

Spontaneous Regression of Lumbar Herniated Disc

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Intervertebral disc herniation of the lumbar spine is a common disease presenting with low back pain and involving nerve root radiculopathy. Some neurological symptoms in the majority of patients frequently improve after a period of conservative treatment. This has been regarded as the result of a decrease of pressure exerted from the herniated disc on neighboring neurostructures and a gradual regression of inflammation. Recently, with advances in magnetic resonance imaging, many reports have demonstrated that the herniated disc has the potential for spontaneous regression. Regression coincided with the improvement of associated symptoms. However, the exact regression mechanism remains unclear. Here, we present 2 cases of lumbar intervertebral disc herniation with spontaneous regression. We review the literature and discuss the possible mechanisms, the precipitating factors of spontaneous disc regression and the proper timing of surgical intervention. [*J Chin Med Assoc* 2009;72(12):650–653]

Key Words: herniated disc, lumbar, nucleus pulposus, spontaneous regression

Introduction

It has been reported that protruded discs can be found in 20–30% of the general population.¹ Most patients experience symptom improvement following nonsurgical treatment. The size of the protruded disc fragment often decreases with time. Since Guinto et al² first presented a case of spontaneous regression of lumbar herniated disc using computed tomography (CT) in 1984, an increasing number of reports have described this phenomenon. The treatment protocols and options have also been gradually changing.

In this paper, 2 cases of herniated intervertebral disc (HIVD) of L4/5 and L5/S1 are presented in which the clinical symptoms improved with time. This was associated with spontaneous regression of the herniated discs as seen on a series of L-spine magnetic resonance imaging (MRI) images. The literature is reviewed, and the possible mechanisms, precipitating

factors of spontaneous disc regression, and proper surgical timing are discussed.

Case Reports

Case 1

A 46-year-old man had low back pain and left lateral leg pain with numbness for more than 6 months. Neurological examination showed no obvious neurological deficit. Lumbar spine MRI (Figures 1A and 1B) revealed a left posterolateral herniated nucleus pulposus (HNP) with caudal migration and compression of the left L5 root, which caused moderate to severe spinal stenosis and margin-like enhancement at the L4/5 level. Surgical intervention was offered, but the patient refused. He received conservative treatment including bed rest, back bracing, rehabilitation, and analgesic drugs. The clinical symptoms subsided



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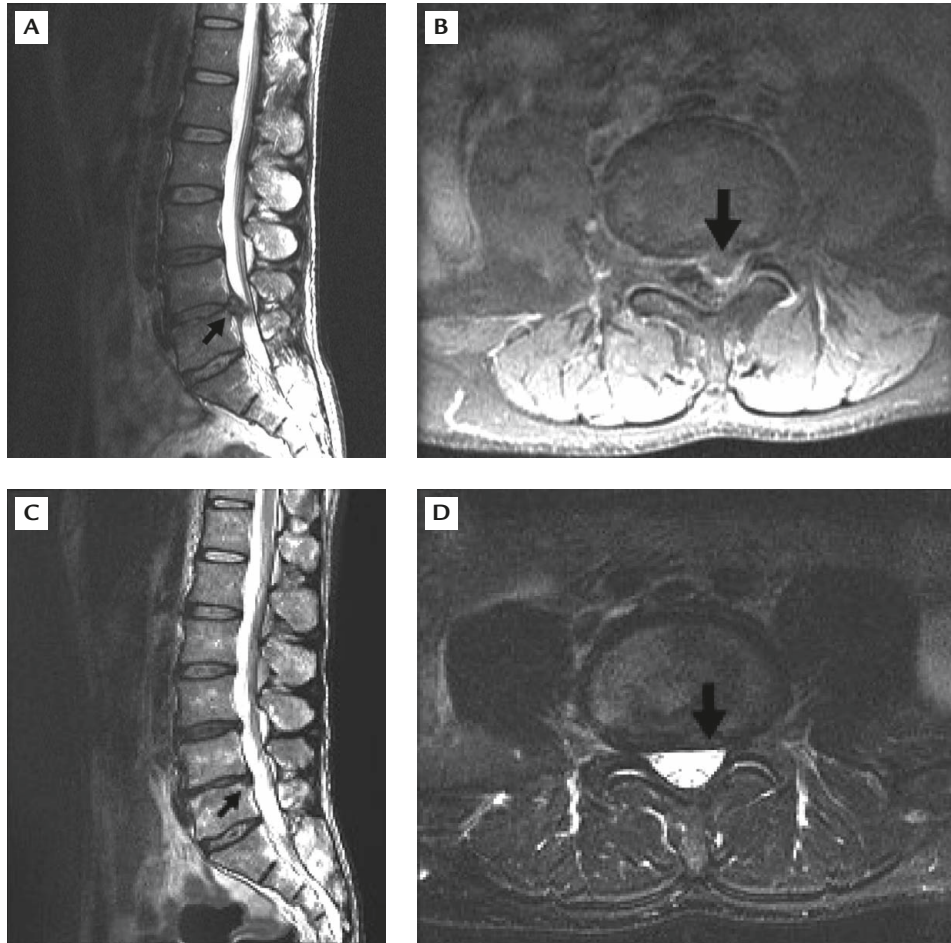


Figure 1. (A) Sagittal T2-weighted imaging (T2WI) of the initial magnetic resonance imaging (MRI) study revealed a large herniated disc at the L4/5 level with caudal migration. (B) Axial post-contrast T1-weighted imaging of the initial MRI showed a left-side posterolateral extruded disc fragment with marginal enhancement around the extruded disc material at the L4/5 level. (C) Sagittal T2WI of the second round of MRI showed almost complete regression of the herniated nucleus pulposus at the L4/5 level. (D) Axial T2WI of the second round of MRI showed almost complete regression of the herniated nucleus pulposus at the L4/5 level without nerve root compression.

gradually. After 30 months, MRI of the second lumbar spine (Figures 1C and 1D) showed that the herniated disc at L4/5 had almost completely regressed without dural sac or nerve root compression.

Case 2

A 29-year-old man had low back and left leg pain associated with intermittent claudication for 1 month. Neurological examination showed no neurological deficit. MRI of the lumbar spine (Figures 2A and 2B) revealed left posterolateral HNP at L5/S1 level with left nerve root compression and severe spinal stenosis. The patient received conservative treatment and his clinical symptoms improved gradually. After 14 months, the patient had right leg pain, and a follow-up lumbar spinal MRI (Figures 2C and 2D) showed regression of the HIVD at L5/S1 without dural sac or nerve root compression, but a newly developed, mild HIVD of L4/5 was detected.

Discussion

After Guinto et al reported the first case of spontaneous regression of lumbar HIVD in 1984,² this phenomenon has been described in further studies, not only in the lumbar region but also in the cervical and thoracic spine with associated radiculopathy and myelopathy. Nevertheless, the exact mechanisms of disc regression remain unclear. There are 3 hypotheses explaining the process. The first, “dehydration of herniated disc”, states that the spontaneous regression of an HIVD is due to the gradual dehydration and shrinkage of discs.³ The second, “retraction of herniated discs” proposes that the herniated disc may retract back into the intervertebral disc space, but this theoretically only occurs if the HIVD has protruded through the annulus fibrosus without separating from it.^{2,4} Third, “inflammation-related resorption”, the most convincing and studied hypothesis, states that

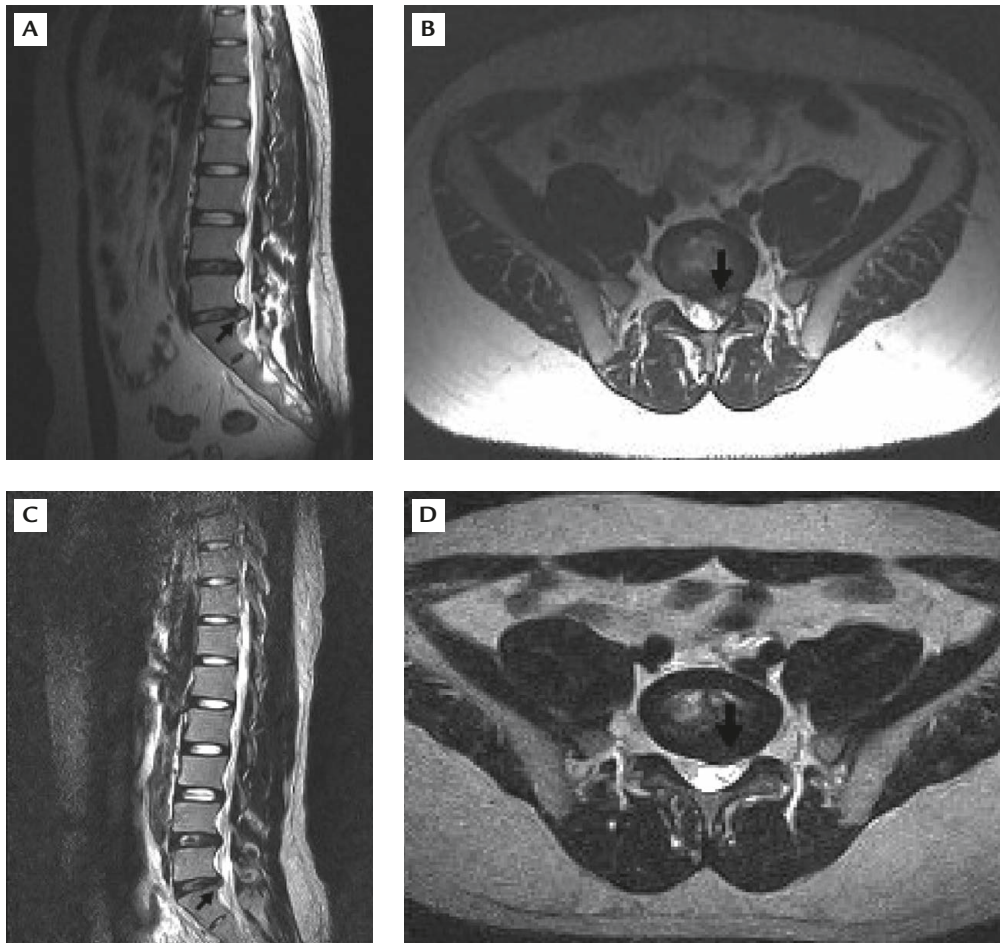


Figure 2. (A) Sagittal T2-weighted imaging (T2WI) of the magnetic resonance imaging (MRI) study revealed a large herniated disc at the L5/S1 level with dural sac compression. (B) Axial T2WI of the MRI study showed a large left-side posterolateral extruded disc fragment at the L5/S1 level. (C) Sagittal T2WI of the second round of MRI showed regression of the herniated nucleus pulposus at the L5/S1 level. (D) Axial T2WI of the second round of MRI showed almost complete regression of the herniated nucleus pulposus at the L5/S1 level without nerve root compression.

the HNP, once extruded into the epidural vascular space of the spine, is recognized as a “foreign” body by the autoimmune system and induces an inflammatory reaction. This inflammatory reaction would lead the bulging disc to neovascularization, enzymatic degradation, and macrophage phagocytosis.⁵ Several histopathological studies from surgical specimens and experimental animal research support this theory.^{6,7} We believe that all 3 mechanisms play a role in this regression process.

Komori et al reported that the more the HNP migrated, the greater the subsequent decrease in size that could be observed.⁸ In their study, the majority of cases (20/32) presented a marked decrease of the migrating mass, and disappearance of the HNP was observed in 7 cases of type III herniation, where the base of the extruded disc extended beyond the disc height. Haro et al also observed that the phagocytosis by

macrophages occurred more often in sequestration-type herniated discs than in subligamentous-type lesions.⁶ Henmi et al noted that the larger protruded disc fragments diminished more than smaller ones, and it may be due to the larger disc fragments having more water content, especially in patients younger than 40 years old.⁵ Moreover, in the Yamashita et al⁹ and Komori et al¹⁰ studies, it was found that a herniated mass having rim enhancement on gadolinium-enhanced MRIs would disappear or markedly decrease in 75–100% of cases. Autio et al even suggested performing a gadolinium-enhanced MRI in these patients to predict the possibility of spontaneous regression of herniated discs.¹¹

Several studies have reported the ratio of spontaneous regression of herniated discs. Recently, a large study was reported in 2006 by Autio et al, in which 68 of 160 enrolled patients (42.5%) documented by

lumbar MRI had a diminished volume of herniated lumbar discs 2 months after the occurrence of the disease.¹¹ In other studies, the occurrence of spontaneous regression of herniated lumbar discs was around 35–63% on average, during a period of 6 months to 1 year.^{4,8,11} However, some patients still need surgical intervention due to the neurological deficit and prolonged, uncontrolled pain. Weber¹² estimated that 1 year after disease onset, about 25% of patients need surgery. The larger Maine Lumbar Spine Study showed that 15% of patients who initially received conservative treatment would undergo surgical intervention within 3 months.¹³

In conclusion, many studies have demonstrated that herniated lumbar discs have the potential to spontaneously regress. This phenomenon may be related to dehydration and/or shrinkage, retraction, and inflammation-led resorption of the herniated discs, especially in the cases in which the discs had migrated the most, those with larger herniated disc fragments or herniated discs with rim enhancement on gadolinium-enhanced MRI, and in which the patient was younger than 40 years old. For such patients, we suggest that treatment should be conservative in the initial course of the disease. Surgical intervention should be limited to those who still have moderate to severe neurological deficits or intractable low back and leg pain after 6 weeks' conservative treatment.¹⁴

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