

Postdural disc herniation at L5/S1 level mimicking an extradural spinal tumor

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Abstract

Introduction Postdural disc herniation has been documented rarely and the pathogenesis is still unknown. The average age of postdural disc herniations is between 50 and 60 years, and the sites most frequently affected by postdural lumbar disc herniations are L3–L4 and L4–L5, only less than 10 % in L5–S1. Although magnetic resonance imaging (MRI) is a useful tool in the diagnosis of this disease, the postdural disc herniation is usually misdiagnosed as extradural spine tumor preoperatively. The definitive diagnosis is made during operation or according to the postoperative pathology.

Methods In this article, we described here a 48-year-old male patient who presented with intermittent pain in the low back and frequent urination for 4 years as well as hypesthesia and pain of the left lower extremity for 1 month.

Results A standard total laminectomy was performed and the histopathological diagnosis was consistent with a degenerated intervertebral disc. The patient presented significant relief of the pain and of the neurological symptoms, but no improvement of frequent urination, in the postoperative period.

Conclusions The diagnosis of postdural disc herniations is very difficult and mainly based on intraoperative and histopathological results. Early surgical intervention is important to relieve symptoms and prevent severe neurological deficits.

Keywords Intervertebral disc herniation · Postdural disc herniation · Extradural spine tumor · L5/S1 level

Introduction

Disc sequestration is defined as a perforation of the fibrous ring and posterior longitudinal ligament, and migration of the fragment to the epidural space. According to Brock [1], disc sequestration accounts for 28.6 % of all disc herniations. The sequestered disc is completely separated from the parent disc and disc space. Free fragments generally migrate within the spinal canal in superior, inferior, and lateral directions [2, 3]. However, posterior epidural migration away from the site of extrusion has been documented rarely. In addition, this entity is frequently misdiagnosed on MR imaging because people are unaware of this possible form of lumbar disc herniation (LDH), which is mainly confused with a variety of posterior epidural lesions. In this report, we present a case of postdural migration of lumbar disc herniation at L5/S1 level and discuss the clinical presentations, imaging features, treatments and outcomes. MR imaging shows a tumor-like mass filling almost the entire spinal canal at the L5/S1 level, and rim enhancement after administration of gadolinium.

Case report

A 48-year-old man with a 4-year history of intermittent pain of low back and left lower limb, and frequent urination was admitted. He complained of increased pain and hypesthesia of the left lower limb that had started 1 month before. 4 years ago, the patient had been admitted to physiatry department of our hospital, and given massage,

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traction, and drug therapy, and the pain of low back and left lower limb had lessened after nonoperative managements. Physical examination revealed hypesthesia of the posterolateral aspect of the lower limb (including pelma), negative Lasegue's sign on the double limbs, slight loss of the left knee tendon reflex and absence of left Achilles tendon reflex, and no significant decline in muscle strength. Lumbosacral radiographs showed degenerative changes without scoliosis. Computed tomography (CT) scans demonstrated herniated nucleus pulposus at the L5/S1 level. MRI revealed a tumor-like mass filling almost the entire spinal canal at the L5–S1 level, causing cauda equina compression. The lesion was hypodense on T2-weighted and T1-weighted images, and showed rim enhancement after administration of gadolinium (Gd) (Figs. 1, 2). A standard total laminectomy was performed. After the excision of the ligamentum flavum, the extruded disc fragment was readily visible posterolateral to the thecal sac. The fragment was compressed, but not adherent to the thecal sac (Fig. 3). The histopathological diagnosis was consistent with a degenerated intervertebral disc.

Discussion

Although disc fragments are known to migrate to superior, inferior or lateral sites in the anterior epidural space, the posterior epidural migration of lumbar disc fragments is extremely rare [4]. Since the first case of posterior epidural migrated lumbar disc fragments was described by

Lombardi in 1973, only about 50 cases have been reported in the English-language literature to date [5–11]. The average age of postdural disc herniations is between 50 and 60 years, and the sites most frequently affected by postdural lumbar disc herniations are L3–L4 and L4–L5, only less than 10 % in L5–S1 [11–13]. The cases in the cervical and thoracic region are especially rare [14]. Patients with postdural disc fragments generally presented with radiculopathy, but also with cauda equina syndrome. This case in our report revealed the pain and hypesthesia of the left lower limb, and frequent urination, combining with radiculopathy and cauda equina syndrome. However, the cauda equina syndrome was not confirmed postoperatively as there was no improvement of frequent urination. The reasons may be as follows: the nerve was constricted so long that could not restore or the frequent urination was not associated with posterior epidural migration of disc fragment.

The pathogenesis of the posterior epidural migration of disc fragment is still unclear. Most authors attributed the occurrence of these cases to the presence of the anatomical structure of this region. These structures included sagittal midline septum, lateral membrane, the epidural fat tissue, the epidural venous plexus, and the nerve root, which acted as an impediment to posterior migration [3, 8, 15–17]. Kuzeyli and his colleagues [18] had stated that the position of the nerve root in relation to the dura and intervertebral disc space may be a factor in posterior epidural migration of disc fragment. Tatli [19] proposed that the insufficiency of ligaments and other structures, which could facilitate

Fig. 1 T1- and T2-weighted images in non-contrast axial MRI demonstrating a huge isointense lesion, located at L5/S1 level, which nearly compresses the entire spinal canal in the axial T1- and T2-weighted images

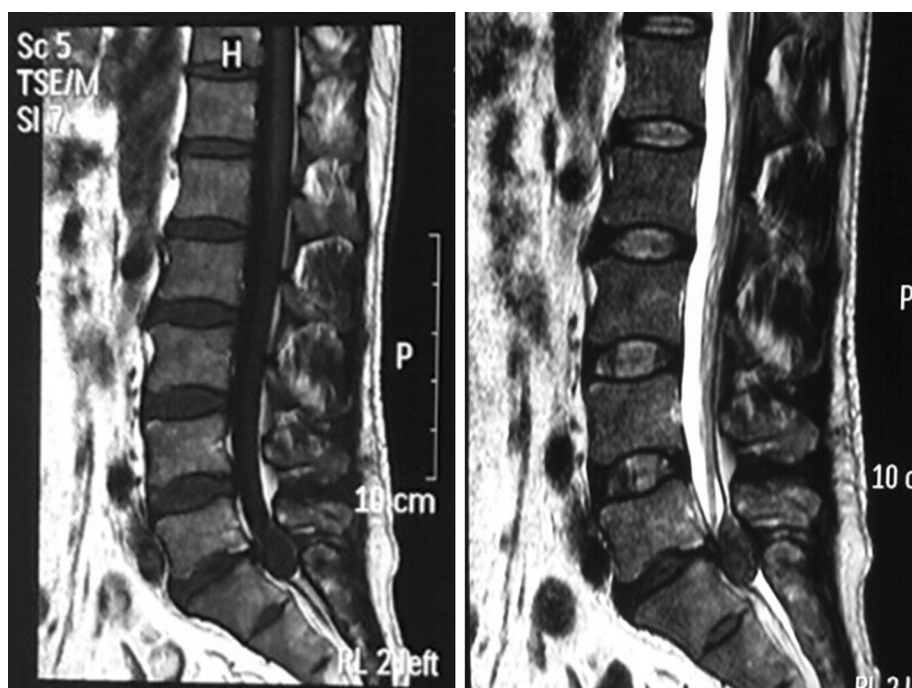


Fig. 2 Gadolinium-enhanced MRI image showing ringlike peripheral enhancement of the lesion

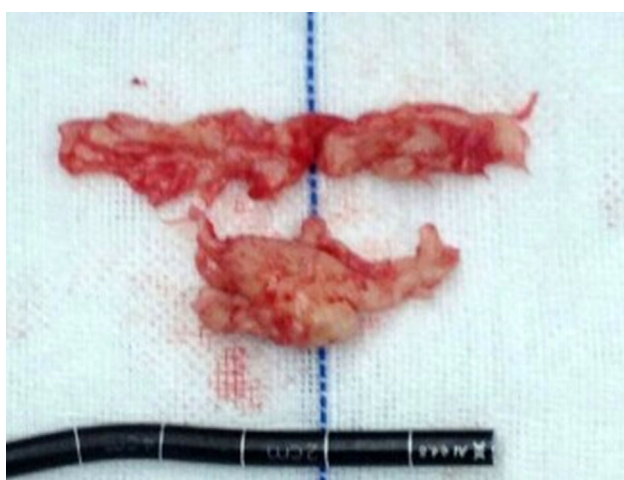
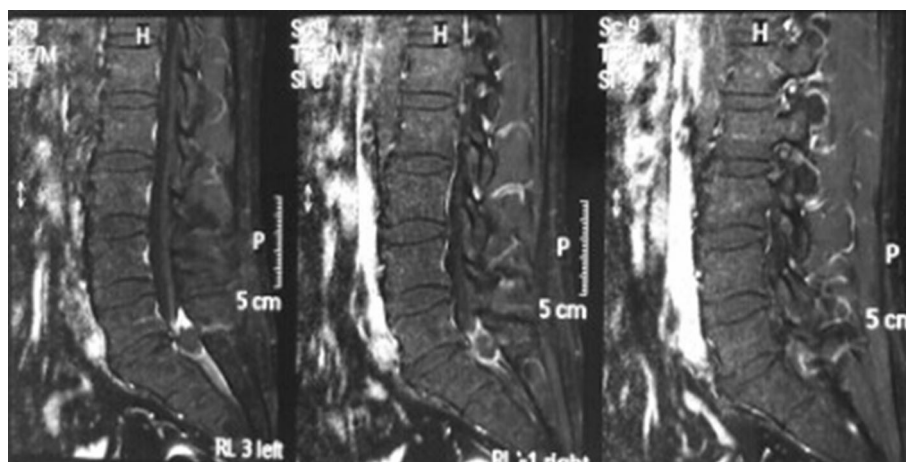


Fig. 3 Intraoperative image demonstrating the lesion being similar to the degenerative intervertebral disc

posterior migration of the disc fragment at the upper lumbar levels, may explain the preponderance for high lumbar level posterior epidural migration of a lumbar intervertebral disc fragment. We speculated that larger spinal canal and more activity in the L3–4 and L4–5 levels were also the factors why posterior migration of the disc fragment was common at these regions, in addition to the insufficiency of ligaments and other structures.

The diagnosis of posteriorly migrated disc fragment is very difficult, because the radiological appearance is similar to other common epidural lesions, such as synovial cysts, ligamentum cysts, cystic neurinomas, tumors, hematomas, and abscesses [15, 20–23]. According to Akhaddar's review [11], 60 % of cases were confused with other posterior epidural space-occupying lesions. MRI is the first diagnostic tool and gold standard for evaluating spinal pathologies [13, 18]. Generally, a posterior disc fragment demonstrated hypointense on T1-weighted images, and most hyperintense on T2-weighted images [12,

18]. Fragment disc lesions usually showed ringlike peripheral Gd enhancement related to their inflammatory response and neovascularization around the extruded tissue [24–26]. The case we presented also displayed ringlike peripheral contrast enhancement, which was consistent with previous reports. As in the most of cases, we were also unable to make the definite diagnosis before operation, because the region was not the frequently affected site, L5/S1 level, and the MRI appearance was very similar to the common epidural tumor, such as neurofibroma or meningioma. But the lesion was identified as posterior epidural migration of disc fragment during operation, which was consistent with the postoperative pathology.

To avoid severe cauda equina syndrome or radiculopathy, surgical removal of the lesion should be the first choice in patients with posteriorly migrated disc fragments [11, 12]. The decision to perform unilateral hemilaminectomy or total laminectomy should be based on the size of the lesion. The disc fragment usually has no or a little adhesion to the dura mater and can be removed completely without difficulty. In this case, we performed a total laminectomy considering large size of lesion, and removed the disc fragments completely. A posterior transpedicular fixation system was adopted to maintain the stability of spine in addition to posterior lumbar interbody fusion (PLIF). The patient presented significant relief of the pain and the neurological symptoms, but no improvement of frequent urination, in the postoperative period and 1-year follow-up.

Compliance with ethical standards

Conflict of interest None of the authors has any potential conflict of interest.

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