

Case Series

Spontaneous Regression of Lumbar Disc Herniations: A Retrospective Analysis of 5 Patients

K Oktay¹, KM Ozsoy², UA Dere³, NE Cetinalp², M Arslan⁴, T Erman², A Guzel^{1,5}

¹Department of Neurosurgery, Gaziantep Medical Park Hospital, Gaziantep,

²Department of Neurosurgery, Cukurova University School of Medicine, Adana,

³Department of Neurosurgery, Baskent University School of Medicine, Ankara,

⁴Department of Neurosurgery, Kepez State Hospital, Antalya,

⁵Department of Neurosurgery, Bahcesehir University School of Medicine, İstanbul, Turkey

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ABSTRACT

The aim of this study is to describe patients who represent spontaneous regression of lumbar disc herniations (LDHs) subsequent to conservative treatments. In this retrospective study, medical records of 862 patients who had presented to our neurosurgery department with LDHs between May 2014 and May 2016 were studied. All of these patients had a history of low back pain and radiculopathy. Lumbar magnetic resonance imaging (MRI) scans were performed to diagnose them. LDHs were categorized into four subtypes including disc bulging, protrusion, extrusion, and sequestration. Five patients developed spontaneous regression of LDHs according to spinal MRI scans. All patients relieved radiculopathy symptoms in 2 to 4 weeks and low back pain symptoms in 3 to 8 weeks except one patient. In one patient hypoesthesia symptom, in one patient motor deficit, and in one patient low back pain remained after the regression. The clinical and diagnostic imaging characteristics and outcomes of these five patients are described and the pertinent literature regarding spontaneous regression of LDHs is reviewed. Sequestered disc herniations represent the main candidates for spontaneous regression according to our clinical research and the pertinent literature. Dehydration and inflammation-related resorption are the main mechanisms for this event. Conservative treatment modalities should not be underestimated for the treatment of such patients in the absence of definitive surgical indications.

KEYWORDS: Lumbar disc herniation, spontaneous regression, sequestered

INTRODUCTION

Low back pain is the most common health problem in the population between the ages of 20 and 50 years.^[1] Lumbar disc herniations (LDHs) represent one of the most common causes of low back pain.^[2] The first description of an LDH causing radiculopathy and its successful surgical treatment was reported by Mixter and Barr in 1934.^[3] But the treatment of LDHs is still a controversial issue. It was shown that most of the patients' symptoms may improve with the conservative treatment modalities in the absence of definitive surgical indications such as motor deficit, intolerable radiculopathy or cauda equina syndrome.^[4-6]

With the improvement in the neuroimaging techniques especially, magnetic resonance imaging (MRI), it was determined that the size of disc herniations also decreases

following the relief of the patients' symptoms and this phenomenon was entitled as "spontaneous regression of lumbar disc herniations". We describe five patients with spontaneous regression of LDHs in this article. The possible pathophysiological mechanisms of this condition are discussed in the presence of the pertinent literature review.

MATERIALS AND METHODS

The research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research


Address for correspondence: Dr. K Oktay,

Department of Neurosurgery, Gaziantep Medical Park Hospital, Sehitkamil District, Ertugrul Street, Gaziantep, Turkey.
E-mail: drkadiroktay@hotmail.com

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Involving Human Subjects”, (amended in October 2013). After obtaining Ethics Committee approval, 862 patients who had presented to our neurosurgery department with LDHs between May 2014 and May 2016 were included in the study. The required data were gathered using the medical records of the patients and comprised primary clinical presentation, demographic data, and radiological findings. All of these patients had a history of low back pain and radiculopathy. Lumbar MRI scans were performed for all of the patients. LDHs were categorized into four subtypes including disc bulging, protrusion, extrusion, and sequestration. The indications for surgical treatment were motor deficit, intolerable radiculopathy or cauda equina syndrome. The patients who did not undergo surgery were treated with conservative modalities. Conservative modalities including immobilization, medical treatment, patient education, physical therapy, brace application, and spinal injections were performed. All patients underwent immobilization and bed rest for seven days. As a medical treatment, non-steroidal, anti-inflammatory drugs including naproxen and diclofenac sodium and muscle relaxants including tizanidine and thiocholchicoside were given to the patients. After immobilization, all patients underwent physical therapy. The pelvic tilt, abdominal strengthening exercises, and stretching exercises were given 3 times 10 repeats a day as physical therapy. All patients underwent 20 sessions of thermotherapy including infrarouge and ultrasound and 10 sessions of transcutaneous electrical nerve stimulation (TENS). Transforaminal epidural steroid injections were performed in patients with radiculopathy symptoms. As a transforaminal epidural injection, 1 cc 2% lidocaine and 2 cc 8 mg dexamethasone were injected into the foramen. The patients who were followed for spontaneous regression of disc herniations were scanned with spinal MRI every 3 months in the first year and every 6 months in the second year. In axial and sagittal spinal MRIs, disc herniation fragments were measured longitudinally and transversely. Regression of disc herniations was identified according to these measurements.

RESULTS

According to MRI scans, 304 patients had disc bulging, 360 patients had a protrusion, 164 patients had extrusion, and 34 patients had sequestration. The ratios of the herniations' subtypes were 35.3%, 41.8%, 19%, and 3.9% respectively. Among all patients, 115 (13.3%) patients were operated. Among 34 patients who had sequestrations, 19 patients underwent surgery and microdiscectomy procedures were performed. 15 patients did not accept the operation because of the

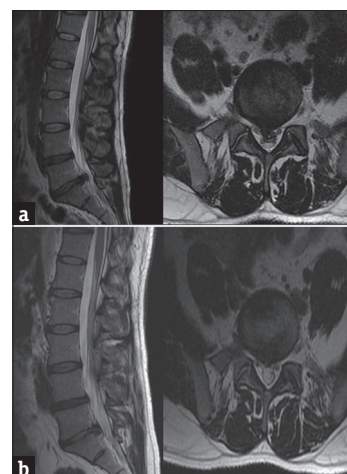


Figure 1: (a) Sagittal and axial T2-weighted MRI of the lumbar spine revealing a right-sided L5-S1 disc herniation. (b) Sagittal and axial T2-weighted MRI of the same patient after spontaneous regression

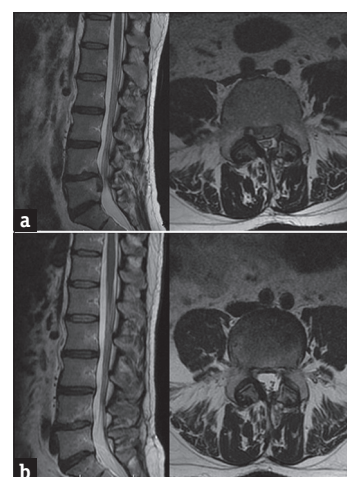


Figure 2: (a) Sagittal and axial T2-weighted MRI of the lumbar spine revealing an L4-5 sequestered disc herniation compressing the spinal canal and bilateral L5 roots. (b) Sagittal and axial T2-weighted MRI of the same patient after spontaneous regression

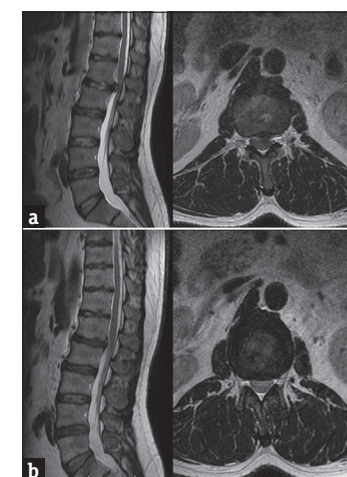


Figure 3: (a) Sagittal and axial T2-weighted MRI of the lumbar spine revealing an L1-2 extruded disc herniation. (b) Sagittal and axial T2-weighted MRI of the same patient after spontaneous regression

Table 1: Data of the patients included in the study

Patient	Age/Gender	Symptoms	Neurological examination	Disc level and side	Time interval for regression (MRI)	Time interval for symptom recovery	Remaining symptoms
1	36/M	LBP, right sided RP	Right- sided S1 hypoesthesia, right SLRT (+)	Right- sided L5-S1 sequestration	9 months	2 weeks (RP)	LBP (mild)
2	56/M	LBP, bilateral RP	Left EHL 1/5, right EHL 3/5, cauda equina syndrome	L4-5 sequestration (bilateral compression)	6 months	8 weeks (LBP), 4 weeks (RP)	Motor deficit, urinary problems and constipation
3	46/M	LBP	Left-sided L1-2 hypoesthesia	Left-sided L1-2 extrusion	9 months	3 weeks (LBP)	Hypoesthesia
4	31/M	LBP, right- sided RP	Right-sided S1 hypoesthesia, right SLRT (+)	Right- sided L5-S1 sequestration	3 months	2 weeks (RP), 4 weeks (LBP)	None
5	41/M	LBP, right- sided RP	Right- sided S1 hypoesthesia, right SLRT (+)	Right-sided L5-S1 sequestration	12 months	2 weeks (RP), 5 weeks (LBP)	None

M=male, LBP=low back pain, RP=radicular pain, SLRT=straight leg raising test, EHL=extensor hallucis longus, MRI=magnetic resonance imaging

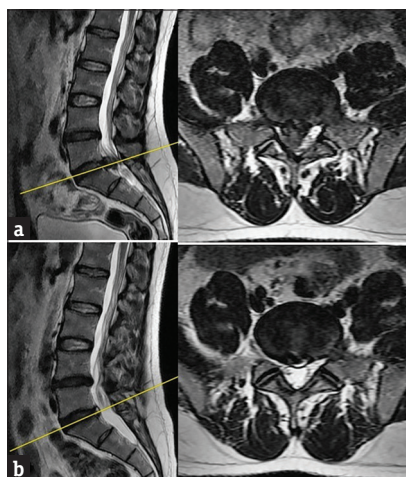


Figure 4: (a) Sagittal and axial T2-weighted MRI of the lumbar spine showing a right-sided L5-S1 sequestered disc herniation. (b) Sagittal and axial T2-weighted MRI of the same patient after spontaneous regression

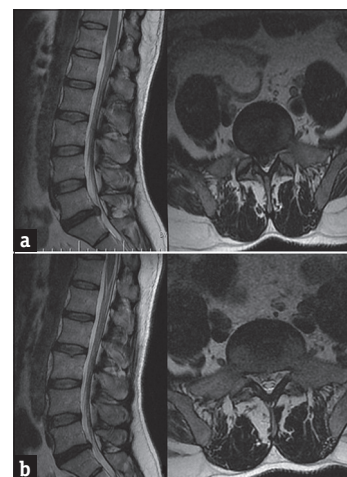


Figure 5: (a) Sagittal and axial T2-weighted MRI of the lumbar spine showing a right-sided L5-S1 sequestered disc herniation. (b) Sagittal and axial T2-weighted MRI of the same patient after spontaneous regression

reasons such as fear about the procedure, religion-related issues or coexisting medical problems. Conservative treatment modalities were performed and all of them were followed with clinical examinations regularly. MRI scans were performed within 3-12 months period and spontaneous regression of sequestered discs was identified in 5 patients. The complaints of the patients were monitored by using the visual analog scale (VAS). All patients relieved radiculopathy symptoms in 2 to 4 weeks and low back pain symptoms in 3 to 8 weeks except one patient. In one patient hypoesthesia symptom, in one patient motor deficit, and in one patient low back pain remained after the regression of the disc herniations. The features of the patients were put together in Table 1. The first case was a 36-year-old male patient who presented with the chief complaints of low back

pain and right-sided radicular pain. His neurological examination revealed right-sided S1 hypoesthesia and straight leg raising test (SLRT) was positive for the right leg. Lumbar spine MRI was performed and right-sided L5-S1 sequestered disc herniation was determined [Figure 1a]. After a thorough discussion with the patient, conservative treatment was performed. In 2 weeks, his radicular pain complaint improved but a mild low back pain remained. Radiologically, spontaneous regression was detected in 9 months after the initial symptoms occurred [Figure 1b]. The second patient was a 56-year-old male patient and he was presented to our clinic with severe back pain, bilateral radicular pain, and gait disturbance. In his neurological examination, he had paraparesis (left extensor hallucis longus 1/5, right extensor

hallucis longus 3/5) and bilateral diminished Achilles reflex. He had also complaints of urinary incontinence, constipation, and erectile dysfunction. Lumbar spine MRI revealed an L4–5 sequestered disc herniation and it was compressing the spinal canal and bilateral L5 roots [Figure 2a]. Because of the religion-related issues, the patient rejected the operation and conservative treatment was performed. His radicular pain and low back pain complaints improved in 4 weeks and 8 weeks respectively. However, the motor deficit in his left leg, urinary incontinence, and constipation complaints remained. In 6 months, spontaneous regression of the disc herniation was detected in the lumbar spine MRI [Figure 2b].

The third patient was a 46-year-old male patient and he was referred to our department with the chief complaint of severe back pain. In his neurological examination, there was no pathology except a mild left-sided L1–2 hypoesthesia. Lumbar spine MRI revealed an L1–2 extruded disc herniation [Figure 3a]. The patient was managed conservatively and his complaints were resolved completely in 3 weeks. After 9 months, his follow-up MRI showed spontaneous regression [Figure 3b].

The fourth and fifth patients were 31 and 41-year-old male patients, respectively and they had similar complaints including low back pain and right-sided radicular pain. Their neurological examination revealed right-sided S1 hypoesthesia and positive SLRT for the right leg. Their lumbar spine MRI scans showed right-sided L5-S1 sequestrations [Figure 4a and 5a]. They rejected the operations and they were both managed conservatively. The fourth patient's radicular pain was relieved in 2 weeks and his back pain was relieved in 4 weeks. The fifth patient's radicular pain and low back pain complaints resolved in 2 weeks and 5 weeks respectively. Both of them had no remaining symptoms and spontaneous regression of disc herniations was determined in 3 months in the fourth patient and in 12 months in the fifth patient radiologically [Figure 4b and 5b].

DISCUSSION

Since, Guinto *et al.*^[7] presented the first case of spontaneous regression of LDH in 1984, an increasing number of studies have described this condition not only in the lumbar region but also in the cervical and thoracic spine.^[8-12] Nevertheless, the exact mechanisms of regression still remain unclear. There are three hypotheses proposed in the literature; dehydration of herniated disc, retraction of herniated disc, and inflammation-related resorption theories. The first theory

includes the gradual dehydration and shrinkage of the herniated nucleus pulposus.^[13-16] The second theory proposes that the herniated disc may retract back into the intervertebral disc space, but this theoretically only occurs if the herniated disc has protruded through the annulus fibrosis without separating from it.^[8,17] The third theory states that the herniated nucleus pulposus, 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.^[18-24] In our opinion, the third theory may play a key role in the process of spontaneous regression and the type of the fragment is also an important issue for spontaneous regression, pure soft nuclear pieces are more suitable disc herniations for regression.

There are also some predictive factors including the size, integrity, and radiological characteristics of the herniated discs mentioned in the literature. Ahn *et al.*^[25] correlated the greater regression of the herniated fragments with the larger initial disc herniations. They classified the patients into three groups: subligamentous, transligamentous, and sequestered herniations and regression ratios were higher in the transligamentous and sequestered herniations as 79% and 100% respectively. Furthermore, important conclusion was the decrease in the herniation ratio of more than 20% correlated with clinical improvement.

In the study consisting of 77 patients, Komori *et al.*^[24] defined a classification of three groups. The radiological features of types 1, 2 and 3 were an intact disc margin, discontinuous disc margin, and extrusion beyond the height of the disc, respectively. The study concluded that morphological changes on MRI mainly corresponded to clinical outcomes but tended to lag behind in the improvement of leg pain. The disappearance of herniated nucleus pulposus was seen frequently in the cases of type 3 herniations, and it was presumed that exposure to the vascular supply was related to this phenomenon. Autio *et al.*^[26,27] also reported an article about the determinants of the spontaneous regression and it was determined that rim enhancement thickness of the herniated discs, a higher degree of herniation displacement in the Komori classification, and age interval between 41-50 years were associated with the higher resorption rates. The thickness of rim enhancement was a stronger determinant of spontaneous resorption than the extent of rim enhancement.

In the studies reported by Sakai *et al.*^[28] and Yamashita *et al.*^[29] rim enhancement on MRI scans was related to the accumulation of contrast material within

the granulation tissue surrounding the avascular sequestered disc. Another study reported by Komori *et al.*^[30] concluded that contrast-enhanced MRI was a useful prognostic parameter in the management of the lumbar disc herniations. It was shown that the enhanced area thickened and intruded into the migrated disc materials as the size of the herniated nucleus pulposus decreased.

There are certain limitations in the present study. The main limitation is the retrospective nature of the study. The other major limitation of this study is the minority of the patient groups (in a total of 862 patients and 5 patients with spontaneous regression).

In conclusion, sequestered disc herniations represent the main candidates for spontaneous regression according to our clinical research and the pertinent literature. Dehydration and inflammation-related resorption are the main mechanisms for this event. In light of all this information, conservative treatment modalities should be the first choice for the treatment of such patients in the absence of definitive surgical indications.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Andersson GB. Epidemiology of low back pain. *Acta Orthop Scand Suppl* 1998;281:28-31.
- Weber H. Lumbar disc herniation. A controlled prospective study with ten years of observation. *Spine* 1983;8:131-40.
- Mixter WJ, Barr JS. Rupture of the intervertebral disc with the involvement of the spinal canal. *N Engl J Med* 1934;211:210-4.
- Kim ES, Oladunjoye AO, Li JA, Kim KD. Spontaneous regression of herniated lumbar discs. *J Clin Neurosci* 2014;21:909-13.
- Macki M, Hernandez-Hermann M, Bydon M, Gokaslan A, McGovern K, Bydon A. Spontaneous regression of sequestered lumbar disc herniations: Literature review. *Clin Neurol Neurosurg* 2014;120:136-41.
- Yang X, Zhang Q, Hao X, Guo X, Wang L. Spontaneous regression of herniated lumbar discs: Report of one illustrative case and review of the literature. *Clin Neurol Neurosurg* 2016;143:86-9.
- Guinto FC Jr, Hashim H, Stumer M. CT demonstration of disk regression after conservative therapy. *AJNR Am J Neuroradiol* 1984;5:632-3.
- Chang CW, Lai PH, Yip CM, Hsu SS. Spontaneous regression of lumbar herniated disc. *J Chin Med Assoc* 2009;72:650-3.
- Orief T, Orz Y, Attia W, Almusrea K. Spontaneous resorption of sequestered intervertebral disc herniation. *World Neurosurg* 2012;77:146-52.
- Song JH, Park HK, Shin KM. Spontaneous regression of a herniated cervical disc in a patient with myelopathy. Case report. *J Neurosurg* 1999;90:138-40.
- Vinas FC, Wilner H, Rengachary S. The spontaneous resorption of herniated cervical discs. *J Clin Neurosci* 2001;8:542-6.
- Westmark RM, Westmark KD, Sonntag VK. Disappearing cervical disc. Case report. *J Neurosurg* 1997;86:289-90.
- Bozzao A, Gallucci M, Masciocchi C, Aprile I, Barile A, Passariello R. Lumbar disc herniation: MR imaging assessment of natural history in patients treated without surgery. *Radiology* 1992;185:135-41.
- Hirabayashi S, Kumano K, Tsuiki T, Eguchi M, Ikeda S. A dorsally displaced free fragment of lumbar disc herniation and its interesting histologic findings. A case report. *Spine* 1990;15:1231-3.
- Kim SG, Yang JC, Kim TW, Park KH. Spontaneous regression of extruded lumbar disc herniation: Three cases report. *Korean J Spine* 2013;10:78-81.
- Slavin KV, Raja A, Thornton J, Wagner FC Jr. Spontaneous regression of a large lumbar disc herniation: Report of an illustrative case. *Surg Neurol* 2001;56:333-6.
- Teplick JG, Haskin ME. Spontaneous regression of herniated nucleus pulposus. *AJR Am J Roentgenol* 1985;145:371-5.
- Citisli V, Ibrahimoglu M. Spontaneous remission of a big subligamentous extruded disc herniation: Case report and review of the literature. *Korean J Spine* 2015;12:19-21.
- Doita M, Kanatani T, Ozaki T, Matsui N, Kurosaka M, Yoshiya S. Influence of macrophage infiltration of herniated disc tissue on the production of matrix metalloproteinases leading to disc resorption. *Spine* 2001;26:1522-7.
- Haro H, Shinomiya K, Murakami S, Spengler DM. Up-regulated expression of matrix metalloproteinases in human herniated discs. *J Spinal Disord* 1999;12:245-9.
- Henmi T, Sairyo K, Nakano S. Natural history of extruded lumbar intervertebral disc herniation. *J Med Invest* 2002;49:40-3.
- Ikeda T, Nakamura T, Kikuchi T, Umeda S, Senda H, Takagi K. Pathomechanism of spontaneous regression of the herniated lumbar disc: Histologic and immunohistochemical study. *J Spinal Disord* 1996;9:136-40.
- Ito T, Yamada M, Ikura F, Fukuda T, Hoshi SI, Kawaji Y, *et al.* Histologic evidence of absorption of sequestration-type herniated disc. *Spine* 1996;21:230.
- Komori H, Shinomiya K, Nakai O, Yamaura I, Takeda S, Furuya K. The natural history of herniated nucleus pulposus with radiculopathy. *Spine (Phila Pa 1976)* 1996;21:225-9.
- Ahn SH, Ahn MW, Byun WM. Effect of the transligamentous extension of lumbar disc herniations on their regression and the clinical outcome of sciatica. *Spine* 2000;25:475-80.
- Autio RA, Karppinen J, Kurunlahti M, Kyllonen E, Vanharanta H, Tervonen O. Gadolinium diethylenetriaminepentaacetic acid enhancement in magnetic resonance imaging in relation to symptoms and signs among sciatic patients: A cross-sectional study. *Spine* 2002;27:1433-7.
- Autio RA, Karppinen J, Niinimäki J. Determinants of spontaneous resorption of intervertebral disc herniations. *Spine* 2006;31:1247-52.
- Sakai T, Tsuji T, Asazuma T, Yato Y, Matsubara O, Nemoto K. Spontaneous resorption in recurrent intradural lumbar disc herniation: Case report. *J Neurosurg Spine* 2007;6:574-8.
- Yamashita K, Hiroshima K, Kurata A. Gadolinium-DTPA-enhanced magnetic resonance imaging of a sequestered lumbar intervertebral disc and its correlation with pathologic findings. *Spine* 1994;19:479-82.
- Komori H, Okawa A, Haro H, Muneta T, Yamamoto H, Shinomiya K. Contrast-enhanced magnetic resonance imaging in conservative management of lumbar disc herniation. *Spine* 1998;23:67-73.