



Regression of a large prolapsed lumbar disc herniation achieved by conservative treatment: A case report and literature review

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ABSTRACT

A common spinal condition known as lumbar disc herniation (LDH) can result in radicular and low back discomfort. A 27-year-old man was admitted to our hospital with a 6-year history of persistent low back pain, and his low back pain had recurred with radiation to his lower extremities over the last two months. An extensive right-sided paracentral disc herniation in the L5/S1 intervertebral region, which compressed the nerve root, was discovered by magnetic resonance imaging (MRI) of his lumbar spine. After receiving conservative treatment, the patient reported that his lower back discomfort and neurogenic claudication had gradually subsided after 4 months. After one year, a follow-up MRI showed that the massive, prolapsed disc herniation at the L5/S1 level had totally disappeared. The sagittal protrusion length of the L5/S1 intervertebral disc shrank from 12.35 mm to 3.49 mm. However, there remained a chance of vertebral height loss. During the course of treatment, the height of the L5/S1 intervertebral space was still slightly reduced. The intervertebral space height declined from 7.705 mm to 7.201 mm after one year of treatment. The current case and a review of the literature demonstrate that LDH can decrease with conservative therapy over a short period of time. We stress the effectiveness of conservative treatment in very select LDH cases that lack a clear surgical justification.

1. Introduction

Low back pain (LBP), the most common musculoskeletal problem globally, is caused by lumbar disc herniation (LDH) [1]. Individuals of all ages, especially young people between the ages of 20 and 40, endure low back pain, which has become a worldwide epidemic [2,3]. From 1990 to 2019, the global DALYs of LBP increased by 47%. There were 223.5 million cases of LBP and 63.7 million LBP-related years lived with disability (DALYs) worldwide in 2019 [4].

After Mixter and Barr first established surgery on patients with herniated lumbar discs in 1934, the surgical procedure has become one of the most commonly treated conditions for patients with disc herniation [5]. However, several randomized controlled trials [6,7] have shown no differences in outcomes between surgical and conservative treatment after 1 year, except that surgical treatment can demonstrate faster pain relief and recovery at an early stage. In patients with lumbar disk herniation-related sciatica lasting more than 4 months, Bailey et al. discovered that microdiscectomy was more effective than nonsurgical treatment in terms of pain intensity at 6 months after the procedure [8]. However, a 10-year observation study [9] also found that there are no statistically significant

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differences between surgical and conservative treatment after 4 and 10 years, which means conservative treatment is also an alternative choice for later stages of LDH. Recent investigations have shown that LDH can show excellent spontaneous regression with conservative treatment; nevertheless, it is important to emphasize that this is a rare occurrence [10–14]. In the present article, we report the case of a 27-year-old man with low back pain and radicular pain due to LDH that resolved after conservative treatment, and we review the related literature. The reporting of this study conforms to CARE guidelines [15]. The baseline characteristics of the subjects are shown in Table 1.

2. Case

A 27-year-old man was admitted to our hospital with a complaint of low back pain for six years. After inadvertently spraining his waist while playing football 6 years prior, he developed chronic low back pain. At the time, bed rest and massage relieved the symptoms. Two months prior to this visit, his low back pain recurred with radiating pain in the lower extremities after an episode of sneezing; the pain was not relieved by lying down and resting.

The patient was 171 cm tall and 65 kg, with a BMI of 22.2 kg/m². He had no other relevant medical history, nor had he ever smoked or abused alcohol. He was admitted with a visual analog scale (VAS) score of 10. He was unable to stand, sit, or even lie down due to excruciating pain. Physical examination revealed paraspinal muscle tenderness and radicular pain in the right L5-S1 level, extending from the right lower back to the back of the leg and ipsilateral foot. He had grade 4 muscle weakness in his right extensor and flexor hallucis longus but no incontinence. The results of the Lasegue test were 10° and 50° for the right and left legs, respectively. Knee reflexes were normal, and Achilles tendon reflexes were reduced in the affected leg. Before receiving treatment, magnetic resonance imaging (MRI) of his lumbar spine revealed a large right-sided paracentral disc herniation at the L5/S1 intervertebral space, compressing the S1 nerve root and resulting in spinal stenosis, which was consistent with his symptoms (Fig. 1). We measured the sagittal protrusion length of the L5/S1 intervertebral disc, which was as high as 12.35 mm (Fig. 2), and the diameter of the spinal canal on the cross section was only 10.31 mm (Fig. 2), which indicated lumbar spinal stenosis. The height of the lumbar intervertebral space was measured by the classic Dabbs method [16]: The height of the intervertebral space = (the height of the front edge of the intervertebral space + the height of the posterior edge of the intervertebral space)/2. Using the computer PACS image workstation, the intervertebral space height of the L5/S1 segmental vertebral body was measured by lumbar magnetic resonance before conservative treatment, and the intervertebral space height was 7.705 mm (Fig. 3).

The patient declined the recommended percutaneous endoscopic lumbar discectomy surgery in favor of conservative treatment. His low back pain and radiating nerve pain were relieved after a single compound betamethasone injection and diclofenac sodium tablets. Betamethasone was used to treat the acute pain with a 1 ml intravenous infusion. Diclofenac sodium was administered at 75 mg once daily and was taken again at night before bedtime if the pain is severe. After the pain was relieved, the patient requested to be discharged from the hospital for a regular outpatient review. He took diclofenac sodium for a month after discharge and received a second dose of compound betamethasone in our clinic. He also underwent physical therapy such as massage, acupuncture, sleep on a hard/firm mattress, and exercise. Acupuncture and traction were performed two to three times a week, both on the same day. Huantiao acupoints, Zhibian acupoints, Yanglingquan acupoints, Juegu acupoints and Huatuo Jiayi acupoints were selected for electro-acupuncture treatment. Massage therapy was mainly used to perform longitudinal traction on the lumbar spine, open the lumbar intervertebral space, and relieve pain. He also took traditional Chinese medicine throughout the treatment. A traditional Chinese medicine outpatient follow-up was performed once a week, according to the patient's symptoms, to adjust the herbal medicine. The traditional Chinese medicine mainly included cooked aconite, Rehmannia glutinosa, cornus, Eucommia, dodder, peony, Astragalus, Atractylodes macrocephala, cinnamon, Morinda officinalis and other herbs that nourish the liver and kidney. The dosage of each Chinese herbal medicine was 5–15 g. After approximately 4 months, the patient's low back pain and neurogenic claudication improved gradually. The lumbar VAS pain score decreased from 10 points to 3 points after treatment. The lower-extremity muscle strength was improved over the previous level of strength. The great toenail stretching strength and great plantar flexor strength of the lower limbs were raised from grade 4 to grade 5.

At a visit to our department one year later, the patient stated that he had no symptoms of low back pain or sciatica with a VAS pain score of 1, and we performed a second MRI, which revealed that the L5/S1 disc herniation had completely resolved (Fig. 4). Using the computer PACS image workstation again, the disc herniation size and intervertebral space height of the L5/S1 segmental vertebral body were measured by lumbar magnetic resonance. The sagittal protrusion length of the L5/S1 intervertebral disc had shrunk from 12.35 mm (Fig. 2) to 3.49 mm (Fig. 4), and the diameter of the spinal canal on the cross-section had increased from 10.31 mm (Fig. 2)

Table 1
Baseline characteristics of the subject.

Gender	Male
Age (yr)	27
BMI(kg/m ²)	22.2
Disease cause	Spraining of his waist
Medical history	No history of combined tumors, hypertension, diabetes, bone disease, etc.
Smoking history	No
Drinking history	No
VAS score before treatment	10
Site of disc herniation	L5/S1

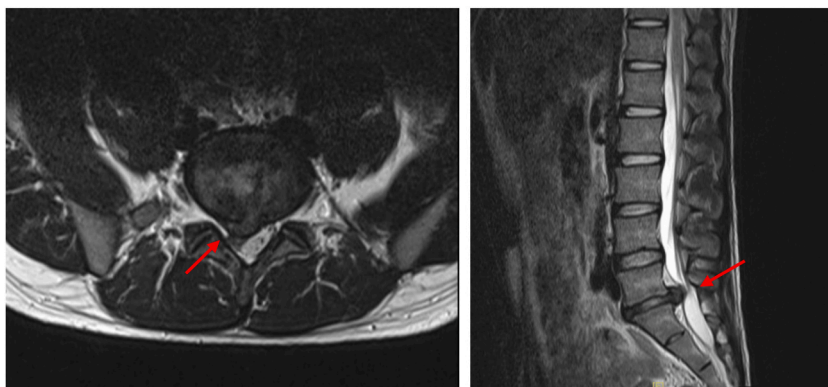


Fig. 1. Sagittal (right) and axial (left) T2-weighted MRI of the lumbar spine shows a large, prolapsed disc herniation on the right side at the L5–S1 level (arrows), which caused compression of the S1 nerve root.

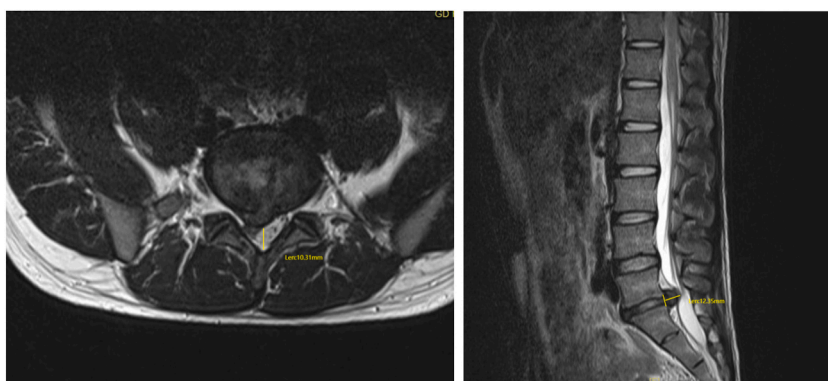


Fig. 2. The diameter of the spinal canal on the cross section was 10.31 mm, and the sagittal protrusion length of the L5/S1 intervertebral disc was as high as 12.35 mm.

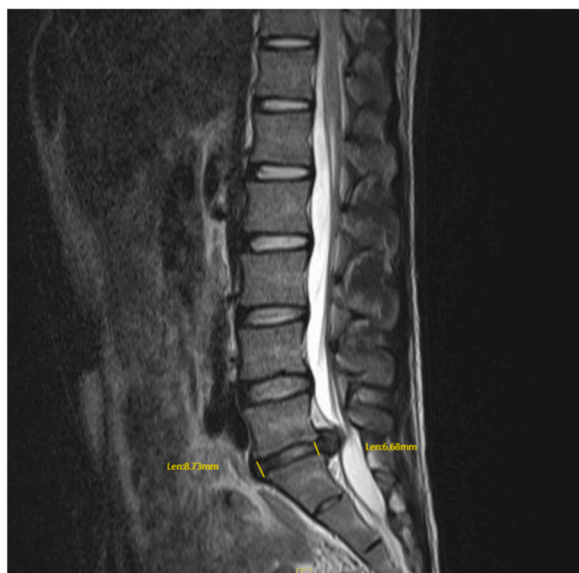


Fig. 3. The height of the front edge and posterior edge of the intervertebral space was assessed; the intervertebral space height was 7.705 mm, as measured by the Dabbs method.

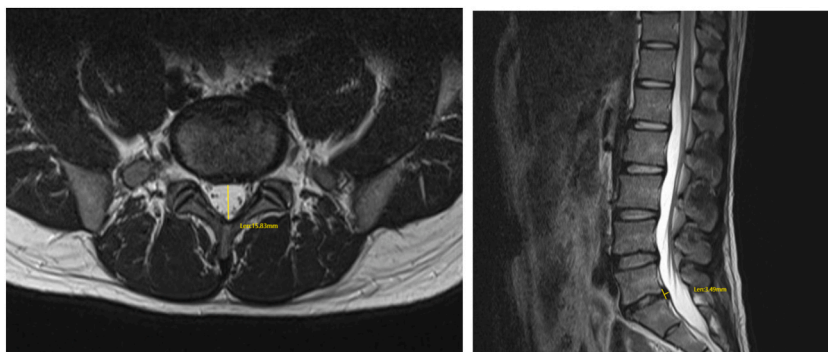


Fig. 4. Sagittal (right) and axial (left) T2-weighted MRI of the lumbar spine after one year of conservative treatment. The diameter of the spinal canal on the cross-section was 15.83 mm, and the sagittal protrusion length of the L5/S1 intervertebral disc was as high as 3.49 mm.

to 15.85 mm (Fig. 4). However, during the course of treatment, the height of the L5/S1 intervertebral space was still slightly lost. The intervertebral space height had declined from 7.705 mm (Fig. 3) to 7.201 mm after one year of treatment (Fig. 5). The decrease in vertebral body height mainly occurred at the posterior edge of the intervertebral space. Following conservative treatment, the patient's pain was relieved, and a herniated disc was retracted, which demonstrated an alternative and effective treatment for lumbar disc herniation.

3. Discussion

Our research suggests that patients with lumbar disc herniation who are opposed to spinal surgery may be able to benefit from conservative treatment, such as compound betamethasone, nonsteroidal anti-inflammatory medications, acupuncture, and bed rest. However, there is still a chance of vertebral height loss.

It is estimated that LDH has a 1-year incidence of 0.1%–0.5% and a lifetime incidence of approximately 1%–2% [17]. Since Guinto et al. first reported LDH regression in 1984 [18], an increasing number of studies have described this condition using computed tomography and MRI [12–14,19–24]. Currently, there are two main LDH therapy options: surgical therapy and conservative treatment. The magnitude of the protrusion, the type of disc herniation, and the clinical symptoms must all be taken into consideration when choosing a clinical treatment for LDH. We must keep an eye on the patient regularly during conservative treatment to reduce the risk of irreparable nerve root injury and cauda equina syndrome [25]. However, prompt surgical intervention is required if any of the following circumstances arise: (1) After 3–6 months of conservative treatment, the symptoms have not been greatly reduced; (2) Conservative treatment worsens the symptoms; and (3) Clinical symptoms of cauda equina syndrome are present [26].

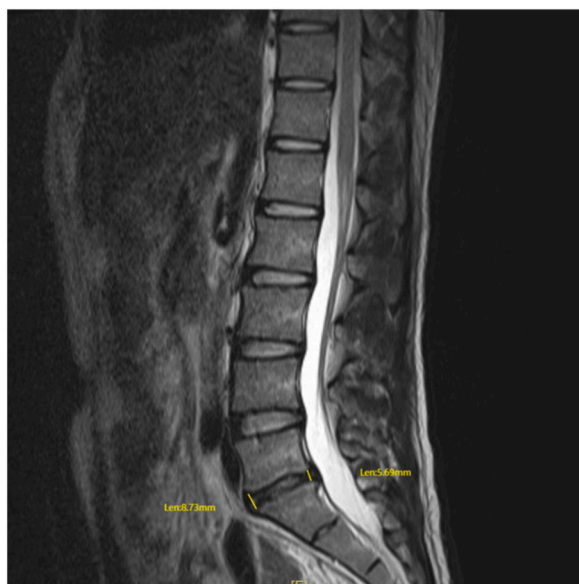


Fig. 5. The height of the front edge and posterior edge of the intervertebral space was assessed; the intervertebral space height was 7.210 mm, as measured by the Dabbs method.

Previous research has suggested that nonsurgical management could result in LDH regression. However, we also recommended that LDH patients with significant motor deficits or cauda equina syndrome undergo decompressive surgery to avoid further neurological sequelae and incontinence. In the absence of the aforementioned symptoms, conservative treatment is recommended as the first line of LDH treatment. In this study, we present a case of complete lumbar disc regression following conservative treatment and review the relevant literature.

A growing number of studies have described the spontaneous regression of LDH. The mechanism of LDH regression is still unknown. In the academic field, three major hypotheses have been proposed. The first theory proposed that the herniated nucleus pulposus would shrink back into the annulus fibrosus due to gradual dehydration [27]. The second hypothesis was that the herniated disc retracts back into the intervertebral space when it protrudes through the annulus fibrosus without separating from it [14]. The third mechanism is associated with inflammatory reactions and neovascularization, with gradual cartilage resorption via enzymatic degradation and phagocytosis [28,29]. Dehydration, inflammation, and neovascularization, in our opinion, may all play a role in the current cases of LHD regression. Steroids, NSAIDs, Chinese herbal medicine, acupuncture and traction massage are included in our treatment plan. Acupuncture has been used in the treatment of different pain conditions, including lumbar disc herniation (LDH), and it can assist patients in relieving symptoms [30]. Our treatment involves anti-inflammation and neovascularization, and the traction and massage technique can stretch the protruding intervertebral space and intervertebral space pressure through longitudinal mechanics.

Although the precise mechanisms of LDH absorption without surgery are unknown, many factors related to the spontaneous resolution of LHD have been investigated by researchers. Bozzao et al. [31] discovered that the amount of herniated disc reduction had a positive correlation with the size of the herniation but no relationship with the location of the herniation. Another study found that the evolution of disc herniation had no relationship with the location [32]. Chiu et al. [33] discovered that extrusion and sequestration disc herniation had a significantly higher chance of spontaneous regression than bulging or protruding discs. Furthermore, when compared to disc extrusion, disc sequestration had a significantly higher rate of complete regression. Obesity is a potential risk factor for intervertebral disc disease, according to Tokmak et al. [23], who discovered that spontaneous regression of extruded lumbar disc herniation may be related to weight loss. According to Li et al. [22], the traditional Chinese medicine of electroacupuncture may promote the spontaneous resorption of lumbar disc herniation in the treatment of LDH by improving microcirculation, providing analgesia, relieving nerve root compression, inhibiting the inflammatory response, and improving spinal function [34]. Kim et al. [21] reported two patients over the age of 50 with lumbar disc herniation regression, with resolution times of 2 years and 9 months. He did not, however, describe how they were treated in detail. Yang et al. [14] reported a 45-year-old man with a large, extruded disc fragment at the L3-4 level. After conservative treatment with physical and medical therapy and bed rest, the patient's complaints were resolved, and MRI images showed total regression of the extruded disc fragment at the 9-month follow-up. Gao et al. [20] discovered similar results after 8 months of conservative therapy. Oktay et al. [19] discovered that the incidence of spontaneous disc regression of LDH with a history of low back pain and radiculopathy is only 0.58%. Wang et al. [13] reported an 8-month LDH regression with nonsteroidal anti-inflammatory drugs in a 25-year-old man. Hu et al. [10] discovered that performing exercises, acupuncture, massage, and refraining from taking medication can also aid in the regression of a large sequestered lumbar disc herniation after 4 months.

The patient we reported on began to gradually experience relief of his symptoms of low back pain and sciatica after 4 months. Before treatment, his VAS pain score was 10 points. After 4 months of treatment, his VAS pain score was reduced to 3 points. However, the patient still had to endure pain for the first 4 months. Lumbar MRI after one year revealed that the disc herniation had completely reabsorbed, which was consistent with previous research. While conservative treatment may be able to fully retract the herniated disc, the patient must still endure pain for the first month or even for four months, which can interfere with daily activities. As a result, we advocate for early percutaneous discectomy to reduce bedridden complications and allow patients to return to their normal daily lives sooner. However, for patients who want conservative treatment, there is no need to be pessimistic because conservative treatment can still relieve pain and provide the possibility of complete retraction after disc herniation.

Magnetic resonance imaging (MRI) of the lumbar spine can be used to track the progression of herniated intervertebral disc fragments. Further research into the relationships between MRI results and clinical outcomes is needed. Oktay et al. [19] demonstrated that clinical improvement can occur only when the decrease in the herniation ratio exceeds 20%. In contrast, another researcher discovered that clinical improvement had no relationship with radiological improvement [35]. This could be due to the patient's tolerance for the pain caused by the herniated disc. However, studies have shown that LDH symptoms can not only disappear after conservative treatment but also reappear [23,28]. In our patient, MRI showed complete retraction of the intervertebral disc to a position that did not compress the nerve root. He still experienced low back pain and sciatica after prolonged sitting. This could be explained by long-term nerve root compression and edema, which causes symptoms to recur frequently.

4. Conclusions

This case report suggests that conservative treatment may cause spontaneous resorption of a herniated disc in very select LDH cases. Conservative treatment is an option for patients with large and extruded LDHs who do not have a definitive surgical indication.

Consent to participate

We confirm in the "case" section of our paper that any patients whose data or images are included in this publication have consented for all images, clinical data and other data included in the manuscript to be published.

Consent for publication

The authors have read and approved the final manuscript for publication.

Ethics approval

This study was approved by the Ethics Committee of the Second Affiliated Hospital of Guangzhou University of Chinese Medicine.

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Author contribution statement

All authors listed have significantly contributed to the investigation, development and writing of this article.

Data availability statement

Data included in article/supp. material/referenced in article.

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declare that there are no conflicts of interest.

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