A Case of the Redundant Nerve Root Syndrome Mimicking Intradural Spinal Tumor

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The redundant nerve root syndrome is not common and demonstrates a large, elongated, and tortuous nerve roots of cauda equina. Usually, the diagnosis of this syndrome is not difficult with the radiological finding and clinical symptom. The authors report a case of the redundant nerve root syndrome mimicking intradural spinal tumor in view of the symptom and radiological findings. Magnetic resonance imaging revealed a globular intradural mass just above canal stenosis. Decompressive laminectomy and durotomy improved back pain and radicular pain. From the experience of this case, the relief of nerve root compression is recommended as early as possible in the redundant nerve root syndrome.

KEY WORDS: Redundant nerve root syndrome · Lumbar stenosis.

Introduction

The redundant nerve root syndrome demonstrates serpentine, large, elongated, and tortuous nerve roots of cauda equina. This syndrome is closely associated with the lumbar spinal stenosis and usually presents as a mild tortuosity11,12). It has been acknowledged and reported by several authors1-13), and is not difficult to make a diagnosis with radiological finding and clinical symptom.

We report a case of unusual redundant nerve root syndrome presenting with a lumbar intradural mass mimicking tumor in the magnetic resonance(MR) image. We discuss clinical and radiological features to grant a diagnosis, a possible pathophysiology and operative procedures for it.

Case Report

A 73-year-old man presented with pain in his bilateral lower extremities in addition to aggravated lower back pain. He noticed to have marked weakness of dorsiflexor of right great toe. The neurological examination revealed paresthesia on bilateral L5 sensory dermatomes. MR image demonstrated stenosis at L2-3 and L3-4 levels, herniated lumbar disc at L2-3 level. A globular intradural mass was demonstrated just above the stenosis. However, gadolinium-enhanced images showed no enhancement of the mass (Fig. 1). It was thought to be an intradural extramedullary tumor, tortuous vessels, or redundant nerve roots.

A decompressive laminectomy was performed at L2, L3 and L4 levels. Herniated disc at L2-3 level was removed and transpedicular screw fixation was done. The exposed dura mater was still tense. We opened the dura vertically. Midline incision of the dura expelled several elongated redundant nerve roots. There were no other intradural pathologies noticed. The tortuously tangled nerve roots were gently manipulated and was released freely(Fig. 2). Then, the dura mater could be closed without tension.

The postoperative course was uneventful. His radicular pain and weakness of his right great toe were resolved rapidly. He was asymptomatic six months after the operation.

Discussion

The redundant nerve root syndrome was once presumed to be a rare congenital anomaly20, but are now considered to be a possible accompaniment to lumbar spinal stenosis. Suzuki, et al11,12) reported that redundant nerve roots(RNR) were detected by myelography in 42.3% of the 130 patients with severe dura mater constriction. On autopsy, RNR were detected in 8.2% of cadavers of aged people.

The patients with the redundant nerve root syndrome are usually male workers in the 5th and 6th decades. They usually
complain low back pain of long duration and radicular pain in one or both legs. Sensory, motor, and reflex abnormalities may be present. The L3 to S1 nerve roots are most commonly involved. Pathological changes in the RNR are dual as follows: 1) disarrangement and degenerative reduction of nerve fibers in the root, and 2) demyelination, endoneurial fibrosis and proliferation of Schwann cells. The demyelination and axonal loss in the RNR were considered to be a consequence of continual mechanical compression of nerve roots by constricted spinal canal.

The redundant nerve root syndrome must be recognized and differentiated from the vascular lesions such as arteriovenous malformation, and neoplastic lesions. Several features help to identify the redundant nerve root syndrome. The redundant nerve roots are located in the lumbar region and always closely associated with the spinal stenosis. The tortuosities of roots vary with the lumbar motion (flexion and extension).

Rengachary, et al. described two types of redundant nerve root syndrome of cauda equina. Type I, the most commonly encountered type, is characterized by the presence of a mild degree of coiling or tortuosity of nerve roots without any thickening. Such a coiling is associated with extrinsic compression of dural sac from spinal stenosis with normal intradural pressure. Coiling of the roots, in itself, seems to be a secondary phenomenon. In this type, decompressive laminectomy alone is a sufficient operative modality. In the other hand, type 2, a much rarer type, is characterized by grossly thickened nerve roots, in addition to the redundancy. In such cases, there is frequently an increased intradural pressure due to intradural mass effect. In this type, decompressive laminectomy alone is insufficient. A durotomy with or without duraplasty may be necessary for decompression.

In our case, redundant nerve roots extruded spontaneously due to increased intradural pressure after a small durotomy, and the nerve roots were enlarged and thickened as type 2. The intradural pressure was much improved after manipulating the roots to be released from the tangled portion.

**Conclusion**

The relief of nerve root compression is recommended as early as possible. The patient who underwent early and sufficient decompression of the increased intradural pressure, and the redundant nerve roots showed rapid and complete neurological improvement.
Redundant Nerve Root Syndrome

References