

Spinal Nerve Root Swelling Mimicking Intervertebral Disc Herniation in Magnetic Resonance Imaging -A Case Report-

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A herniated intervertebral disc is the most common type of soft tissue mass lesion within the lumbar spinal canal. Magnetic resonance imaging (MRI) is a useful tool for the assessment of patients with lower back pain and radiating pain, especially intervertebral disc herniation. MRI findings of intervertebral disc herniation are typical. However, from time to time, despite an apparently classic history and typical MRI findings suggestive of disc herniation, surgical exploration fails to reveal any lesion of an intervertebral disc. Our patient underwent lumbar disc surgery with the preoperative diagnosis of lumbar disc herniation; however, nothing could be found during the surgical procedure, except a swollen nerve root. (Korean J Pain 2010; 23: 51-54)

Key Words:

herniated intervertebral disc, magnetic resonance imaging, nerve root.

Lower back pain (LBP) is a common symptom experienced by 60–90% of the total population [1] and one of the most frequent reasons to visit a pain clinic. LBP can be caused by an anomaly of vertebra and other related structures. Since initially reported in 1934 [2], a herniated intervertebral disc has been recognized as the common cause of LBP and pain radiating through the leg. The development of diagnostic imaging techniques has greatly affected the diagnosis of vertebral disorders and the decision for which methods of treatment are the most appropriate to use. In particular, magnetic resonance imaging (MRI), which was firstly introduced in 1973 by Lauterbur [3]

and has been rapidly developed since then, allows the analysis of vertebral anatomical structures, nucleus pulposus displacement, and posterior longitudinal ligament rupture, and is regarded as the most effective method for the diagnosis of a herniated intervertebral disc. However, from time to time, a difference can be found between radiological diagnosis and surgical diagnosis, in spite of the development of imaging techniques. Here, we report the case where no herniated intervertebral disc was found during the operation of a patient who appeared to have a herniated intervertebral disc of the extrusion type in an MRI.

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CASE REPORT

A 32-year old female patient came to the emergency room with the chief complaints of right side LBP, buttock pain, and lower leg pain, which began two days before the visit and became worsened on the day of the visit. The patient was without any particular trauma history and mentioned that the symptom started after she had walked a long distance the previous day. The patient expressed the symptom as a "twinge". The pain was weak when in the supine position, but it was aggravated when rising up or moving, so that the patient could not carry out the movements and activities of daily living. A pertinent part of the patient's history was that she had received conservative treatments in another hospital for right LBP and right radicular leg pain, six months before the visit. The computer tomography (CT) image taken at that time appeared to show that the patient had a herniated intervertebral disc at the 4–5th lumbar spine and spondylolysis at the 5th lumbar spine. According to the physical examination, right radicular leg pain was developing along the dermatomes of the 4, 5th lumbar nerve roots. In the straight leg raising test, the degree was limited to 45 for the right leg and the pain was aggravated by extension and flexion of lumbar spine part. Neither distinct tender

points nor abnormality in the motor, sensory, and reflexes response was found. The pain was 8, according to the verbal numerical rating scale (VNRS). The pain was slightly relieved to VNRS 6 after the caudal epidural block and posterior division of spinal nerve block at the 4–5th lumbar spine by blind method on admission, but movements were still impossible. On the third day of admission, a lumbar spine MRI was taken and the results showed degenerative change at the 4–5th lumbar spine intervertebral disc, posterolateral intervertebral disc extrusion, slight spondylolytic spondylolisthesis at the 5th lumbar spine and neural foraminal stenosis at the 5th lumbar spine–first sacrum part (Fig. 1). After consulting with neurosurgery to decide on an operation by neurosurgical diagnosis, an emergency operation was performed for the 4–5th lumbar spine intervertebral disc extrusion on the fourth day of admission. When the lamina was removed by the surgical field, it was found the dural sac had been torn and the nerve root was greatly swollen. There was only a slight intervertebral disc extrusion and an extruded disc was not observed. Taking the possibility of a mistaken patient, MRI film, or operation site into account, the operation team and the anesthesiologist checked the information a second time, but no problem was found. The possibility of the migration of the extruded nucleus pulposus was also considered, but that was



Fig. 1. Sagittal (A) and axial (B, C) T2-weighted MRI showing disc extrusion (white arrows) at the L4-5.

not observed, either. After explaining the status to the patient's caregiver, hemilaminectomy of the lamina at the 4–5th lumbar spine, and vertebral medial facetectomy were performed. However, the patient's pain remained at VNRS 6–7 after the operation. Thus, posterior fusion using screws for spondylolytic spondylolisthesis was performed in an operation two weeks later, after which, the symptom turned to VNRS 2–3. The patient was discharged two weeks after the operation. A follow-up MRI was recommended to the patient and the caregiver after a consultation with the surgical operator, but it was not performed because they did not want it.

DISCUSSION

A herniated intervertebral disc is one of the main causes of LBP and pain radiating through the leg, and this can be diagnosed by myelography, CT, and MRI, as well as clinical manifestations and physical examination. In the studies in which the MRI findings and surgical findings of a herniated intervertebral disc were compared and analyzed, the MRI is suggested as a useful mechanism that helps determine the diagnosis and treatment method because its sensitivity and specificity to herniated intervertebral discs are high [4,5]. However, even within normal, healthy people, MRI findings of a herniated intervertebral disc have a ratio of around 30% [6]. Thus, when diagnosing a herniated intervertebral disc as the cause of lower back and leg pain, not only MRI findings but also clinical symptoms, courses, physical examination, and radiological findings should be taken into consideration, in order to avoid an erroneous diagnosis. In addition, differential diagnosis with neuroma, malignancy, synovial cyst, and postoperative fibrosis, which show similar findings with that of a herniated intervertebral disc, remains an important problem.

Cases have been continuously reported where the diagnostic imaging findings and surgical findings were shown to differ when the operation was performed after the diagnosis of a herniated intervertebral disc. Macnab [7] reported in 1971 that there was one case where an intervertebral disc lesion was not found during the operation, which was performed after the diagnosis of a herniated intervertebral disc by both typical clinical symptoms and myelography. He analyzed the causes of this to be migration of the sequestered disc, pedicular kinking, sup-

pression by articular process, spinal stenosis, and extraforaminal disc herniation. At present, however, these causes can be excluded because the exact location and status of a herniated intervertebral disc can be confirmed by comparing and analyzing the MRI images from many planes with respect to anatomic structural anomalies of vertebrae and degenerative change of tissue. Nonetheless, some cases have been reported which show similar clinical symptoms, physical examination results, CT, and MRI findings in correlation with those of a herniated intervertebral disc, leading to misdiagnosis. Ashkenazi et al. [8] reported the case where a herniated intervertebral disc was diagnosed as neurinoma. Asamoto et al. [9] presented the case where epidural varices were mistakenly diagnosed as a herniated intervertebral disc, and Kim et al. [10] reported that lumbosacral nerve roots anomaly could be misdiagnosed as a herniated intervertebral disc. Especially nerve roots anomaly, the most common type of which is conjoined nerve roots, could be difficult to find during the operation because the anatomic characteristics of nerve roots can be hidden or mistakenly diagnosed as mass due to swelling and reactive change [11]. It requires differentiation by means of an MRI, which includes the contrast-enhancement image, because it may be seen as neuroma or a sequestered disc by a CT [12]. Although an MRI produces more precise findings for diagnosis than a CT, the conjoined nerve roots that look like asymmetric mass in the anterolateral epidural space can nonetheless be erroneously diagnosed as a herniated intervertebral disc [13]. Nerve roots anomaly does not need any particular treatment if there is no neurologic symptoms, thus care is required for analysis of the image findings, in order to avoid unnecessary operation.

In the case of this study's patient, only a torn dural sac and swollen nerve roots were observed during the operation, and a herniated intervertebral disc or findings of the 4–5th lumbar spine intervertebral disc extrusion were not found. In addition, there was no problem in other matters related to the patient, and the separated nucleus pulposus was not found. After excision of the lamina, the operating doctor initially regarded the swollen nerve roots as mass, but after further detachment of the adjacent tissue, later confirmed that it was swollen nerve roots. We cannot produce an unassailable conclusion, but based on the surgical findings, it can be assumed that the structure which was initially diagnosed from the MRI findings as a herni-

ated intervertebral disc was actually the swollen nerve roots.

Considering that the patient's pain continued even after neural decompression but was reduced after posterior fixation for spondylolytic spondylolisthesis was performed, the cause of the pain is assumed to be the vertebra instability and spondylolisthesis. If selective nerve root block had been carried out or local anesthetics had been injected at the pars interarticularis defect site and the reactivity had been determined, the cause of pain would have been judged more precisely [14,15], and an unnecessary operation could have been avoided by devising the treatment plan accordingly.

Although image findings in rapidly developing methods of imaging diagnosis methods have been an important factor in diagnosing vertebra disease and deciding the treatment method, clinical symptoms, physical examination results, and image diagnosis findings should be comprehensively used for an accurate diagnosis, especially considering that the image findings can differ from actual surgical findings. Further, appropriate nerve blocking, according to a patient's need, may be helpful in more precisely determining the cause of pain.

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