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Aberrant Root Compression Due To Lumbar Disc Herniation Case Reports

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Case Report

History

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ABSTRACT

Case 1:A 42-year-old male patient presented with left hip and leg pain. Neurological examination revealed an absent left Achilles tendon reflex without muscle strength deficits. Lumbar MRI showed a disc herniation at the L5-S1 level, and lumbar microdiscectomy was planned. During the operation, two nerve roots closely coursing alongside each other were observed at the L5-S1 disc level. Since the patient's clinical findings strongly suggested S1 nerve root compression, the caudal root compressed by the disc fragment was considered to be S1, and the cranial root was interpreted as L5. The disc fragment was removed, and the patient made a full recovery postoperatively. This outcome confirmed the consistency between clinical and intraoperative findings.
Case 2: 37-year-old male patient presented with pain in the left leg and weakness in the left foot. Foot- drop was present in the left ankle. MRI showed left L5-S1 disc herniation. Lumbar microsurgery operation was planned. During the operation, the L5 and S1 nerve roots were observed to be closely positioned. The disc compressing the L5 root axilla and S1 root shoulder was observed, and the disc fragment was removed.
Discussion:NRA results from abnormal root migration during embryological development. Postacchini's classification is commonly used, and this case corresponds to Type 3. Diagnostic challenges can arise due to the lack of coronal MRI sections. Surgical approaches should minimize root retraction, and advancements in microdiscectomy techniques provide effective treatment options.
Conclusion: Spinal root anomalies are rare and often overlooked conditions. Careful preoperative evaluation and precise microdiscectomy techniques are essential to avoid intraoperative iatrogenic injuries.

Keywords: Aberrant Root anomalies, Lumbar disc herniation, Microdiscectomy, Nerve root anomalies

Aberant Root Basısına Neden Olan Lomber Disk Hernisi Olgu Sunumları

Olgu Sunumu

Süreç

Geliş: 27/04/2025
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Telif Hakkı

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ÖZ

Giriş: Lumbosakral sinir kökü anomalileri (SKA), nadir görülen konjenital anomalilerdir ve genel popülasyonda %0.34-%14 arasında bir insidansa sahiptir. SKA'ler ameliyat öncesinde genellikle fark edilmez ve çoğunlukla intraoperatif olarak tespit edilir. Bu durum, iatrojenik sinir kökü hasarına neden olabilir. SKA'lerin preoperatif MR görüntüleme ile belirlenmesi cerrahi planlama açısından önemlidir.
Olgular:42 yaşında erkek hasta, sol kalça ve bacak ağrısı şikayetiyle başvurdu. Nörolojik muayenesinde sol aşil tendon refleksi alınamazken, kas gücü defisiti saptanmadı. MRG'de L5-S1 disk hernisi görüldü ve lomber mikrodiskektomi planlandı. Operasyonda L5- S1 disk mesafesinde birbirine oldukça yakın seyreden iki sinir kökü izlendi. Hastanın klinik bulgularının S1 sinir kökü basısı düşündürmesi nedeniyle, kaudalde yer alan kök S1 siniri, kranialde yer alan diğer kök ise L5 siniri olarak değerlendirildi. S1 sinir köküne bası yapan disk çıkarıldı ve hasta postoperatif dönemde tamamen iyileşti.
37 yaşında erkek hasta, sol bacakta ağrı ve sol ayakta güçsüzlük şikayeti ile başvurdu. Sol ayak bileğinde düşük ayak mevcuttu. MRG'de sol L5-S1 disk hernisi tespit edildi. Lomber mikrocerrahi operasyonu planlanan hastada operasyon esnasında L5 ve S1 sinir rootlarının birbirine oldukça yakın seyrettiği görüldü. L5 root aksillasına ve S1 root omzuna bası yapan disk görüldü ve disk fragmanı çıkartıldı.
Tartışma:SKA'ler embriyolojik gelişim sırasında anormal kök göçünden kaynaklanır. SKA sınıflamaları arasında Postacchini'nin sınıflaması yaygındır ve bu sınıflandırmaya göre bizim olgularımız Tip 3'e uymaktadır. Radyolojik görüntülemelerde koronal kesitlerin eksikliği nedeniyle tanı zorlukları yaşanabilir. Cerrahide aşırı ekartasyon gerektirmeyen yöntemler tercih edilmeli ve mikrocerrahinin sağladığı olanaklar kullanılmalıdır.
Sonuç: Spinal kök anomalileri nadir ve genellikle gözden kaçan durumlardır. Ameliyat sırasında iyatrojenik hasardan korunmak için dikkatli preoperatif değerlendirme ve mikrocerrahi tekniklerinin uygulanması büyük önem taşır

***Anahtar Kelime*:** Aberant root, Lomber Disk Hernisi, Mikrodiskektomi, Spinal Kök Anomalisi

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Introduction

Lumbosacral nerve root anomalies (NRA) are rare congenital anomalies that were first reported by Zagnoni.[1] The incidence of NRA in the lumbosacral region in the general population has been reported in a wide range between 0.34% and 14%, based on autopsy studies, neuroradiological examinations and intraoperative findings. [2] The diagnosis of patients with NRA may be missed preoperatively and patients are at risk of iatrogenic root damage because they are usually detected incidentally during surgery. Detection of these anomalies with magnetic resonance imaging (MRI) in the preoperative period is important for determining the strategy in lumbar disc surgery and preventing iatrogenic root damage.

In this article, we discussed two patients in whom we observed a nerve root anomaly during lumbar disc microsurgery, in the light of the literature.

Cases

Case 1.

A 42-year-old male patient presented with left hip and leg pain. Neurological examination revealed an absent left Achilles tendon reflex without muscle strength deficits. Lumbar MRI showed a disc herniation at the L5-S1 level, and lumbar microdiscectomy was planned. During the operation, two nerve roots closely coursing alongside each other were observed at the L5-S1 disc level. Since the patient's clinical findings strongly suggested S1 nerve root compression, the caudal root compressed by the disc fragment was considered to be S1, and the cranial root was interpreted as L5. The disc fragment was removed, and the patient made a full recovery postoperatively. This outcome confirmed the consistency between clinical and intraoperative findings

Case 2.

37-year-old male patient presented with pain in the left leg and weakness in the left foot. Foot- drop was present in the left ankle. MRI showed left L5-S1 disc herniation. Lumbar microsurgery operation was planned. During the operation, the L5 and S1 nerve roots were observed to be closely positioned. (Figure 1). The disc compressing the L5 root axilla and S1 root shoulder was observed, and the disc fragment was removed. The patient's left leg pain resolved after the operation. The wound site was clean in postoperative follow-up. Physiotherapy and rehabilitation were recommended because of foot-drop.

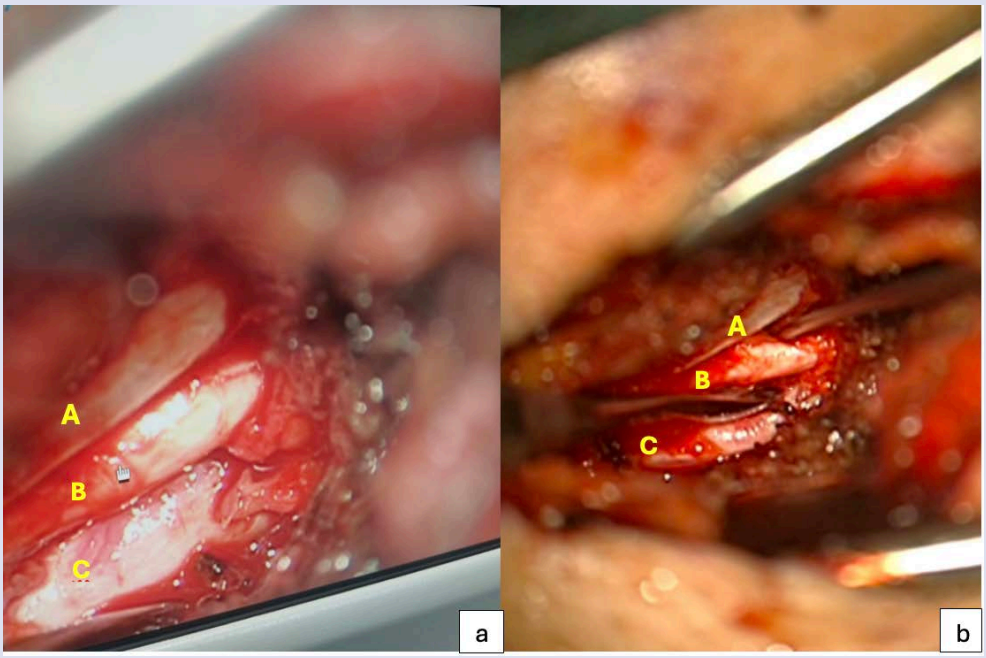


Figure 1. Intraoperative abberant root image
A. Duramater
B. Left L5 nerve root
C. Left S1 nerve root

Discussion

The lumbar nerve root, surrounded by a root sheath extension of the duramater, runs medially to laterally under the corresponding vertebral pedicle and exits through the corresponding intervertebral foramen. [3] However, many lumbosacral nerve root anomalies have been described that are thought to result from abnormal migration of the corresponding roots during embryological development. [4]

Different classifications have been made by many researchers. Firstly, Canon et al. classified the NRAs into three groups as spinal united roots, anastomotic roots and transverse roots. [4] After Cannon, Postacchini et al. classified the NRA into five groups.[5] (Table 1) [5]. Our cases were classified as type 3 according to this classification.

Table 1	Postacchini Classification
Type	Type of Anomaly
1	One or more root abnormal cranial they come out of the level
2	One root abnormal caudal come out of the level
3	Two or more roots protrude too close to the dural opening
4	Two roots emerge from the dural sac in the main nerve trunk
5	The two roots are connected by an anastomotic band during the extrathecal course

Approximately 50% of the root anomalies in the lumbosacral region originate from the L5 and S1 roots, while S2 root anomalies constitute approximately 1/3 of all cases. [6]. These anomalies are mostly located on the left side of the body and have been reported to be associated with multiple malformations. [7]

Patients with isolated NRA have no clinical findings, whereas patients with degenerated disc and/or spinal canal stenosis may have clinical signs and symptoms due to spinal root compression.[8] However, due to root anomaly, radiological pathology and neurological examination findings may be inconsistent. For example, neuro deficits of L5-S1 disc herniation may be detected in a patient with radiological findings of L4-5 disc. Therefore, if there is no pathology to explain the complaint during herniated disc surgery, root anomalies should be considered. In patients with persistent complaints after lumbar disc surgery, NRA should be investigated. Kayacı et al.[6] investigated the relationship between spinal root anomaly and herniated disc. (Figure 2)[6] Accordingly, Group A is classified as the herniated disc localised between the medial nerve root and dura, Group B as the herniated disc localised between two spinal roots, and Group C as the herniated disc localised between the lateral spinal root and facet or lateral resses. [6] Our cases were compatible with Group B according to this grouping. Figure 2. [6]

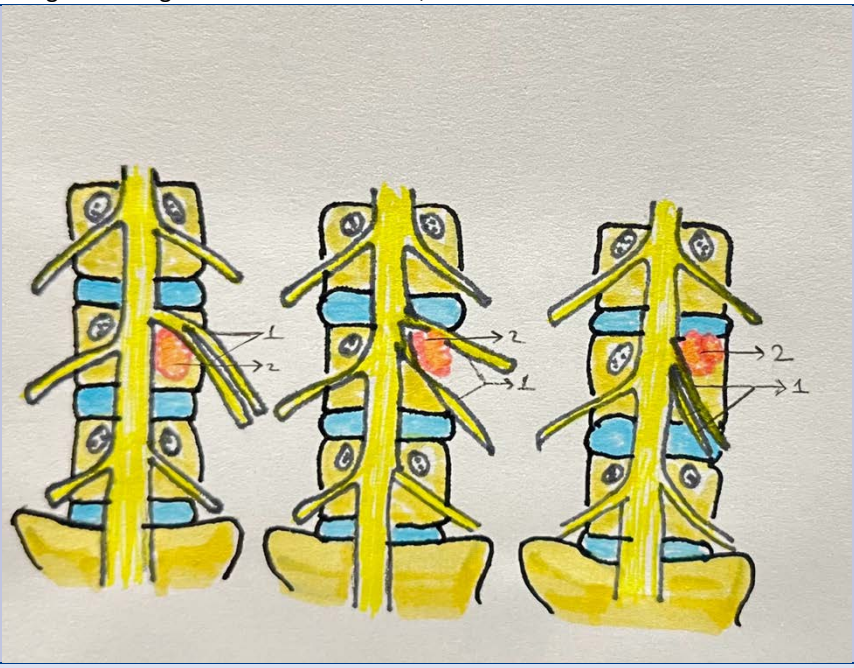


Figure 2.
Group A: The herniated disc localised between the medial nerve root and dura
Group B: The herniated disc localised between two spinal roots
Group C: The herniated disc localised between the lateral spinal root and facet or lateral resses

1. Aberrant root anomaly
2. Herniated disc
3. Aberrant root anomaly
4. Herniated disc

Although MRI is useful in the diagnosis of spinal root anomaly, sagittal, axial and especially coronal image of MRI methods should be seen together to detect spinal root anomaly. In addition, root anomaly may be missed

on MRI mostly due to herniated disc. Therefore, root anomaly is often encountered intraoperatively, which may cause many iatrogenic damages.[7] In our cases, the coronal section was not included in the preoperative lumbar MRI and the NRA could not be detected by MRI.

Canon et al. were the first to comment on spinal root anomaly surgery and stated that the standard surgical procedure (hemilaminectomy and discectomy) provided inadequate decompression.[4]

Subsequently, White et al. determined the success rate as 30% in patients undergoing standrat lumbar disc surgery and emphasised the importance of performing pedunculocutomy. They suggested that if facetectomy is not performed, morbidity will increase due to excessive retract of neural elements.[9]

Pamir et al. also stated that laminectomy, facetectomy and pediclelectomy are necessary in these patients.[10]

However, in parallel with the developments in microsurgery, Houra et al. [11] stated that interlaminectomy (hemiparsial laminectomy) can provide adequate exposure of the intervertebral foramen and lateral resses and discectomy can be performed without over-exclusion of existing nerve root anomalies.

Kayacı et al. 2014, in the light of this information, reported that hemipartial laminectomy and 1/2 facetectomy provided sufficient field of view and herniated disc was evacuated without the need for excessive root retraction. They recommended that the foraminotomy should be wider than normal. In cases with sequestered fragments or extruded protrusion on the lateral side, they recommended complete removal of the facet. [6]

In our 2 cases, fragmented disc excision was performed without facetectomy.

Conclusion

Spinal root anomalies are a rare condition that can be easily missed even with advanced preoperative imaging methods. In order to prevent intraoperative iatrogenic root injury, utmost care should be taken in their diagnosis and surgical management. In parallel with recent advances in microsurgery, disc excision can be performed without facetectomy as in our cases.

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