



Spontaneous Regression of Traumatic Lumbar Disc Herniation: A Case Report and Literature Review

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Traumatic intervertebral disc herniation is more common in the cervical spine than in the lumbar spine. Traumatic lumbar disc herniation (LDH) had the same symptoms as degenerative LDH including low-back pain and nerve root radiculopathy. Many reports are showing that herniated discs can regress spontaneously, therefore, improving neurologic symptoms. The exact mechanism of spontaneous herniated disc regression remains unclear. Traumatic LDH treatment principle should be the same as degenerative LDH. We report a case of traumatic LDH with spontaneous regression and discuss the possible mechanisms of spontaneous lumbar herniation disc regression.

Key words: Trauma, herniated disc, lumbar, spontaneous regression

INTRODUCTION

Herniation of intervertebral disc is a common disease and can be found in 20%–30% of the general population. Some cases of lumbar disc herniation (LDH) need surgical intervention but most of them heal with conservative therapy. After Guinto *et al.*¹ reported a case of spontaneous regression of lumbar herniated disc demonstrated by computed tomography in 1984, many papers also reported this phenomenon. Traumatic disc herniation is most commonly occurs in the cervical spine and a rare occurrence in the lumbar spine.^{2,3} Here, we reported a case of traumatic LDH with the presentation of sciatica. After conservative treatment, magnetic resonance imaging (MRI) of the lumbar spine showed spontaneous regression of herniated lumbar disc. We review the related literature and discuss spontaneous lumbar disc regression's possible mechanisms and precipitating factors.

CASE REPORT

A 38-year-old female without sciatica symptoms before admission. She suffered from severe back pain with pain, tingling, and numbness of the left S1 dermatome after a traffic

accident. Straight leg raising test showed positive, left at 30°. Deep tendon reflex showed normal knee jerk and ankle jerk reflex. The manual muscle testing revealed a score of 5/5 for big toe dorsiflexion and plantarflexion. Anterior–posterior view of the lumbar X-ray showed mild scoliosis. The lateral view of the lumbar X-ray showed normal alignment but a slight decrease in the height of the L5/S1 intervertebral disc [Figure 1]. MRI of the lumbar spine revealed a ruptured disc at the L5/S1 level, the left side, with severe nerve root compression [Figures 2 and 3, red arrow]. Surgical intervention was recommended, but the patient refused. She received conservative treatment, including bed rest, back bracing, rehabilitation, and analgesic drugs. The rehabilitation includes physical therapy and thermotherapy. The abdominal strengthening exercises, pelvic tilt, and stretching exercises were given two times 10 repeats daily as physical therapy for 3 months. The patient underwent thermotherapy, including infrared, ultrasound, and transcutaneous electrical nerve stimulation (TENS) 3 days a week for 6 months. Severe back pain and pain, tingling, and numbness of left S1 dermatome subsided gradually and she did not complain of any symptoms

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after 6 months. After 18 months, a lumbar spine X-ray revealed recovery of disc space narrowing at the L5/S1 level [Figure 4]. MRI of the lumbar spine revealed complete regression of the ruptured disc at L5/S1 level without dura sac or nerve root compression [Figures 5 and 6, blue arrow].

DISCUSSION

Disc herniation is commonly occurring due to degenerative changes but is relatively rare in trauma patients. Spinal trauma-related disc herniation is usually found in the cervical region rather than in the lumbar disc. Apple *et al.*⁴ reported the incidence of traumatic LDH is <0.4%. The central portion of the disc, nucleus pulposus, is usually hydrated and includes a matrix of collagen, proteoglycans, and other

proteins. This characteristic made it show high signal intensity on T2-weighted images in young and healthy adults but low signal intensity on T2-weighted images in dehydration and degenerative discs. Our patient did not have sciatica symptoms before the traffic accident, and her lumbar spine MRI showed high signal intensity on the T2-weighted image, which made us believe that the patient's LDH is trauma induced.

After Guinto *et al.*,¹ many papers also reported the phenomenon of spontaneous regression of LDH. One systematic review reported the rate of herniation disc regression was 96% in the sequestered disc, 70% in the extruded disc, 41% in the protruded disc, and 13% in the bulged disc, and complete resolution rate of disc herniation was 43% for sequestered discs and 15% for extruded discs.⁵ The rate of spontaneous regression of LDH was higher in extrusion and

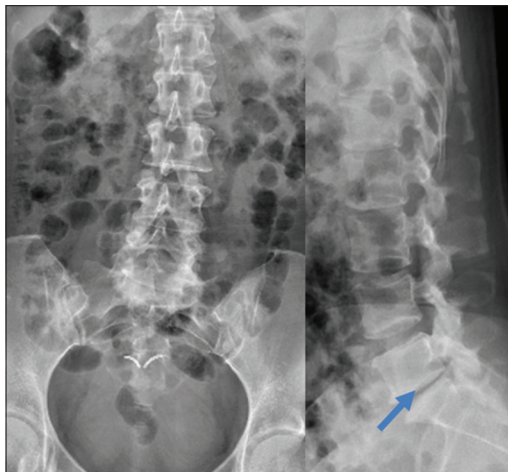


Figure 1: Initial lumbar spine X-ray showed mild scoliosis at anterior-posterior view. The lateral view showed normal alignment without bony fracture but mild disc space narrowing (blue arrow) at the L5/S1 level



Figure 2: Sagittal T2-weighted imaging of the initial magnetic resonance imaging study of a ruptured disc (red arrow) at L5/S1 level, left side with severe nerve root compression. MRI: Magnetic resonance imaging, T2WI: T2-weighted imaging

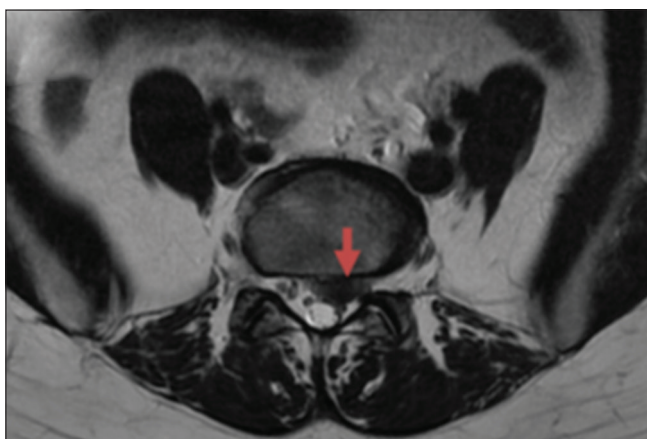


Figure 3: Axial T2-weighted imaging of the initial magnetic resonance imaging study of a ruptured disc (red arrow) at L5/S1 level, left side with severe nerve root compression. MRI: Magnetic resonance imaging, T2WI: T2-weighted imaging

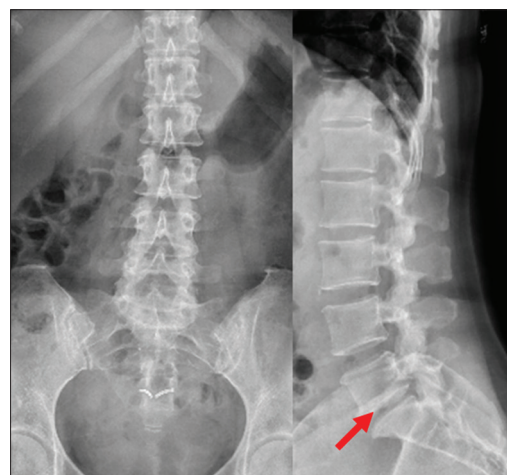


Figure 4: After 18 months, the lateral view showed recovery of disc space narrowing (red arrow) at the L5/S1 level



Figure 5: Sagittal T2-weighted imaging of the second round of magnetic resonance imaging showed complete regression of the herniated disc (blue arrow). MRI: Magnetic resonance imaging, T2WI: T2-weighted imaging

sequestration patients than in bulging or protruding patients. Komori *et al.* reported 77 patients with unilateral radiculopathy under conservative treatment at a mean interval of 150 days with at least two times of MRI studies.⁶ Migrating herniated nucleus pulposus showed an obvious decrease in size (20/32), even complete regression in seven cases, but protrusion nucleus pulposus showed little or no change in follow-up MRI. Autio *et al.* reported 160 patients with unilateral sciatica who received conservative treatment. Sixty-eight of 73 patients showed significant resorption of disc herniation at 2-month follow-up image, and 51 of 55 patients showed more pronounced resorption at the final 1-year follow-up.¹⁰

The mechanism of spontaneous disc regression is still unclear. There are three possible mechanisms of disc regression were reported.⁷ The first mechanism is retraction into the intervertebral space, which may occur only if the herniation disc has protruded through the annulus fibrosis without separating from it.⁸ The second mechanism is dehydration/shrinkage of the herniation disc that made gradual regression of the herniation disc.⁷ The third mechanism is resorption due to inflammatory reaction, which is the most convincing and studied hypothesis. The herniated disc is recognized as a foreign body by the autoimmune system in the epidural vascular space and induces neovascularization, macrophage phagocytosis, and enzymatic degradation.⁹ In the spontaneous regression process, we think that all three mechanisms play an important role.

Morphologic changes have corresponded to clinical outcomes. Komori *et al.* reported that the more migration of the herniated nucleus pulposus, the more decrease in size could be observed.⁶ Henmi *et al.* also noted that bigger protruded disc fragments decreased more than smaller ones which may be due to bigger protruded discs usually having more water content.⁹ This phenomenon is more dominant in

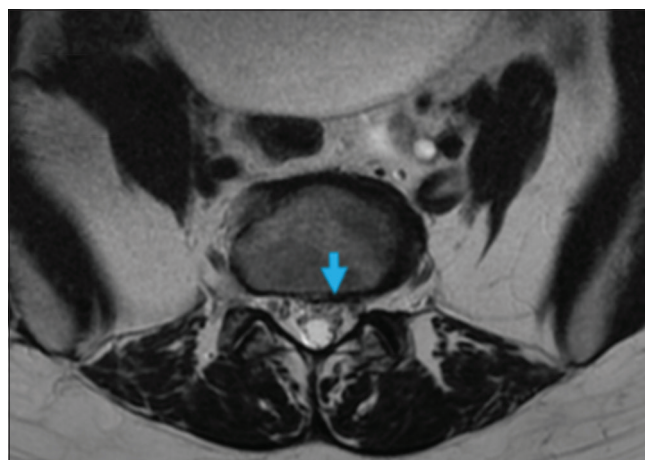


Figure 6: Axial T2-weighted imaging of the second round of magnetic resonance imaging showed complete regression of the herniated disc (blue arrow). MRI: Magnetic resonance imaging, T2WI: T2-weighted imaging

patients younger than 40 years old. Sequestered herniation disc had a higher regression rate than other types, which may be related to sequestration herniation disc showed more frequency of macrophage phagocytosis.¹⁰ Komori *et al.* reported that herniation discs with rim enhancement on gadolinium-enhanced MRI have a higher regression rate.⁶ Autio *et al.* stated that the thickness of rim enhancement had a significant association with spontaneous herniation disc regression and can be a predictor for the possibility of spontaneous herniation disc regression.¹⁰

Conservative treatment for traumatic LDH, including bed rest, back bracing, rehabilitation, and analgesic drugs. During the acute inflammatory phase of LDH, bed rest was recommended to eliminate excessive mechanical stresses on the lumbar spine segment and prevent further exacerbation. Back bracing can treat pain caused by a herniated disc, by providing stability and spinal support. Infrared and TENS were demonstrated to be effective in reducing low-back pain. Core exercises will intensify the muscles that support the lumbar spine, which may reduce the risk of a herniated disc recurring, promote flexibility in the spine, and relieve lower back pain.

For those patients with neurologic deficits and intractable pain, surgical intervention is still required. The Maine lumbar spine study showed that 25% of the patients who initially received conservative treatment would have at least one lumbar spine operation at a 10-year follow-up. Surgical patients showed more complete relief of leg pain and improved function and satisfaction compared with nonsurgical patients over 10 years.

CONCLUSION

Traumatic disc herniation is usually found in the cervical

region and is less common in lumbar disc. Many studies revealed that herniated lumbar discs have the potential to regress spontaneously, which may be related to retraction, dehydration/shrinkage, or inflammation-related resorption of the herniated discs. For patients with sequestered herniation disc, larger herniated disc fragment, and rim enhancement of herniated disc on gadolinium-enhancement MRI or younger than 40 years old, we recommend conservative treatment in the beginning course of the disease. Surgical treatment should be preserved for those patients failure of conservative treatment.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Chia-Yuan Chang, upon reasonable request.

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Conflicts of interest

There are no conflicts of interest.

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