

Clinical Improvement After Spontaneous Partial or Complete Absorption Of Herniated Lumbar Disc.

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Abstract

Background Data: Intervertebral disc herniation is a common disease that usually occurs in middle aged active persons. It presents by back pain and involved nerve root radiculopathy. Some neurologic symptoms in the majority of patients improve after a period of conservative therapy due to regression in the size of the herniated disc. The exact mechanism of disc regression is not yet clear, however clinical improvement and MRI follow up can document this condition.

Study Design: Retrospective clinical case review.

Purpose: To assess the clinical improvement of patients with herniated lumbar disc if it occurred by the conservative treatment due to partial or complete spontaneous disc absorption without conveying surgery.

Patients and Methods: Here we present fifty cases with single symptomatic disc herniation followed for one year showing the extent of clinical improvement by the conservative treatment, MRI changes and the fate of these fifty patients during and after a one year period of follow up. Male to female ratio was 3:2. The mean age was 38.6 years.

Results: History of trauma preceding the disc herniation was given only in 5 (10%) patients. Left sciatica was reported in 34 (68%) and right in 16 (32%) patients. Motor weakness was found only in 5 (10%) patients. L4-5 was the commonest disc to be involved and was found to be herniated in 26 (52%) patients. 44 (88%) patients showed improvement without surgical intervention, while 6 (12%) patients only were operated upon.

Conclusion: Herniated intervertebral discs have the potentials for spontaneous regression. Conservative treatment can be tried for all cases even those with mild neurologic deficits at least for 2 months. Surgical treatment should be applied only for patients with severe neurologic deficits or for those with persistent intractable sciatica. (2012ESJ031)

Keywords: lumbar, herniated disc, spontaneous regression

Introduction

Although the first reported surgery for lumbar disc herniation was done more than 60 years ago, the optimal treatment option for each specific case remains doubtful.⁹ Treatment modalities for herniated lumbar disc are many and ranged widely from the aggressive extensive laminectomy and discectomy to the well-known minimally invasive intradiscal procedures. Nevertheless, the fact that neurological symptoms caused by an intervertebral disc herniation may frequently improve without surgical treatment is well known.^{7,11} Guinto et al⁸ in 1984 reported the first case of spontaneous regression of herniated intervertebral disc, after that this phenomenon was described in further studies not only in the lumbar region but also in the cervical and thoracic spine with associated radiculopathy and myelopathy.^{2,4} Considering the literature, we adopt the conservative treatment for all cases with herniated lumbar disc whatever the size was, except cases with cauda equina affection or motor deficit less than grade 4. We followed the cases both clinically regarding the improvement in the clinical manifestation and if they needed surgery or not and radiologically to follow the changes in the herniated disc size.

Patients and Methods

Fifty consecutive cases with single symptomatic herniated lumbar disc were followed for a period of 1 year. At the first visit, complete relevant history taking, neurologic examination and radiologic evaluation to get a basic data were done. The neurologic examination entailed back and leg examination. Plain X-ray was done for all cases. Patients coming with only CT for the lumbar spine were asked to do MRI. The severity of the sciatic pain was assessed at the first visit and during the follow up using the visual analogue scale. The size of the herniated disc was measured in the MRI pictures at the first visit and during the follow up. Patients were classified according to the change in the herniated disc size during the follow up to no absorption (<20% size reduction), partial absorption (20-80% size reduction) or complete absorption (>80% size reduction) of the disc.

Patients with manifestations of cauda equina syndrome, spondylolesthesis, spondylolysis, multiple significant herniated discs and those who

selected surgery as a first line treatment were excluded. After establishing the diagnosis, both the pathologic and clinical aspects of the disease were explained to the patient. Medical treatment in the form of a tapering course of steroids, anti-inflammatory treatment, skeletal muscle relaxant, back hot fomentation for patients with manifest back pain and activity modulation program were given to all patients. Physiotherapy was only advised for patients with motor weakness or for those continued to experience the same pain after 2 weeks. It was not asked routinely from the start of the complaint to avoid the patient the undue extra effort during the acute stage of the disease.

Patients were followed for one year, first, each 2 weeks for the first 2 months, and then monthly. During the follow up, interrogation about the leg pain using the visual analogue scale and neurologic examination were done. The decision of surgery was left for the patient so long as there was no neurologic deterioration. The first follow up MRI was asked after 3 month from the start of the disease condition in patients showing improvement and then every 3 months till the end of the follow up period. For patients who decided to shift to surgery, a new MRI was asked if the surgical decision was taken after the lapse of more than 2 months from the start of the disease process.

Results

Fifty patients were the subject of this study, 31 of them were males. The patients' age ranged between 22 and 65 years (mean 38.6 yrs). The history of accompanying trauma was given only in 5 patients. Only 18 patients experienced the natural history of lumbar disc herniation that was at the first back pain for few days that then improved in the concomitant with the appearance of the leg pain. In 11 patients there was acute onset of leg pain not related to any trauma while in 21 patients the sciatica complicated a rather chronic recurring back pain. Thirty four (68%) patients complained of left sciatica while 16 complained of right sciatica. In three patients there was sciatica contralateral to the side of the herniated disc.

Mechanical back signs in the form of paravertebral muscle spasm and obliterated lumbar lordosis were present in 47(94%) patients, while evident scoliosis was present only in five. Forty five patients were

intact regarding the motor examination during the first time examination, 3 patients showed grade 4 weakness of the left dorsiflexors, while 2 patients had grade 2 weakness of the dorsiflexors (one right and one left) and both refused surgery. Forty one patients (82%) had sensory affection in the distribution of the affected nerve root. Straight leg raising test was positive at less than 30 degrees in 28 patients, while the rest had a positive test but at a higher degree.

MRI examination showed herniated L4-5 disc in 26 and L5-S1 in 22 while L3-4 disc herniation only in 2 patients. Sequestered disc fragment was identified in 31 patients while annular disc bulge was seen in 19 patients. The clinical data are represented in (table 1).

Table 1. Clinical data of the fifty patients

Sex	Male	31
	Female	19
Trauma	Yes	5
	No	45
Affected Leg	Right	16
	Left	34
Motor Weakness	Yes	5
	No	45
Herniated Disc Level	L3/4	2
	L4/5	26
	L5/S1	22

Regarding the sciatic pain, Seventeen patients (34%) showed improvement in their sciatic pain at the first follow up visit after 2 weeks (0-2 grade by the visual analogue scale). This number increased to 24 (48%) after one month and then to 35 (70%) after 2 month. These 35 patients lead a normal life free of leg pain after the first 2 month and all through the period of follow up.

Figure (1) represents the number of patients (N=38) showing improvement (VAS grade 0-2) of the sciatica through the period of follow up.

The MRI pictures of these 35 patients after 3 month showed complete spontaneous resorption of the herniated disc in 15 cases (30%). By the end of six months this number was increased to 27(54%). Of the other 8 patients, 3 patients (6%) showed partial reduction in the herniated disc size while 5 (10%) continued to have the same disc size in the

MRI in spite of having no sciatic pain whatsoever. In the 30 patients that showed either complete (54%) or partial (6%) absorption of the herniated disc, 23 patients (46%) had sequestered fragment while 7(14%) patients had annular disc bulge. Table (2) represents the changes in the size of the herniated disc during the period of follow up. Figure 2 and 3 demonstrate radiological disc absorption in this study.

Figure 1. Showing clinical improvement of sciatica in this study.

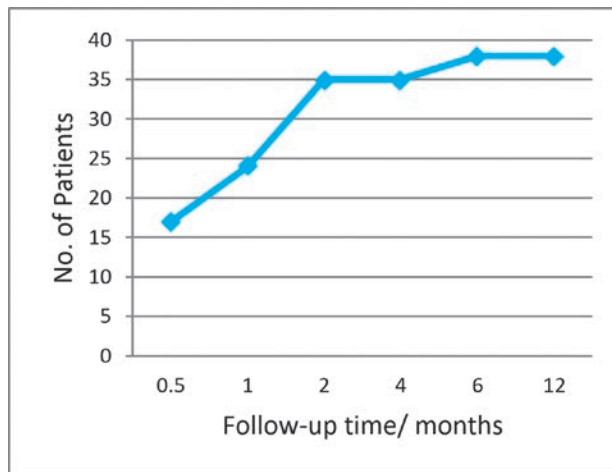


Table 2. Fate of the herniated disc during the follow up

Disc absorption	No of patients
Complete >80%	27(54%)
Partial 20-80%	5(10%)
No change<20%	18(36%)

Fifteen patients (30%) continued to have the same sciatic pain by the end of 2 month, 5 patients decided to go to surgery. MRI examination of these patients showed non absorbed disc, 2 of them were sequestered fragment. The remaining 10 patients refused surgery and decided to continue medical treatment. During the follow up period, 3 patients became pain free (grade 0-2 on visual analogue scale) by the end of the fifth and six month respectively (Figure 1). Their MRI follow-up showed partial reduction in the size of their herniated disc. By the end of the 5th month 1 patients decided surgery, his follow up MRI showed persistent non absorbed disc. The remaining 6 patients showed improved pain by the end of the 6th month that did not interfere

with their daily activity and infrequently required analgesics (grade 3-5 on visual analogue scale). Their MRI showed non absorbed herniated disc.

Regarding the motor weakness, no motor power deterioration occurred in this series during this study. Four out of the 5 patients with the motor weakness showed improvement in the first follow-up visit after 2 weeks. Even the 2 patients with grade 2 weakness returned to normal muscle power by the end of 2 month. One patient with grade 4 weakness did not improve regarding the motor weakness during the whole period of follow-up despite the

complete disappearance of his sciatic pain and complete absorption of the disc fragment in his MRI pictures during the follow-up.

Regarding the mechanical back signs all patients showed improvement by the end of the first month. Of the 5 patients with scoliosis, 3 improved totally while 2 persisted to have evident scoliosis without back or sciatic pains all through the period of follow up. Over all out of 50 patients enrolled in this study, conservative therapy was successful in 44 (88%) patients, where 6 patients went to surgery.

Figure 2. A: sagittal and B axial MRI showing huge RT L5-S1 disc herniation with caudal migration, C: sagittal and D: axial MRI of the same patient after 3 month showing complete (>80%) absorption of the herniated disc.

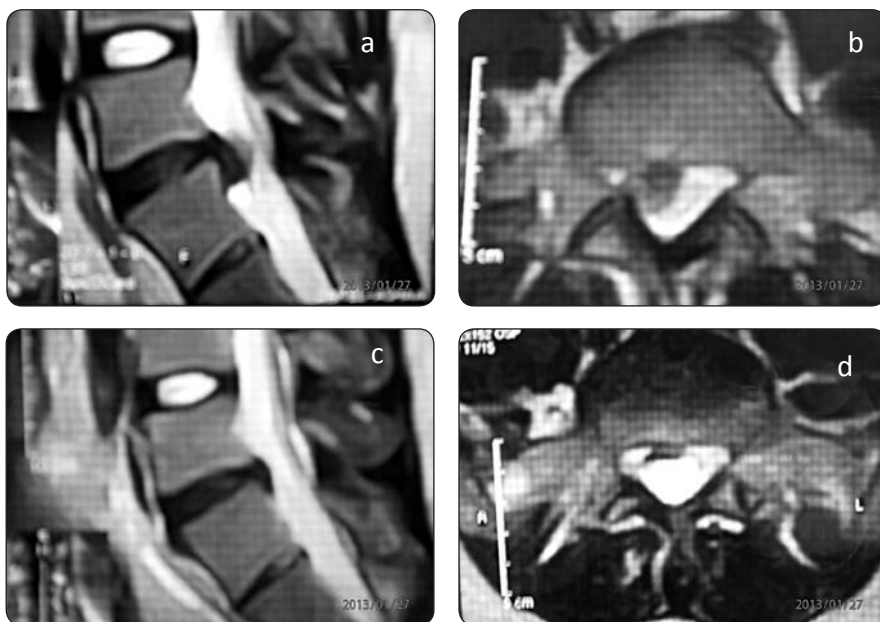
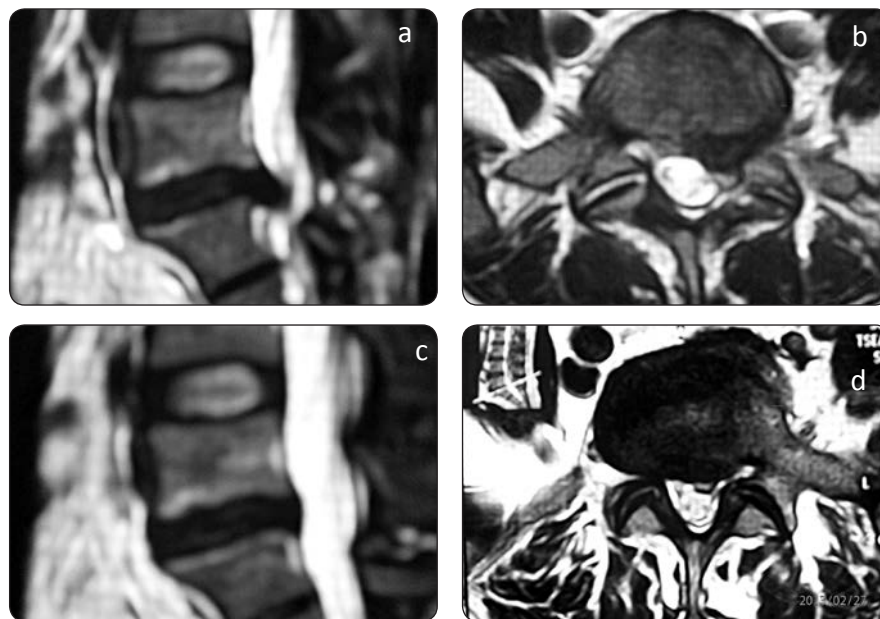


Figure 3. A: sagittal and B: axial MRI showing herniated Lt L5-S1 disc, C: Sagittal and D: axial MRI of the same patient showing complete (>80%) disc absorption.



Discussion

Regression of herniated discs has been described at different levels and with various clinical presentations including cervical radiculopathy and myelopathy^{19,16}, thoracic myelopathy,⁹ and lumbar radiculopathy.^{7,11,12} Several reports in the literature documented the spontaneous gradual regression or disappearance of herniated intervertebral discs without surgical intervention.^{5,7,11,12} Fager⁷ in 1994 documented by myelography the reduction in the size of the extradural defect after improvement in the patient clinical conditions ascribing this reduction to the spontaneous regression of a herniated lumbar disc. CT scanning allows direct demonstration of the spontaneous regression of a herniated nucleus pulposus.^{4,11} The introduction of MRI has provided more detailed information about disc herniation and their natural history.^{7,10,11} Several studies with lumbar MRI have postulated that the largest disc herniations are most likely to show the greatest regression in size over times.^{3,13} Rim enhancement on MR images has been reported to be related to the accumulation of the contrast material within the vascularized granulation tissue surrounding the avascular sequestered disc fragment.^{15,20} It was postulated that the herniated intervertebral disc acts as a foreign body in the epidural space. Several immunohistologic studies have demonstrated that the immune system attempts to remove the invading disc tissue.^{6,10}

The exact mechanism of spontaneous disc regression remains unknown; however the literature presents three possible mechanisms. The first mechanism is the regression due to gradual disc dehydration and shrinkage. The second one takes in consideration the enzymatic degradation and phagocytosis due to the inflammatory reaction and neovascularization generated as a response to disc herniation. The third and the least accepted one is the retraction of the herniated fragment back to the corresponding disc.⁴

Our study entailed the examination, diagnosis, surgery (when asked) and the follow-up of 50 cases of herniated lumbar discs. The protocol for the intended conservative therapy was presented. Among these patients the 2 with dorsiflexors grade 2 muscle weakness eventually had to do surgery. The disease condition was fully explained to them

before starting the medical and physical therapy. Both cases showed improvement of the sciatica (0-2 grade by the visual analogue scale) and the motor weakness to the degree of regaining the normal motor power by the end of the second month. Reports describing the improved neurologic affection by the conservative measures and physiotherapy have been mentioned in the literature even with discogenic myelopathy.^{2,5,16,19} Surgery can be carried out as an emergency when bladder symptoms or progressive motor weakness are present. In the absence of these symptoms, 75-90 % of patients with acute sciatica due to a protruded lumbar disc experience a resolution of symptoms without surgery.¹¹ During our period of follow-up, 44 (88%) patients were able to avoid surgery for lumbar disc herniation. Seventy percent of these patients were totally free of sciatica by the end of the second month and 76% by the end of the six month (figure 1).

MRI follow-up of the patients at regular intervals documented complete absorption of the herniated disc in 54%, partial absorption in only 10 %, and there was no change in the herniated disc size through the whole follow up period in 36 % of patients. These 36% included 6 patients who went eventually to have surgery. Complete disc absorption occurred in 34% in the first three months and in 54 % by the end of the six month.

Autio et al² reported diminished herniated disc size in 42% of the followed patients 2 month after the occurrence of the disease. In other studies¹¹ the occurrence of spontaneous regression of herniated lumbar discs was around 35-63 % during a period of 6 months to 1 year. It is apparent that tendency for complete herniated disc absorption occurred early and as the time passed tendency for resorption diminishes.

Clinical improvement frequently correlates with radiologic disc regression, and MR imaging is the best tool for following the situation, however the direct relationship between clinical and radiographic improvement has not been reported.¹¹ This can explain the complete disappearance of the sciatic pain in some cases with partial or even no disc absorption and the partial improvement in the others. On the contrary, the persistence of the motor weakness despite the complete resorption of the herniated disc has been reported.

In our study of 50 patients, only 6 patients (12%) preferred the surgical solution to their problem and pain was the main leading cause for their decision, as those with even marked motor weakness preferred trying the conservative option. It was evident also that tendency for surgery is usually preferred in the early course of the disease while the pain is more severe and may be intolerable. As the acute condition subsides and the severity of pain diminishes the surgical decision may be remote. However, Weber¹⁷ estimated that after 1 year of the disease's onset, about 25% of patients still need surgery due to the neurologic deficit and the prolonged uncontrolled pain. Atlas et al¹ in their Larger lumbar spine study showed that 15 % of patients who initially received conservative treatment would undergo surgery within 3 months.

Conclusion

Herniated intervertebral discs have the potentials for spontaneous regression. Clinical improvement is the main indicator for disease subsidence, and follow up imaging tools may provide evidence of morphologic regression of the herniated disc. Conservative treatment can be tried for all cases even those with mild neurologic deficits at least for 2 months. Surgical treatment should be applied only for patients with severe neurologic deficits or for those with persistent intractable sciatica.

References

- 1) Atlas SJ, Killer RB, Chang, Deyo RA, Singer DE: Surgical and non-surgical management of sciatica secondary to a lumbar disc herniation: five year outcome from the Maine lumbar spine study. *Spine* 26:1179-1187, 2001
- 2) Autio RA, Karppinen J, Niinmaki J: Determinants of spontaneous resorption of intervertebral disc herniation. *Spine* 31:1247-1252, 2006
- 3) Bazzo A, Callucci M, Masciocchi C, Aprile I, Barille A, Passriello R: lumbar disc herniation: MRI imaging assessment of natural history in patients treated without surgery. *Radiology* 185(1):135-141, 1992
- 4) Chun WH, Ping HL, Chi MY, Shu SH: Spontaneous regression of lumbar herniated disc: case report. *Chin Med Assoc* 72(12):650-653, 2009
- 5) Coevoet V, Benoudiba F, Lignieres C, said G, Doyon D: spontaneous and complete regression in MRI of thoracic disc herniation. *J Radiol* 78:149-151, 1997
- 6) Doita M, Kanatani T, Mizuno K: Immunohistologic study of the ruptured intervertebral disc of the lumbar spine. *Spine* 21(2):235-241, 1996
- 7) Fager CA: Observation on spontaneous recovery from intervertebral disc herniation. *Surg Neurol* 42:282-286, 1994
- 8) Guinto FG, Hashim H, Stumer M: CT demonstration of disk regression after conservative therapy. *AJNR* 5:632-633, 1984
- 9) Hakan S, Selcuk O, Erdner T: Spontaneous regression of extruded lumbar disc herniation: report of two illustrative cases and review of the literature. *Turkish Neurosurgery* 18(4):392-369, 2008
- 10) Hirabayashi S, Kumano K, Tusuiki T, Egushi M, Ikeda S: A dorsally displaced free fragment of lumbar disc herniation and its interesting histologic finding. A case report. *Spine* 15(11):1231-1233, 1990
- 11) Komori H, Shinomya K, Nakai O, Yamaura I, Takeda S, Furuya K: The natural history of herniated nucleus pulposus with radiculopathy. *Spine* 21:225-229, 1996
- 12) Konstantin V, Ali R, John T, Franklin C, Wagner JR: Spontaneous regression of a large lumbar disc herniation: Report of an illustrative case. *Surg Neurol* 56:333-337, 2001
- 13) Maigne JY, Rime B, Deligne B: computed tomographic follow up study of forty eight case of non-operatively treated intervertebral disc herniation. *Spine* 17(9):1071-1074, 1992
- 14) Miller S, Casden AM: Spontaneous regression of a herniated disc. A case report with a four year follow up. *Bul Hosp Joint Dis* 37:99-101, 1998
- 15) Saki T, Tsuji T, Asazuma T, Yato Y, Matsubara O, Nemoto K: Spontaneous resorption in recurrent intradural lumbar disc herniation. Case report. *J Neurosurg Spine* 6:574-578, 2007
- 16) Song JH, Park HK, Shin KM: Spontaneous regression of a herniated cervical disc in a patient with myelopathy. Case report. *J Neurosurgery (spine)* 90:138-140, 1999

- 17) Teplik JG, Haskin ME: Spontaneous regression of herniated nucleus pulposus. AJR 145:371-375, 1985
- 18) Weber H: Lumbar disc herniation. A controlled prospective study with ten years of observation. Spine 8:131-140, 1983
- 19) Westmark RM, Westmark AD, Sonntog VKH: Disappearing cervical disc. case report. J Neurosurg 86:289-290, 1997
- 20) Yamashita K, Hiroshima K, Kurata A: Gadolinium enhanced magnetic resonance imaging of a sequestered lumbar intervertebral disc and its correlation with pathologic finding. Spine 15(4):479-482, 1994

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التحسن الإكلينيكي للقرص القطني المنفتق المصاحب بأعراض بعد الامتصاص العفوي له جزئياً أو كلياً مقدمة: يعتبر انزلاق الغضروف القطني من الأمراض الشائعة خاصة في سن الوسط ومن أعراض الغضروف آلام الظهر والساق أو ضعف بالعضلات. يعد العلاج التحفظي هو العلاج الرئيسي لمعظم حالات الانزلاق الغضروفي حيث يحدث تحسن في الأعراض نتيجة ضمور بحجم الغضروف غير معروف سببه ولكنه مثبت بأشعة الرنين المغناطيسي. الهدف من البحث: هو تقييم التحسن الإكلينيكي للمرضى المصابون بالغضروف القطني مع العلاج التحفظي نتيجة ضمور جزئي أو كلي للغضروف القطني بدون تدخل جراحي.

مواد و طرق البحث: تمت الدراسة على خمسون مريضاً يعانون من انزلاق الغضروف القطني وحيد حيث تمت متابعتهم بالعلاج التحفظي وإظهار مدى التحسن الإكلينيكي والتغيير في أشعة الرنين المغناطيسي لمدة عام كامل. نسبة إصابة الرجال والنساء ٢:٣ ومتوسط أعمارهم ٣٨.٦ سنة.

النتائج: ١٠٪ من المرضى تعرضوا إلى إصابة للظهر. ألم الساق اليسرى كان موجوداً بنسبة ٧٨٪ و ضعف العضلات كان موجوداً بنسبة ١٠٪. غضروف ما بين الفقرات ٤-٥ القطنية هو أكثر الغضاريف انزلاقاً بنسبة ٥٢٪ من المرضى. و وجد أن ٨٨٪ من المرضى تحسّنوا بدون تدخل جراحي بينما ١٢٪ احتاجوا تدخل جراحي.

الخلاصة: العلاج التحفظي للغضروف يؤدي إلى ضمور بالغضروف في حالات الإصابات العصبية البسيطة مع يحسن الحالة في خلال شهرين بينما التدخل الجراحي مطلوب في حالات الإصابات العصبية الشديدة مع آلام غير محتملة.