermittent bilateral lumbar pain. One week before, he experienced a sudden exacerbation of lumbar pain and began falling frequently; he also reported weakness and tingling in his lower limbs. A hematoma collection associated with a large juxtafacet cyst at L2-L3 was suspected on magnetic resonance imaging. He underwent surgical decompression, and the cyst was resected. Microscopic examination was consistent with the diagnosis of a synovial cyst. Two days postoperatively, he was walking independently.

Although several descriptions exist of hemorrhagic lumbar juxtafacet cysts after trauma or anticoagulant therapy, to the authors’ knowledge, this is the first documented case of hemorrhage in an upper lumbar synovial cyst without previous traumatic event or medication use. Magnetic resonance imaging was essential in making the preoperative diagnosis. Surgical removal of the cyst was an effective treatment.

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Figure: Sagittal T1-weighted magnetic resonance image showing high signal intensity in an extradural lesion (A) and sagittal T2-weighted magnetic resonance image showing a well-defined hypointense lesion compressing the thecal sac (B).
Lumbar spine synovial cysts are becoming more common, and they are generally associated with osteoarthritis of the facet joints, particularly at L4-L5. They are common in lower lumbar lesions but rare in upper lumbar lesions. Symptoms may occur when the cyst becomes large enough to occupy the neural foramen or spinal canal, compressing the dural sac and adjacent nerve roots, causing motor and sensory dysfunctions.

These cysts most commonly present with back pain followed by chronic progressive radiculopathy or gradual onset of symptoms of spinal canal compromise. Acute onset of radicular symptoms has been reported in a few cases after hemorrhage into lumbar spine synovial cysts.

This article describes a case of a 65-year-old man with subacute cauda equina syndrome and radiculopathy resulting from spontaneous hemorrhage in a synovial cyst in an upper lumbar facet joint.

**Case Report**

A 65-year-old man presented with a 3-month history of intermittent bilateral lumbar pain. One week before, he experienced a sudden exacerbation of lumbar pain and began falling frequently; he noticed weakness and tingling in his lower extremities. He reported mild incontinence of the bowel and bladder. He reported no traumatic event and had not been taking any regular medication. Neurological examination revealed a distal asymmetrical hyporeflexic paraparesis (grade 3/5 in the right lower limb and grade 3/5 in the left lower limb); bilateral hypoesthesia in L3, L4, L5, and S1; and bilateral steppage gait.

Laboratory evaluation was unrevealing. Lumbar computed tomography showed a left intracanal extramedullary space-occupying lesion at L2-L3 that was isodense with soft tissues. Lumbar magnetic resonance imaging (MRI) confirmed the presence of an extradural space-occupying lesion at L2-L3, mainly on the left side adjacent to the posterior facet joint and with mass effect on the roots of the cauda equina. No connection with the intervertebral disk was identified. The round, well-defined lesion was isohyperintense on T1-weighted MRI (Figure 1A) and hypointense on T2-weighted MRI (Figure 1B). The intravenous infusion of gadolinium increased the signal intensity of the lesion on T1-weighted MRI (Figure 2). These imaging studies suggested a hematoma collection associated with a large juxtafacet cyst, compressing the thecal sac.

The patient underwent surgery 3 days after presentation. Partial laminectomy and facetectomy were performed at L2-L3 on the left side to remove the compressive lesion. A hemorrhagic cystic mass was detected lying attached to the facet joint at L2-L3. The cyst was resected together with the medial portion of the facet joint; dural and radicular decompression of L2 and L3 was then performed.

Histologically, the cyst wall consisted of fibrous tissue with myxoid degeneration and focal vascularization with sub-
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Acute signs of hemorrhage and the presence of synovial lining cells. These findings were consistent with the diagnosis of synovial cyst.

Two days postoperatively, the patient walked independently. One month later, he had recovered fully with no symptoms in his lower back or extremities. Magnetic resonance imaging confirmed the complete disappearance of the lesion and decompression of the dural sac, with no recurrence of the cyst 1 year postoperatively.

Discussion

Synovial cyst is a common lesion that occurs typically in the extremities, especially at the wrist, knee, ankle, and foot.9 Reports of juxtafacet cysts of the spine are becoming more common, partly due to the improved sensitivity of neuroradiological investigations.1 In the spine, these lesions are most common in the lumbar (L4-L5) segment and are usually associated with osteoarthritis of the adjacent facet joint. Low-grade degenerative spondylolisthesis is also a common finding in these patients. Juxtafacet cysts are caused by degeneration, trauma, and inflammation; they can also be seen congenitally.10 Although sometimes symptomatic, the most common presentation of a lumbar juxtafacet cyst is intermittent low back pain in the absence of motor or sensory impairment, radicular symptoms, neurogenic claudication, and, less often, cauda equina syndrome.11 Acute onset of radicular symptoms after hemorrhage into a lumbar juxtafacet cyst has been reported in a few cases.3,4 The hemorrhage causes the sudden exacerbation of pain, but it is not clear whether the cause is sudden expansion of the cyst or inflammation resulting from the hemorrhage. Although the hemorrhage is generally secondary to trauma or anticoagulation therapy,1-8 the hemorrhage in the current case was spontaneous because no history existed of trauma or anticoagulant medication.

Various lesions may develop in the lumbar spinal canal, potentially compressing the neural structures resulting in neurological symptoms. The differential diagnosis of juxtafacet cysts includes disk herniation, metastatic tumor, meningioma, schwannoma, neurofibroma with cystic degeneration, arachnoid cyst, epidermoid or dermoid cyst, perineural cyst, neuroradicular cyst, and bronchogenic cyst.12 It is difficult to distinguish juxtafacet cysts from other etiologies of radicular compromise on the basis of neurological examination alone.

Imaging studies are useful for diagnosing and differentiating these cysts from other lesions. Although the diagnosis of a cyst of the lumbar facet joint can be established using computed tomography, this cyst is often more conspicuous and more easily diagnosed using MRI because of its increased contrast resolution. On computed tomography scans, a lumbar facet synovial cyst appears as a low-attenuating lesion adjacent to the facet joint. It may protrude into the epidural space, indenting the thecal sac, or it may extend into the adjacent neural foramen, compressing the nerve root. It may show wall calcifications in approximately 30% of cases or an internal vacuum phenomenon.13 On T1-weighted MRI, it appears as a lesion with low to intermediate signal intensity. On T2-weighted MRI, the cyst capsule usually appears as a hypointense line (usually well demarcated from the high signal intensity of intrathecal cerebrospinal fluid), and the fluid in the cyst demonstrates high signal intensity.14 However, signal intensity may be heterogeneous depending on the composition of the cyst, owing to the presence of hemorrhage, calcification, or the vacuum phenomenon.

Enhancement of the cyst wall and content and, occasionally, enhancement of the adjacent facet joint, has been demonstrated after intravascular administration of gadolinium-based contrast material. The relationship with the adjacent facet joint is best depicted on axial images. In the current case, the cyst showed increased signal intensity on T1-weighted MRI as the result of internal hemorrhage that contained a high concentration of methemoglobin, the predominant blood degradation product of hemoglobin in the subacute phase. Water molecules can approach the paramagnetic heme of methemoglobin, permitting proton–electron and dipole–dipole interactions that shorten T1, giving methemoglobin its characteristic hyperintensity on T1-weighted MRI. After gadolinium administration, enhancement of the cyst wall was visible, probably because of the presence of vascularization, as demonstrated histologically.

The definitive differential diagnosis of synovial and ganglion cysts is made by pathological examination.15 A synovial cyst has a lining of epithelium-like cuboid synovial cells with clear or xanthochromic fluid. However, a ganglion cyst contains gelatinous protein material and myxoid degeneration of the fibrous adventitial tissue but no synovial lining.16,17 However, no clinical significance exists in the distinction between ganglion and synovial cysts because their clinical features, indications for treatment, and prognosis are the same.18,19 The pathologic distinction in many cases is not made or attempted by pathologists; therefore, the true incidence of one vs the other is not known.

Neurosurgical cyst removal has been effective in the treatment of symptomatic lumbar juxtafacet cysts even when they are hemorrhagic, which allows complete recovery from the neurological deficits.20

Conclusion

Considering upper lumbar synovial cyst in the differential diagnosis of lumbar pain associated with neurological deficits is important. Although few descriptions of hemorrhagic lumbar synovial cysts after trauma or anticoagulant therapy have been reported, the current patient presented
with a hemorrhagic synovial cyst at an upper lumbar facet joint with no antecedent traumatic event or medication. Computed tomography and more particularly, plain and enhanced MRI, are essential in making the preoperative diagnosis. Prompt recognition and appropriate surgical decompression can give an excellent outcome.

REFERENCES