CASE REPORT

An Unusual Case of Nerve Root Compression by Intradiscal Gas Pseudocyst of the Lumbar Spine

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Abstract

An Intradiscal gas collection, referred to as the vacuum disc phenomenon (VDP) is a relatively common finding on radiographic studies of the lumbar spine, whereas gas-containing lumbar disc hernia is rarely observed. We report a case of a patient with left leg pain, provoked by a radiographically and surgically documented L4-5 gas containing disc hernia.

Introduction

Intradiscal gas collections known as vacuum disc phenomenon (VDP) are relatively common whereas a lumbar disc hernia containing gas is much less so. The gas filled cyst can act as a mass and compress the nerve roots. We report the case of L5 nerve root compression from a lumbar disc pseudocyst successfully treated by surgical needle decompression.

Case Report

A 48-year-old man presented with a 1-year history of pain radiating into the left leg. Symptoms were aggravated by walking and relieved by recumbency. On neurologic examination, straight leg raising (SLR) test was positive at 60°on the left. There was a weak muscle strength of extensor hallucis longus and light touch sensations were decreased over the lateral aspect of the calf and foot distally on the left. Patella and ankle reflexes were symmetrical. Lumbar spine films showed narrowing of the L1-2, L2-3, L4-5 and L5-S1 disc space with anterior spur formation and VDP was seen on the L2-3, L4-5 and L5-S1 levels. MRI showed a large spherical lesion behind the L5 vertebral body with low signal intensity on T1-weighted and T2-weighted images, which displaced the left L5 root and the dural sac (Figure 1). Although an invasive procedure, discography followed by CT was performed to clarify the communication between the mass and the disc space. The result of the L4-5 discography revealed rapid flow of contrast medium into the mass through a thin channel from the disc, accompanied by severe radiating pain in the left leg. CT discography confirmed the gas in the herniated mass and the communication between the filling and the L4-5 disc (Figure 2). The pain responded only slightly to conservative therapy, so surgical intervention was performed. At surgery, the gray-colored mass appeared to be gas-filled and was compressing the L5 root. Marked adhesion between the mass, L5 nerve root and dura was observed. Direct needle puncture of the mass resulted in rupture and the release of gas. The displaced nerve root relaxed into its normal position. There was a tiny hole in the annulus at its attachment to the superior rim of the L5 vertebral body. Only after vigorous curettage were a few small fragments of disc removed. The patient had complete relief of pain following surgical decompression and was able to return to work. He was followed up regularly and remained asymptomatic 9 months later.

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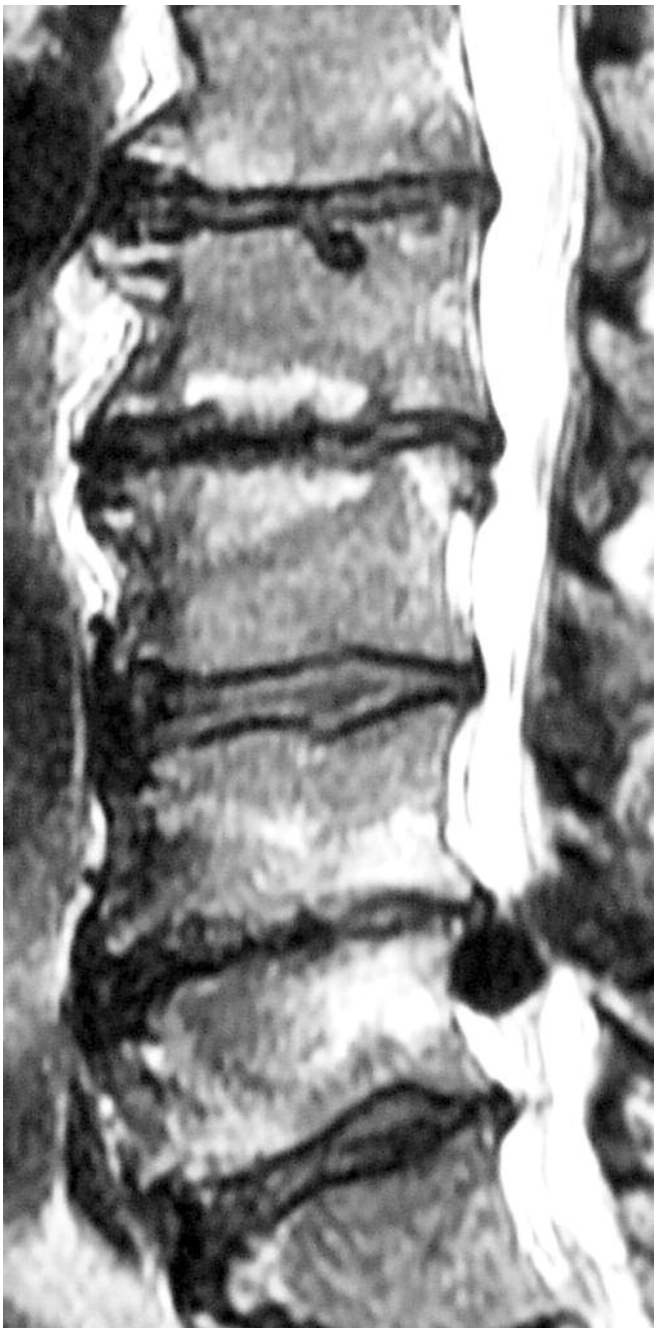

Fig 1 *T2-weighted MRI showing compression of the dura by the spherical homogenous mass with low intensity*

Fig 2 *Postdiscogram CT showing gas containing pseudocyst and the communication between the filling and L4-5 disc*

Discussion

The finding of gas within the disc space, referred to as vacuum disc phenomenon (VDP), was first described in 1937 by Magnusson [1]. Although numerous causes of intradiscal gas have been reported, degenerative process is the most common aetiology. The incidence of VDP is 1-20% on plain lumbar radiographs and increases with age, being correlated with disc degeneration [2,3]. Ford et al reported that the gas is composed of greater than 90% nitrogen, along with oxygen, carbon dioxide, and other trace gases [4].

The pathogenesis of the gas production within the disc is not clear, but one possible mechanism is that as the disc degenerates, there is loss of disc material and consequently loss of disc space volume. However, this loss of disc space volume is not as great as the loss of disc material and therefore gas is liberated from surrounding tissue to compensate. Extension of the spine will widen the spaces, resulting in decreased pressure and expansion of the gas already present. Flexion will decrease the volume and increase the pressure of the gas within the disc space. As pressure increases, the gas may then be forced out of the disc space through a weak spot in the annulus and cannot be reabsorbed or replaced by liquid because the degenerated disc is avascular. The several reports [6-9] and operative findings of the present case lend support to this hypothesis. When the herniated gas is collected within a capsule, it can act as a mass and produce symptoms, much like a herniated nucleus pulposus.

The clinical presentations are similar to those of common lumbar disc herniation, but the high percentage of leg pain alone as first symptom, the absence of SLR and increased age of the group have been observed in the gas-containing lumbar disc herniations [8,9]. The usefulness of CT scanning in the detection of the gas has been reported [8], but additionally, the MR imaging characteristics such as spherical extradural homogenous mass with low signal intensity on T1- and T2-weighted images in this patient may achieve the same benefit to identify the presence of the gas. Discography is an invasive procedure, but revealed further diagnostic evidence of the communication between the gas and the corresponding disc.

The natural history of the gas-containing disc hernia is not fully understood and so the optimal treatment of this phenomenon remains to be established. Several reports recommend the operative treatment because of the high recurrence rate by the needle puncture of the gas-filled pseudocyst[7-9], but it is not clear whether surgery should be done in all cases. To evaluate the appropriate treatment of the gas-containing disc hernia, statistical analysis and careful observation of the additional cases must be required.

References

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