

A probable extraordinary etiology of a redundant nerve root syndrome: Lumbar spondylolisthesis

Ahmet Dağtekin¹ , Vural Hamzaoğlu¹ , Hakan Özalp¹ , Emel Avcı¹ , Mehmet Ali Karataş², Mehmet Tamer Varyemez³, Mutlu Alımlı⁴ , Celal Bağdatoğlu¹ 

¹Department of Neurosurgery, Mersin University Hospital, Mersin, Turkey

²Department of Neurosurgery, Hatay State Hospital, Hatay, Turkey

³Department of Neurosurgery, Private Odak Hospital, Denizli, Turkey

⁴Department of Neurosurgery, Private 7 Mart Hospital, Osmaniye, Turkey

Abstract

The description of redundant nerve root syndrome (RNRS) is known as large, elongated and tortuous nerve roots with a severe lumbar stenosis. It is considered that the cause is chronic compression of the nerve roots. To the best of our knowledge, this is the first case of RNRS related with lumbar spondylolisthesis without lumbar canal stenosis in the English literature. In this case report, we have presented a patient who had been diagnosed as RNRS in association with lumbar spondylolisthesis. The Magnetic resonance imaging (MRI) and peroperative observation of the clinical entity are discussed.

Keywords: Redundant nerve root syndrome, lumbar spondylolisthesis, cauda equina, magnetic resonance imaging

INTRODUCTION

Verbiest had first underlined this clinical pattern in 1954; whereas named by Cressman and Pawl in 1968 (1, 2). Redundant nerve root syndrome (RNRS) is characterized by a tortuosity of elongated and enlarged nerve roots of the cauda equina. We can see the well defined relationship between RNRS and lumbar spinal stenosis in literature (1-8). A 54 years old rare female case who had been operated, was presented upon the basis of MRI with lumbar spondylolisthesis.

CASE PRESENTATION

A 54-year-old woman came to our clinic with low back pain, progressive numbness and pain radiating to her lower extremities. She has been previously surgically treated for lumbar disc hernia. Paresthesia was observed on bilateral L4, L5, S1 dermatomes in neurological exam. MRI of the lumbar spine demonstrated thick, long and tortuous signals resembling redundant nerve of cauda equina and spondylolisthesis at L4-5 level without spinal stenosis (Figure 1a-e). Decompressive laminectomy with a duraplasty by a graft was planned for a surgical method, after the concent form was taken directly from the patient with a clear definitive explanation. The thick and long, tortuous nerve roots were exposed (Figure 2). No complaints were reported after the early phase of operation.

DISCUSSION

RNRS of the cauda equina is a rare clinical situation which has been criticized in literature. The physiopathology of RNRS has been attributed to a squeezing strength from the constricted lumbar spinal canal acting on the nerve roots of cauda equina (2, 5, 6). The probable mechanism is the acquired elongation of nerve roots which were squeezed at the level of canal stenosis (7). Through the light of literature; in the definition of RNRS cases, the thick elongated nerve roots exist due to lumbar stenosis and its result which the physiopathologic factors are explained above. In the presented case, no spinal stenosis is determined when all levels are carefully overviewed. There is only spondylolisthesis at the level of L4-5.

You may cite this article as: Dağtekin A, Hamzaoğlu V, Özalp H, Avcı E, Karataş MA, Varyemez MT, et al. A probable extraordinary etiology of a redundant nerve root syndrome: Lumbar spondylolisthesis. *Neurol Sci Neurophysiol* 2018; 35: 50-52.

Corresponding Author: Vural Hamzaoğlu **E-mail:** vuralhamzaoglu@gmail.com **Submitted:** 2 May 2017 **Accepted:** 6 June 2017

Figure 1. a-e. Sagittal MRI showing the redundant nerve root which presented as a tortuosity of elongated and enlarged nerve roots and spondylolisthesis at L4-5 level without spinal stenosis (a), Axial MRI showing the redundant nerve root without spinal stenosis at the L2-3 level (b), L3-4 level (c), L4-5 level (d) and L5-S1 level (e).

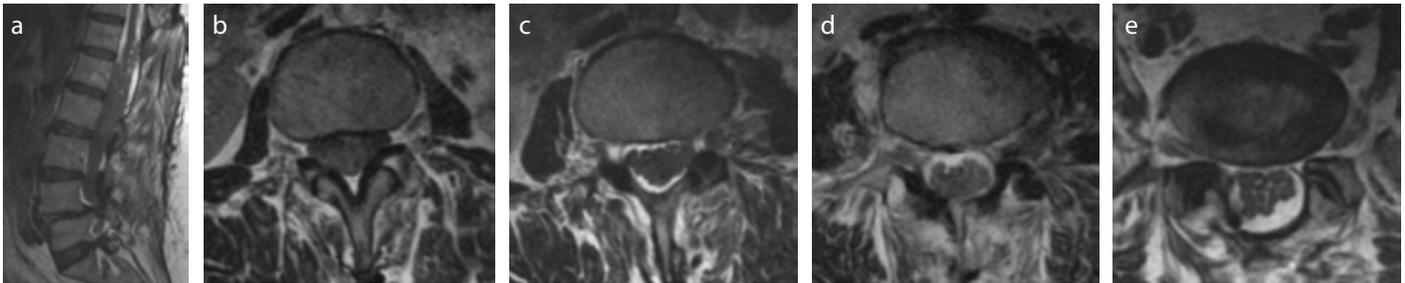


Figure 2. Intraoperative photograph showing a thick, elongated and tortuous nerve root.



The differential diagnosis is the lumbar discopathy or canal stenosis in RNRS because of similar clinical symptoms such as low back pain and leg pain however RNRS is a chronic, long lasting clinical stage in elders (7). It has been diagnosed over the years by myelographic features. Characteristic features including serious extradural block related with canal stenosis and multiple filling defects above the block owing to elongated nerve root on myelographic investigation (3, 7). Some disorders such as arteriovenous malformation, plexiform neurofibroma, and hereditary neuropathies may be included in differential diagnosis of RNRS with similar myelographies (7). However, it can be currently well diagnosed by MRI that has been written in literature (2, 4, 7). The elongated and enlarged nerve roots have similar intensity to the cauda equina nerves on MRI. The lumbar MRI of the case demonstrates a thick, elongated and tortuous nerve root without spinal stenosis and spondylolisthesis at the level of L4-5.

Symptomatic nerve root changes such as enhancement, thickening and displacement are very obvious for the lumbar discopathy surgeries and it can be shown by MRI with contrast after operation (9). The clinical signs include radicular pain due to thickened nerve roots and intraneural edema (10, 11). The changes in intraneural pressure, chemical irritant exposure, ischemia and minor mechanical deformation leading radicular pain are the leading cause of nerve root inflammation.

The arachnoiditis is known as the inflammation of the meninges and subarachnoid space. All three layers of meninges including the nerve roots of cauda equina are effected in spinal arachnoiditis (12). Spinal operations are the most common preceding modalities for arachnoiditis besides infectious diseases and tumors (13). Intrathecal water insoluble contrast agents were accused for arachnoiditis in past.

Decompressive laminectomy with duraplasty is recommended for the relief of the nerve root compression before neurological deterioration (5-8, 10). Our patient underwent decompressive laminectomy following with an exposure of tortuous, thick and long nerve root. Intraoperative findings correlates with the MRI finding. According to MRI findings, no spinal canal stenosis has been determined at lumbar level that gives a clinical symptom including L2-3 level. Besides, post-operative laminectomies are the leading cause of arachnoiditis; whereas we have not experienced such a neurological symptomatology like that after surgery from the aspect of our neurosurgical skill. So after performing a duraplasty by using a graft, recovery was achieved in the early period after surgery.

In summary, the redundant nerve root syndrome of the cauda equina is defined as the association of a lumbar spinal stenosis with large, elongated and tortuous nerve roots (5, 6). Relationship between lumbar spinal stenosis and RNRS was well defined in the literature (1-8). However, to the best of our knowledge, this is the first case of redundant nerve root syndrome related to spondylolisthesis in English literature.

Ethics Committee Approval: N/A.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - A.D., E.A., C.B.; Design - A.D., E.A., C.B.; Supervision - A.D.; Resources - A.D., V.H.; Materials - A.D., V.H., H.Ö., M.A.K., M.T.V., M.A.; Data Collection and/or Processing - A.D., V.H., H.Ö., M.A.K., M.T.V., M.A.; Analysis and/or Interpretation - V.H., H.Ö.; Literature Search - V.H., A.D.; Writing Manuscript - V.H.; Critical Review - A.D., E.A., C.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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