



OLGU SUNUMU / CASE REPORT

Lumbar intervertebral disc herniation in childhood: a report of 7 cases

Çocukluk çağında lomber intervertebral disk herniasyonu: 7 olgunun sunumu

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Abstract

Lumbar disc herniation is a rare pathology in adolescent age and these patients only constitute 1-5% of all patients who underwent surgery for disc herniation. Trauma and family history are reported as important initiating factors for disc herniations but degenerative changes are less important than adults. The objective of this study was to treat the lumbar intervertebral disc herniation in childhood. Between 2005 and 2016, we performed interlaminar microdiscectomy to 7 patients younger than 15 years of age for lumbar disc herniation. These patients were evaluated for clinical features, radiological features, operative findings and outcome of surgery. All patients were complaining of low back pain, six of them had radicular pain. Although most of our patients have significant trauma histories there are no evidences of severe trauma on imaging studies. We had excellent results in all patients for the improvement of low back pain and leg pain but neurological deficits were more resistant to improvement. We had excellent results with limited laminectomy and microdiscectomy without fusion. In all cases pains improved postoperatively and they got back to their normal lifestyle in one month

Key words: Lumbar intervertebral, disc herniation, childhood, low back pain, microdiscectomy

Öz

Lomber disk hernisi adolesan yaşta görülen nadir bir patolojidir ve bu hastalar disk hernisi için ameliyat edilen tüm hastaların sadece % 1-5'ini oluşturur. Travma ve aile öyküsü disk hernileri için önemli faktörlerdir. Fakat dejeneratif değişiklikler yetişkinlerden daha az önemlidir. Bu çalışmanın amacı çocukluk çağında lomber intervertebral disk herniasyonunu tedavi etmektir. 2005-2016 yılları arasında lomber disk hernisi için 15 yaşından küçük 7 hastaya interlaminar mikrodiskektomi uyguladık. Bu hastalar klinik özellikler, radyolojik özellikler, ameliyat bulguları ve ameliyatın sonucu açısından değerlendirildi. Tüm hastalarda bel ağrısı şikayetleri vardı. Hastaların altısında radiküler ağrı şikayeti mevcuttu. Hastalarımızın çoğunda belirgin travma öyküsü olsa da, görüntüleme çalışmalarında ciddi travma olduğuna dair herhangi bir kanıt bulunmamaktadır. Tüm hastalarda bel ağrısı ve bacak ağrısı şikayetlerinin düzelmesi açısından mükemmel sonuçlar aldık, ancak nörolojik defisit düzelmesi daha dirençli idi. Sınırlı laminektomi ve mikrodiskektomi ile füzyonsuz mükemmel sonuçlarımız vardı. Tüm olguların şikayetleri ameliyat sonrası düzeldi ve bir ay içinde normal yaşam tarzlarına döndüler.

Anahtar kelimeler: Lomber intervertebral, disk herniasyonu, çocukluk çağı, bel ağrısı

INTRODUCTION

Lumbar disc herniation is a common vertebral column disease in adults whereas this disease is rare in childhood and adolescent age. Since it was first described by Wahren as a case report¹ in 1945 there

was only few patients described in the literature. In only 13% of these cases magnetic resonance imaging studies showed degenerative changes, end plaque defects and asymmetric joint facets as to be adults. It was affected at single level in 88% and at two or three levels in 12% of these patients. While disc

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were remained subligamentous in 80%, extruded in 4%, intact annulus in 16%, it was a rarely announced calcification of disc²⁻⁵. In 30-60% of patients, it was reported existence of a significant trauma in historical examination, in addition familial predisposition and congenital anomalies were determined as important factors in young patients^{3,4,6-9}.

The most common complaint of these patients was low back pain. Radiculopathy, neurological compromise due to lumbar disc herniation compressing, sensory loss, cauda equina syndrome, sphincteric disturbances and scoliosis were major findings in physical examination^{2,3,5}. In previously series, macroscopic examination of herniated discs represent different to those observed in adults.

Discs were soft, rubbery and hydrated in 92% while hard or partially calcified in 8%^{3,10}. The objective of this study was to show method of the lumbar disc herniation treatment with limited laminectomy and microdiscectomy without fusion in childhood.

CASES

Between 2005 and 2016, seven patients younger than 15 years of age were surgically treated for lumbar disc herniation in our clinic (Table 1). All patients presented low back pain due to lumbar disc herniation. Other causes of low back pain (spondylolisthesis, congenital malformations, infections of spine, inflammation and neoplastic pathologies) were excluded.

Table 1. Age, gender, clinical features, radiological involved levels and treatment results of patients.

Patient	Age/ Gender	Symptoms	Neurological Examination	Involved Levels	Treatment	Result
1.	14/ f	Low back pain which radiates to left foot	Reduced plantar-flexion , dorsi-flexion (3/5) with absence of Achilles reflex of the left foot and mild atrophy of left calf muscles, sensorial loss	L5-S1	Single level limited interlaminalmicro discectomy	Cured and discharged after 3 days
2.	12/ m	Low back pain radiates to right foot	Reduced dorsi-flexion(4/5) of the right foot	L4-5	Single level limited interlaminalmicro discectomy	Cured and discharged next day
3.	11/ m	Diffuse low back pain	Reduced plantar-flexion(3/5) of the right foot, sensorial loss	L5-S1	Single level limited interlaminalmicro discectomy	Cured and discharged after 2 days
4.	10/ m	Low back pain radiates to right foot, neurogenic claudication	Sensorial loss on lateral aspects of left foot	L3-4 L4-5 L5-S1	Single level limited interlaminalmicro discectomy (L4-5)	Cured (except mild sensorial loss) and discharged after 2 days
5.	12/ f	Low back pain radiates to right foot, urinary incontinence	Foot drop on the right side, mild (4/5)dorsi-and plantar-flexion paresis of left foot, bilaterally absence of Achilles and Patella reflexes, urinary incontinence	L2-3	Single level limited interlaminalmicro discectomy	Motor weakness was partially cured. Found better results after 4 weeks on follow-up physical examinations Urinary incontinence resisted
6.	15/ f	Low back pain which radiates to left foot, neurogenic claudication	Severe dorsi-and plantar-flexion paresis (2/5) of left foot, absence of Achilles reflex,scoliosis, sensorial loss	L4-5 L5-S1	Two level hemi-laminectomy and discectomy	Cured and discharged after 2 days
7.	14/m	Low back pain which radiates to left foot	Bilateral straight leg raise test (+), Sensorial loss on lateral aspects of left foot	L5-S1	Single level limited interlaminalmicro discectomy	Cured and discharge after next day

These patients were evaluated for clinical features, radiological features, operative findings and outcome of surgery. Although all of these seven patients were applied rest and conservative treatment, they continued to complain of radicular pain, persistent back pain and restriction of activity. Four of patients were boy and three were girls. The mean ages of the patients were 12.5 years. Six of our patients had radicular pain. Six patients had a history of significant trauma, three of them had nonspecific sport injuries, and other three patients have fallen down from tree and stairs.

The last patients historical and physical examination also exposed being heavy lifting. There wasn't any family history of lumbar disc herniation. We performed single level interlaminar microdiscectomy to six patients and two level microdiscectomy to one patient. The patient with three levels of herniated disc underwent surgery for exceedingly protruded L4-5 level; L3-4, L5-S1 levels were not operated.



Figure 1A. Sagittal T2-MRI lumbar disc herniation showing a marked extrusion at L2-3.



Figure 1B. Axial T2-MRI lumbar disc herniation showing a marked extrusion at L2-3.

Five patients had lower limb weakness, in two patient there was no motor weakness and three patients had no sensorial loss. Scoliosis was present in one case. The most commonly involved level was L5-S1 which occurs in five patients. Two cases were affected multiple levels, one of them was L4-5, L5-S1 (Figure 2A-B-C) and the other one was L3-4, L4-5, L5-S1 (Figure 3A-B).

In all cases of magnetic resonance imaging (MRG) disclosed centrolateral placed discs. Single level discectomy was performed in 5 cases and in one case we performed two level discectomy. At operation, all disc substances were soft, rubbery and dehydrated. Before discharge, their low back pain were improved. Except the patient which L2-3 disc was affected, their motor deficits improved. Sphincteric function of the patient with L2-3 disc

herniation was better after operation and dorsiflexion loss was minimally improved. In all patients claudication distance and scoliosis improvements were observed. Out of four patients' sensorial loss improved only in one patient.



Figure 2A. Sagittal T1-MRI lumbar disc herniation showing a marked extrusion at L4-5, L5-S1.

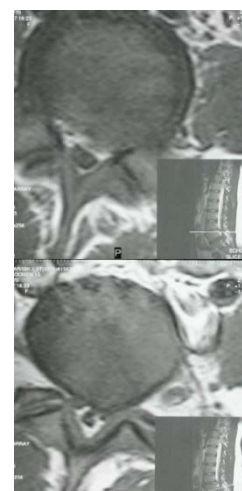


Figure 2B. Axial T1-MRI lumbar disc herniation showing a marked extrusion at L4-5, L5-S1.



Figure 2C. Coronal T1-MRI lumbar scoliosis

In eleven years, we operated seven patients for incapacitating, low back pain, radicular pain or neurological deficit due to lumbar disc herniation. The mean duration of symptoms was 5.6 months. All patients had low back pain, which was diffuse low back pain in one and radicular in six patients. Neurogenic claudication was present in two patients. Incomplete cauda equine syndromes and sphincteric disturbances were present in one patient at L2-3 level (Figure 1A-B).

DISCUSSION

Lumbar disc herniation rarely occurs in childhood and adolescence, it represents only 0.5-3.8% of all cases. This rate is raised among Japanese and it constitutes around 15.4% of disc disease^{5,11}. There are reported only four cases in age 9 and less⁵. In adults, lumbar disc herniation results from lifting and twisting, whereas major causes are repetitive trauma by sport, being heavy lifting and having tall stature in childhood, also in previously reports most cases are seemed to be related to fractures and dislocations which associated with major traumas^{11,12,13}. It is exceptional to happen disc herniation without vertebral osseous injury in adolescence period. In 13% of cases there exists degenerative changes and only 2% of these cases are aggravated by trauma and it has suggested that decreased blood flow in end plaque results degeneration of nucleus pulposus. 60-68% of cases have a family history of lumbar disc herniation. It might be a result of weak connective tissue and early predisposition of degenerative changes in the spine in these families, and leading to disc herniation in relatively young age^{13,14}.



Figure 3A. Sagittal T2- MRI lumbar disc herniation showing a marked extrusion at L5-S1.



Figure 3B. Axial T2-weighted magnetic resonance image lumbar disc herniation showing a marked extrusion at L5-S1.

Six of our cases have a story of significant trauma: four of them were sport related incidents, one of them was falling down from a tree and the last one was falling down from stairs. The sixth patient has a complaint of heavy lifting. None of the patients had any family story, nor repetitive traumas. It was previously reported that severe trauma is associated with structural changes such as fractures and dislocations, furthermore occurrence of disc herniation without any osseous injury is unusual^{5,15}. Immature ligamentous flaccidity, immature muscular structures, incomplete ossification and increased

mobility due to immature facet joints might prevent fractures and dislocations in childhood. Although most of our cases have a story of trauma, imaging studies and operational findings showed not any vertebral injury. It is supporting previously reports that suggests gross changes are not necessarily contributory factors for lumbar disc herniation in adolescent age group^{3,4,16}, also microtrauma which may not be seen radiologically but aggravates disc herniation is a significant factor in these cases. In contrast to previously reports which suggests congenital anomalies and discogenic diseases play an important role, in our series there was not any^{4,8}.

It was suggested that the most vulnerable level is L4-5 in childhood^{3,5}. However, in our series the most commonly involved level was L5-S1. The L2-3 level was involved in one case. Multiple level involvement was seen in two cases (Table1). Their major complaint was low back pain. Pain was diffuse in one patient and radicular in six patients. We have found motor weakness in five cases, sensorial loss in five cases and severe sphincteric disturbances in one case. As previously reported, after surgical treatment, we demonstrated excellent results especially for the improvement of the pain. Only one patient with L2-3 level involvement was partially cured, motor weakness was partially improved but urinary incontinence resisted to treatment. These results were similar to previously reports which demonstrated that neurologic deficits are more resistant for improvement^{3,17,18}.

We performed interlaminar microdiscectomy to our patients. Discs were soft, rubbery, hydrated therefore hard to excise. All of these operations were performed unilaterally where major neurologic deficit locates. The cases with multiple levels of herniated lumbar discs were treated at the level of where MRI studies demonstrated significant protruded disc. We only performed multilevel discectomy (L4-5, L5-S1) to the case with foot drop and diminished achilles reflex together. It was endoscopic discectomy, chemonucleolysis and other noninvasive techniques and anterolateral approaches were previously reported as useful methods. Some senior authors suggest to use fusion techniques.

We had excellent results with limited laminectomy and discectomy without fusion. The pain of the all cases were improved postoperatively, the patients returned to normal lifestyle in one month after surgery. We performed interlaminar microdiscectomy for lumbar disc herniation under

15 years of age. We had excellent results with limited laminectomy and microdiscectomy without fusion. In all cases, pain improved postoperatively and they got back to their normal lifestyle in one month.

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