

Unilateral surgical approach for lumbar disc herniation with contralateral symptoms: Two case reports

Karşı taraf semptomları olan lomber disk hernileri için tek taraflı yaklaşım: İki olgu sunumu

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Abstract

Lumbar disc herniation is the most common cause of the lumbar radicular pain and it is usually encountered on the same side with its symptoms. However, lumbar disc herniation with contralateral symptoms is sometimes observed too. This situation may cause a dilemma for spine surgeons. There are no consensus about cause of the pathophysiology of contralateral radiculopathy, and which surgical approach may suitable for these patients. In here, we present two case reports lumbar disc herniation with contralateral symptoms and discuss this phenomenon in the light of the literature.

Keywords: Lumbar disc herniation, Contralateral symptoms, Unilateral surgical approach

Öz

Lomber disk hernileri, lomber radiküler ağrının en yaygın nedenlerindedir ve sıklıkla lomber disk hernisi ile semptomları aynı tarafta karşılaşırlar. Fakat bazen lomber disk hernisi karşı taraf semptomları ile de gözlemlenebilir. Bu durum, omurga cerrahları için bir ikileme neden olabilir. Çünkü, karşı taraf radikülopatinin patofizyolojisinin nedenleri ve hangi cerrahi yaklaşımın bu hastalar için uygun olduğu ile ilgili bir konsensus yoktur. Burada karşı taraf semptomu olan 2 lomber disk olgusu sunulacak ve bu fenomen literatür eşliğinde tartışılacaktır.

Anahtar kelimeler: Lomber disk hernisi, Karşı taraf semptom, Tek taraflı yaklaşım

Introduction

Lumbar disc herniation (LDH) is the most common cause of the radicular pain and it is usually encountered on the same side with its symptoms [1]. However, LDH, which causes contralateral radiculopathy, is sometimes observed [2]. Surgeons usually choose to explore both sides to be certain they do not miss a lesion [3-6]. On the other hand, some surgeons report that exploration of LDH and micro-discectomy are enough to recover from contralateral symptoms [1,7]. Therefore, this situation presents a dilemma for surgeons when they make a decision about which side to choose to approach. Several authors have reported some patients with LDH having contralateral symptoms and have suggested many hypotheses about LDH causing the contralateral radiculopathy [1,2,4,7-10]. In this study, we present two case reports and explain the LDH with contralateral radiculopathy.

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Case presentation

Case 1

A 57-year-old male patient admitted to hospital because of weakness in his left foot. His complaints had started one month ago. Left foot weakness (4/5), and pain on the L4 dermatome were identified in his neurological examination. Patient's Preoperative Visual Analog Score (VAS) was 9. Lumbar Magnetic Resonance Imaging (MRI) was performed, and right paracentral disc herniation was identified on the L3-4 level (Figure 1A). And then, we decided to perform Electromyography (EMG) to identify which roots were affected. EMG showed us isolated left L3 chronic and L5 acute motor unit potential changing. We suggested an operation, and informed patient consent was received from the patient. In the operation, right L3 laminotomy, flavotomy and microdiscectomy were performed with operation microscope. Post-operative VAS was 1. The patient was discharged two days after the surgery. The weakness in the left ankle recovered one month after the surgery, and lumbar MRI control was performed (Figure 1B).

Case 2

A 34-year-old male patient admitted to hospital with pain in the left leg, and weakness in the left foot. The patient's complaints had started two months ago with pain in the left leg, and then weakness in the left foot. Neurological examination was performed, and the straight leg raising test was positive in 10 degree (Preoperative VAS: 8), and left foot plantar flexion (4/5) weakness were identified. Lumbar MRI was performed preoperatively, and L5-S1 mediolateral extrude disc fragmentation was identified (Figure 2A). And then, we suggested to perform EMG to identify which roots were affected. EMG showed us isolated left S1 acute motor unit potential changing. Operation was suggested, and informed patient consent was received from the patient. In the operation, right L5-S1 microdiscectomy was performed, and the patient's complaints (post-operative VAS: 1) and weakness recovered after the surgery. Lumbar MRI control was performed just after the surgery (Figure 2B).

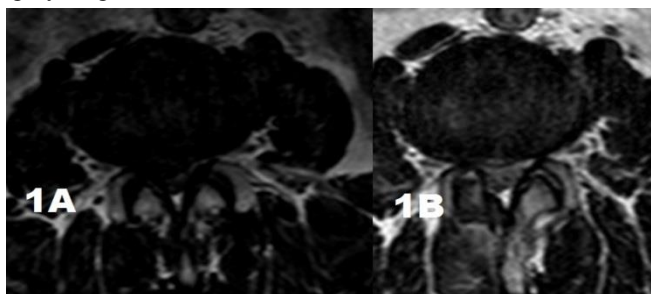


Figure 1: Axial T2-weighted magnetic resonance image through the L3-L4 disc showing the right mediolateral disc herniation (1A), postoperative lumbar MRI one month later after surgery (1B)

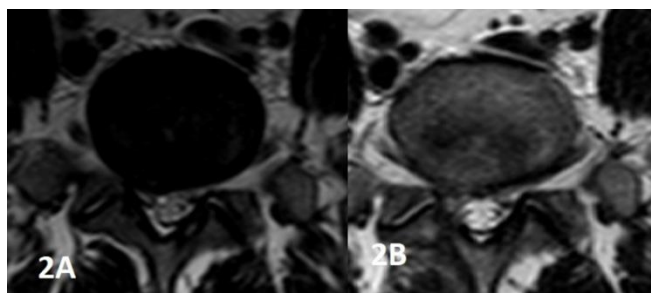


Figure 2: Axial T2-weighted magnetic resonance image through the L5-S1 disc showing the right mediolateral disc herniation (2A). Postoperative lumbar MRI one month later after surgery (2B)

Discussion

Various hypotheses have been suggested to explain the pathophysiology of LDH with contralateral symptoms [1,2,4,7-10]. Kornberg has suggested that in the absence of dural attachments to the posterior longitudinal ligament, which also fixes the nerve root, the contralateral nerve roots are affected in the space of the lateral recess [4]. Sucu et al. [7] and Kim et al. [11] have suggested that traction may be responsible for the emergence of the contralateral symptoms rather than direct compression. Because, an apex of disc herniation laterally deviated away from the symptomatic side. Contrary to Kornberg, Akdeniz et al. [1] has suggested that more dural attachments on the posterior longitudinal ligament than usual could cause the fixing and trapping of the contralateral side of the nerve root and in the absence of the dural attachments, the nerve root may partially escape from the disc, but if it is anchored with attachments, it cannot. Therefore, the nerve root may be entrapped in the lateral recess by traction forces (similar with the double crush syndrome). Kalemci et al. [2] have suggested that venous congestion may be a factor for contralateral symptom. It was suggested in a clinical and morphometric study conducted by Karabekir et al. [9] that an asymmetrically hypertrophied ligamentum flava might be the causing factor. The migrated epidural fat hypothesis has been suggested by Yang et al. [8] and the lateral recesses stenosis and friction radiculitis have been suggested by Hasegawa et al. [10].

However, in many suggested hypotheses about LDH with contralateral symptoms, there is no consensus about surgical approach side or sides and the pathophysiology. Some authors like Choudhury et al. [3], Kornberg [4], Mirovsky and Halperi [5] performed bilateral explorations to do not miss a lesion. However, Sucu and Gelal [7], Akdeniz et al. [1], and Karabekir et al. [9] performed the operative approach only on the lumbar disc herniated side and reported that exploration of the LDH side with microdiscectomy was enough for the recovery of the contralateral symptoms.

In our opinion, the hypothesis that will explain the contralateral symptom findings must support the following 3 questions: First question: Can there be a relation between the direction of the apex of the disc and the contralateral symptom? Second question: Why were there no symptoms in the side where the disc was clear? Third question: Can there be a similarity between the formation pathophysiology of the contralateral symptom in the lower segments except the next level of the level where the disc come out-, and the contralateral root pathophysiology neighboring the segment where the disc came out? In our opinion, as Sucu and Gelal [7] explained previously in their case series, there is a relation between the apex of the disc and the contralateral symptom; however, in addition to this, we also think that the apex of the disc may cause asymptomatic root findings -except the expectations- showing root pressure radiologically. Because, depending on the direction of the apex at the moment of its beginning, its pushing the root to the postero-lateral in the asymptomatic side may also cause the movement of symptomatic root in the contralateral side towards dorsomedial. The movement of the asymptomatic root towards dorsolateral causes the asymptomatic root approach towards the pedicle and makes the root become stuck in the lateral recess

and decreases its stretching. Contrary to this, the movement of the root in the contralateral side towards the dorsomedial causes the root move away from the pedicle, and therefore may cause stretching in the contralateral root, and may also cause secondary injury by pressing the root in the lateral recess. In addition to this, the secondary caudal fiber findings may be in the front line in the pressure on the contralateral caudal fibers rather than the traction forces in the appearance of the contralateral symptoms in the lower segments of the level where the disc has come out. Because, while the caudal fibers of the lower level act freely within the dura in normal conditions, they may cause hypertrophy in disc hernias with wide-base medium-line discs, or cause contralateral lower level root findings as secondary to compression by being squeezed between the degenerated ligamenta flava.

As in our first case presentation, it is observed that there is a ligamenta flava hypertrophied at the same level together with the size of the medium-line component of the disc. These radiological findings support the hypothesis that the traction force may be in the front line in the appearance of the contralateral root findings at next level related with the direction of the apex of the disc; however, in the appearance of lower level contralateral root findings -except the next level-, the compression forces may be effective. Our second case presentation supports the hypothesis that the traction force is in the front line in the appearance of contralateral root findings in situations where the medium-line pressure is not clear. Since we think that -similar to the literature- the disc is an etiological factor in the appearance of contralateral root findings, we approached to the disc from the herniation side in the easiest way with microdiscectomy to not to cause additional complications. The examination and radiological findings of the patients in the postoperative period support the authors claiming that the excision of the disc with microdiscectomy from the side where it is clear is sufficient in these types of patients.

Conclusion

As a result, we can conclude that in the formation of contralateral symptoms, not only the traction but also the compression force may be influential. Especially, the traction force may be in the front line in the initial appearance of contralateral findings depending on the medium-line size and the direction of the apex of the disc. In patients with contralateral lower segment findings, on the other hand, contralateral root findings secondary to the contralateral caudal fibers pressure might appear depending on the size of the medium-line component of the disc and on the effect of the ligamenta flava which is hypertrophied or degenerated. In cases that do not have the same or lower level foraminal stenosis and lateral recess syndrome, excising the disc with microdiscectomy by approaching it from the side where it is clear may help them to relieve their complaints.

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