Exacerbation of Symptoms of Lumbar Disc Herniation Complicated by a Schwannoma: A Case Report

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Herniation of the lumbar disc is a common cause of low back pain. Conservative management with physiotherapy, such as lumbar spine traction, is usually effective. Although a schwannoma of the lumbar spine is relatively uncommon, the clinical manifestations are similar to those of lumbar disc herniation, making the diagnosis difficult. This case report describes a 51-year-old male who had suffered from low back pain for 3 years and who was diagnosed with L2/L3 lumbar disc herniation. The low back pain was well-controlled by conservative treatment and the symptoms improved progressively. Two months prior to our evaluation, however, the symptoms worsened acutely, and were accompanied by the onset of symptoms of cauda equina syndrome. A small tumor at the site of the L2/L3 disc herniation, observed incidentally during magnetic resonance imaging, was responsible for the symptoms of spinal stenosis at the lumbar region. The patient underwent laminectomy, tumor resection, and discectomy with near-complete resolution of symptoms. In patients with lumbar disc herniation that improves with conservative treatment, the recurrence of symptoms should prompt a thorough review of the medical history, physical examination, and imaging studies to establish the diagnosis and prevent delay in treatment.

Key Words: cauda equina syndrome, intervertebral disc herniation, schwannoma
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Lumbar disc herniation is a common cause of chronic, acute, or recurrent low back pain (LBP) [1]. The most commonly affected population is middle-aged men (average age, 40 years) whose work requires physical strength. Most patients with lumbar disc herniation respond to conservative treatment [2], but for those with persistent or progressive symptoms of spinal cord compression, surgical treatment should be considered. Large central herniations causing cauda equina syndrome require immediate surgical decompression [3].

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Schwannomas are slow-growing, benign, encapsulated tumors that originate from the Schwann cells in the myelin sheaths of nerve fibers. They are generally single tumors [4] and account for 20% of all intraspinal tumors that involve the lumbar spinal nerves [5].

This case report describes a patient with an L2/L3 disc herniation whose LBP initially improved with conservative treatment, but later recurred with concurrent symptoms of cauda equina syndrome (i.e. voiding difficulties and lower extremity weakness). Further investigation by magnetic resonance imaging (MRI) with contrast incidentally revealed a small spinal tumor at the site of the disc herniation that was causing spinal stenosis at the lumbar region and exacerbating the pre-existing symptoms. Following surgical resection of the tumor and the herniated

disc, the patient's symptoms improved substantially, and he was able to return to work.

Case Presentation

This 51-year-old patient is a married man of average physical stature. He was employed as a water company officer, which involved 8 hours of sedentary work each day. He had no major medical conditions or history of surgery. The patient had been experiencing LBP since May 2002, which led him to seek help from local medical clinics. His symptoms were occasionally alleviated with medication and physiotherapy. In February 2003, he visited an orthopedist at our hospital. Plain films of the lumbar spine revealed lumbar spondylosis, which did not improve with pharmacotherapy. The patient sought evaluation at another local hospital in July 2003 and underwent an MRI scan of the lumbar region, confirming the diagnosis of L2/L3 intervertebral disc (IVD) herniation. He then came to our orthopedic department in August 2003 to be evaluated for surgical management. As he showed improvement with medication and physiotherapy, it was suggested that conservative treatment should remain first-line and surgery should be considered only when the former was no longer effective.

In July 2004, the patient sought help for LBP and numbness of both lower limbs from our Department of Physical Medicine and Rehabilitation. Physical examination showed the muscles of the lower back to be rigid with areas of local tenderness. The result of the straight leg raising test was 90° bilaterally, the Patrick test was normal, and there was no reduction in deep tendon reflex. Muscle strength was normal bilaterally. The patient reported abnormal sensations in the left anterior thigh. On the basis of these findings, the patient was diagnosed with L2/3 IVD herniation with left L2 radiculopathy. This was managed by the application of heat packs to the lower back to facilitate circulation and relieve the muscle spasm, and traction of the lumbar spine to reduce the IVD herniation. Pain was alleviated by the use of vector interference treatment. The patient was also educated about exercises and posture that could improve the symptoms of pain. With conservative management, the patient's symptoms, including the intensity and frequency of pain, continued to improve, and the frequency of rehabilitation sessions were reduced from once daily to once every 4–5 days.

In June 2005, the patient's LBP worsened suddenly and he began to experience voiding difficulties. The strength of the lower limbs and deep tendon reflex were both normal on physical examination, as was the rectal exam. The only apparent abnormalities were abnormal sensations in the buttocks; the straight leg raising test was 60°/45°. Together, these findings led us to suspect cauda equina syndrome caused by herniation of the IVD. An MRI scan showed L2/L3 IVD herniation and narrowing of the bilateral intervertebral foramina. An incidental intradural structure, which became more distinct with use of gadolinium chelate injection, was noted and thought to be a schwannoma. The assumed schwannoma, which measured $0.8 \times 0.9 \times 0.7$ cm in size, was causing significant stenosis of the spinal canal (Figure 1). The patient was referred to a neurosurgeon for lumbar laminectomy, intraspinal tumor resection, and L2/L3 lumbar discectomy. The pathology report confirmed the tumor to be a schwannoma (Figure 2). Over the ensuing 6-month postoperative period, the patient's symptoms improved significantly, with only a residual abnormal sensation on the skin of the left buttock.

Discussion

IVD herniation (either central or unilateral) in the lumbosacral spine is a common source of LBP. The most common cause is distortion of the lumbar spine, which leads to degeneration of the longitudinal ligament and the fibrous annular rings. The pain is typically unilateral but can be bilateral. When there is impingement on neighboring nerve roots, the areas supplied by the affected nerves exhibit abnormal sensations and myalgia [1].

The majority of patients with these problems improve with conservative treatment. The most common treatment is traction of the lumbar spine, which is used to reduce the nerve compression caused by the IVD. Traction of the lumbar spine increases the thickness of the IVD, tenses the anterior and posterior longitudinal ligaments, and loosens the facet joints to enlarge the foramen and allow for passage of the nerve. In order to avoid nerve impingement, the applied force of traction must be at least 25%, but not more than 50%, of the patient's body weight [6]. In a study using

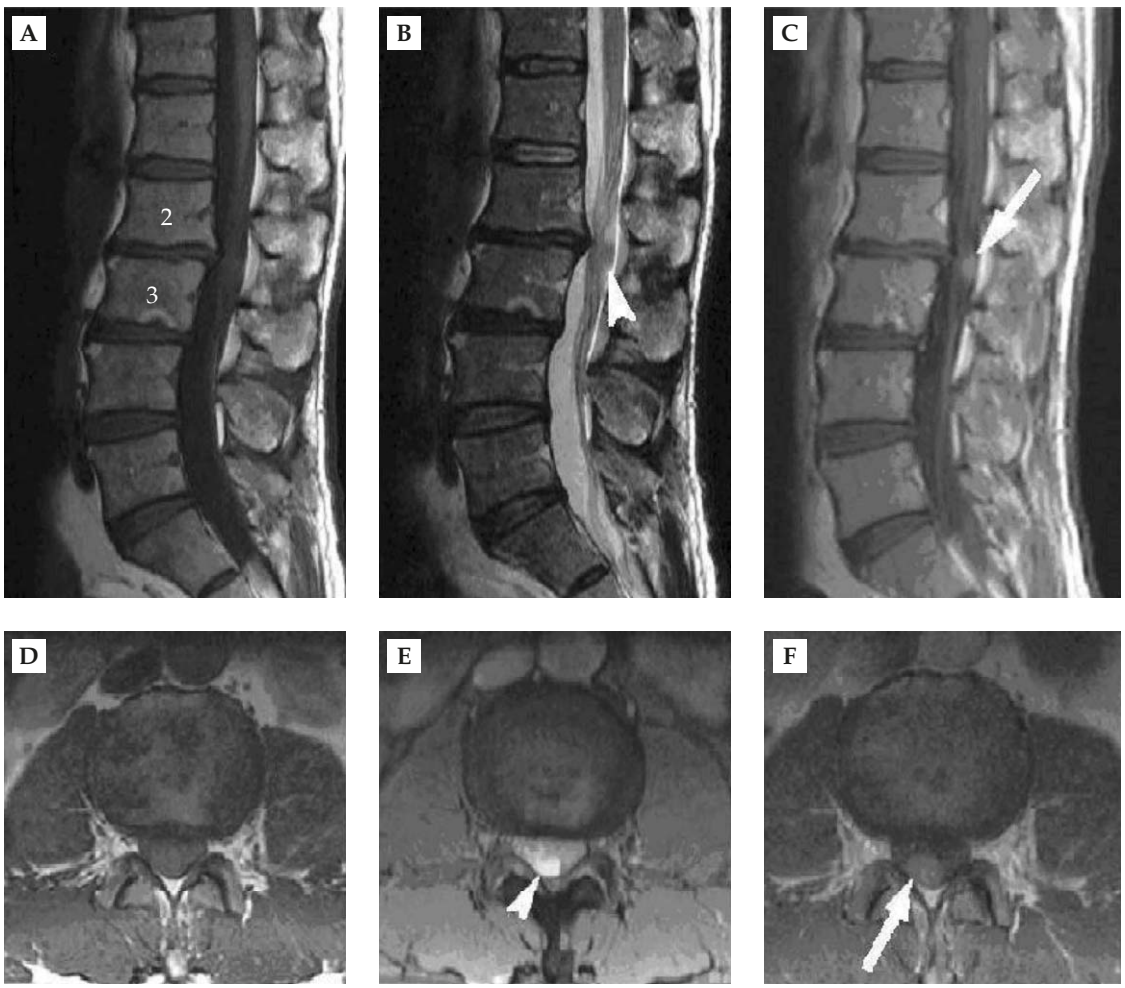

Figure 1. *(A, D) T1-weighted, (B, E) T2-weighted, and (C, F) enhanced T1-weighted lumbar sagittal and axial images demonstrating central disc herniation compressing the thecal sac and bilateral neural foramen at L2/3 and an intradural structure (B and E, arrowheads) of increased density (C and F, arrows) following enhancement at the same site. The central herniated disc and intradural structure occlude most of the spinal canal.*

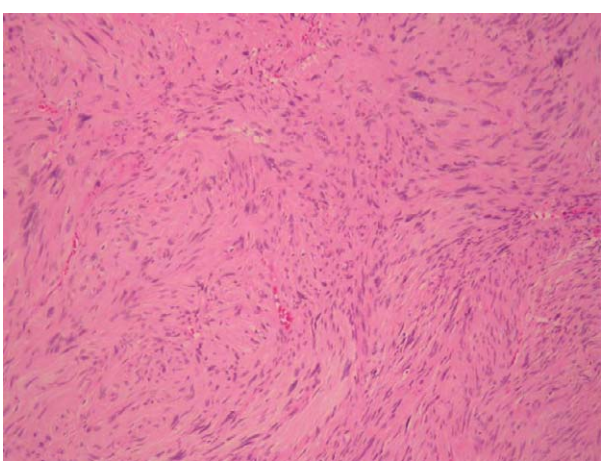

Figure 2. *Pathology shows compact spindled areas composed of cells with elongated and tightly packed nuclei (hematoxylin & eosin, 100×).*

computed tomography (CT) to assess the impact of traction on IVD herniation, Onel et al [7] found that seven of 14 patients had reduced herniated disc substance following traction, which they attributed to negative pressure in the IVD created by traction. An increase in the tension of the posterior longitudinal ligament returns the IVD to its original position [7].

Our patient was an office clerk who had engaged in sedentary work for a long time and was occasionally required to perform heavy lifting. He reported pain and tenderness at the site of the second lumbar spinous process when his back was bent. He also recalled discomfort in the back associated with leaning on a hard-surfaced chair back while sitting. An MRI scan was performed as a result of a numbing sensation in the left groin, the anterior thigh and knee. The MRI

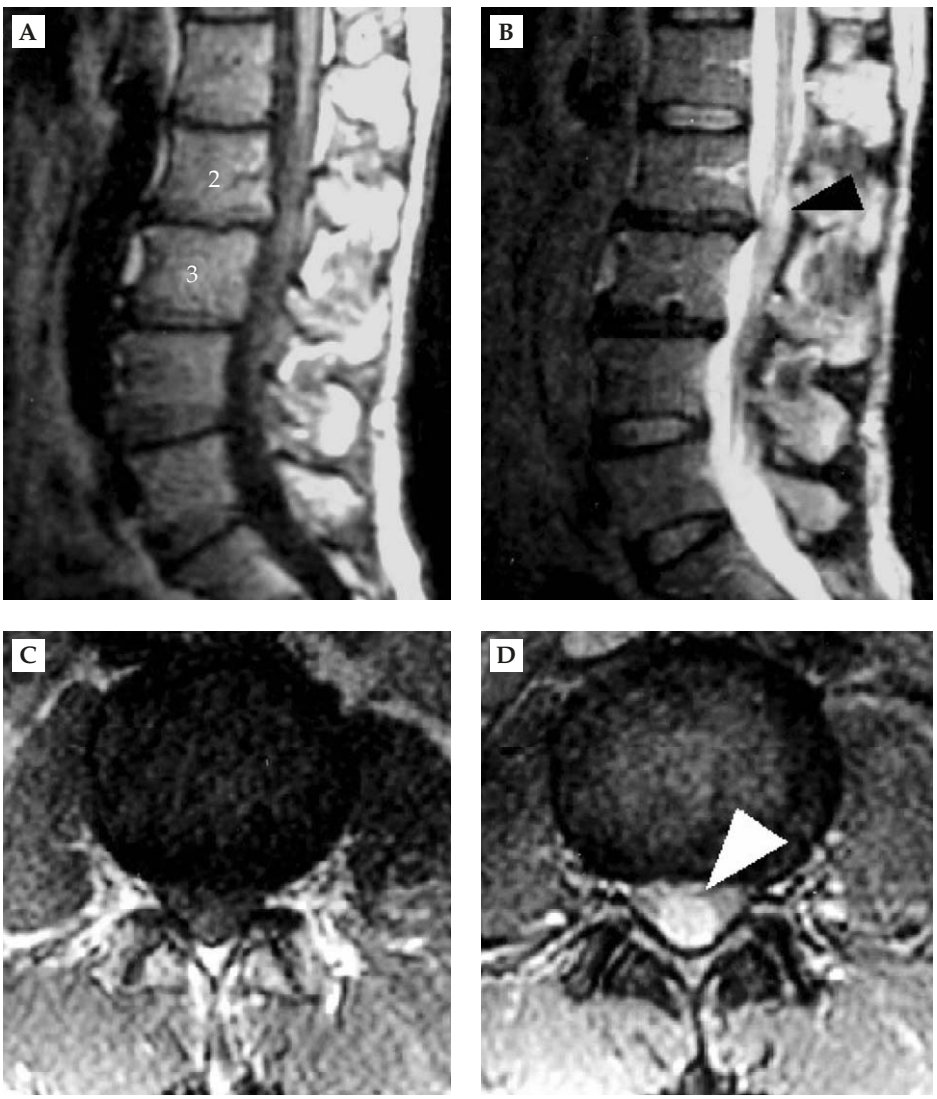

Figure 3. *(A, C) T1-weighted and (B, D) T2-weighted lumbar sagittal and axial images demonstrating central disc herniation compressing the thecal sac and bilateral neural foramen at L2/3 and an intradural structure (B and D, arrowheads) at the same site. The schwannoma had been present 2 years earlier.*

results showed an L2/L3 IVD herniation combined with left L2 radiculopathy. Conservative treatment using long-term traction treatment of the lumbar spine was the primary plan and would continue unless the symptoms persistently worsened with failure to relieve nerve compression. In the event of cauda equina syndrome, immediate surgical treatment would be scheduled [8]. Although the patient's symptoms continued to improve, they did not resolve completely due to a small schwannoma, which was growing slowly at the site of the herniation.

Too high a traction load on the lumbar spine can potentially exacerbate disc herniation syndrome. As shown by Onel et al [7], two of 14 patients showed greater amounts of herniating disc substance with increasing pain after traction. Excessively high traction loads can also induce cauda equina syndrome as shown by Dosoglu et al [9], who reported the case of a 47-year-old patient who developed acute cauda equina syndrome after lumbar spine traction and in whom a piece of IVD material was found in the area between the L3/L4 vertebrae. Donaldson et al [10] also described a 49-year-old female patient with acute sciatica who developed cauda equina syndrome after receiving traction; a severe IVD herniation at the L5/S1 level was ultimately shown to be the cause.

The patient in this study was found to have an L2/L3 IVD herniation, identified by MRI 2 years

prior to being seen in our office. After treatment with traction of the lumbar spine in June 2005, he developed voiding difficulties and weakness of the lower limbs, leading us to initially suspect cauda equina syndrome as a result of traction overload. However, MRI with contrast revealed that the cause of the cauda equine syndrome was a schwannoma at the site of herniation with consequent narrowing of the spinal canal.

The possibility of tumor growth or increased herniation must be ruled out to prevent delayed diagnosis and treatment in cases where symptoms worsen after using lumbar spine traction as a treatment for IVD herniation.

The coexistence of a spinal tumor and IVD herniation is uncommon. Albert et al [11] reported the case of a 52-year-old male patient with L4/L5 IVD herniation together with a schwannoma in the L5 spinal nerve root. The L4/L5 disc herniation and a neighboring intradural lesion at the right L5 nerve root were initially found on myelography. CT confirmed the L4/L5 disc herniation and also identified an intradural lesion, which showed higher intensity with contrast enhancement, a finding consistent with previous myelography. Intraoperatively, a sequestrated disc prolapse was found to have significantly compressed the L5 nerve root. At the exit of the nerve root, a small spherical schwannoma, approximately 12 mm in diameter, was also found [11]. Although both the schwannoma and the herniated IVD appeared bright on T2-weighted MRI, only the schwannoma was highlighted by gadolinium; thus, the use of different contrast enhancement can be used to distinguish between the two [12]. When prior MRI images of our patient were thoroughly reviewed, we found that the schwannoma had been present 2 years earlier (Figure 3). The small schwannoma in the spinal canal was not initially noticed because contrast enhancement had not been used, thus the diagnosis was delayed.

LBP and cauda equina syndrome generally result from larger tumors that are impinging on multiple spinal root levels [13]. The detection of small and slow-growing schwannoma accompanied by lumbar IVD herniation requires the use of MRI with contrast enhancement. Preoperative detection of a schwannoma has a significant positive impact on the outcome of surgery and postoperative rehabilitation.

Spinal nerve compression due to tumors or IVD herniation cannot be easily distinguished clinically. In patients undergoing conservative treatment for lumbar IVD herniation, if symptoms acutely worsen, the possibility of an intraspinal tumor must be considered. A thorough history must be obtained, and physical examination in conjunction with investigative measures such as MRI with contrast should be performed to ensure early diagnosis and institution of adequate treatment.

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腰椎椎間盤突出症合併神經鞘瘤導致症狀惡化 — 病例報告

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腰椎椎間盤突出症為下背痛常見的原因之一，接受保守之治療如：腰椎牽引等物理治療，通常有療效；腰椎脊柱中產生之神經鞘瘤並不多見，產生臨床症狀亦與腰椎椎間盤突出症相似，不易診斷。本例為一位 51 歲男性患者，3 年前有下背痛的情形，於 2 年前經磁振掃描證實 L2/L3 之腰椎間盤突出症，經保守治療改善後，於一年前下背痛復發，經保守治療症狀持續改善，但於二個月前症狀突然惡化，並感覺排尿困難與下肢無力等馬尾症候群，後經磁振掃描檢查意外發現於 L2/L3 腰椎間盤突出處有一小顆神經鞘瘤，造成腰椎狹窄使症狀加劇。患者後來接受椎板切除術並腫瘤移除和椎間盤切除術，患者經追蹤半年，目前症狀解除，唯左側臀部仍遺存麻木感。結論：經保守治療且症狀改善之腰椎椎間盤突出症，若症狀突然惡化，則須再詳細詢問病史與理學檢查，並配合進一步的檢查，如磁振掃描與顯影劑使用，以確定診斷避免延誤病情。

關鍵詞：馬尾症候群，椎間盤突出，神經鞘瘤
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