Disc herniation in lumbar spondylolisthesis

Report of 3 symptomatic cases

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Because of its rarity, we present the case histories of three patients with a painful lumbar disc herniation in spondylolytic spondylolisthesis. The herniations were diagnosed by MRI and CT. Two of the herniations were confirmed at surgery, and one was treated conservatively.

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Case 1

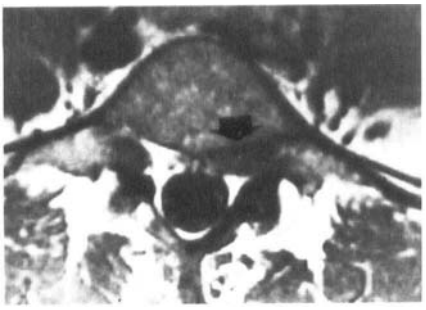
A 42-year-old woman, a sedentary worker, had suffered from low back trouble since adolescence. The low back pain had increased in the course of one year; for 3 months she had also had radicular pain in the left leg down to the first and second toes. She walked with a limp, dragging her left leg. The lumbar spine was stiff in all directions. The muscle strength in her legs was normal and symmetric, as were the knee and ankle jerks. The Lasègue test was negative bilaterally.

Plain radiographs of the lumbar spine showed spondylolysis of the 5th lumbar vertebra with a slip of 8 mm, the same as in radiographs obtained 10 years earlier. The L5–S1 intervertebral space was slightly

Case 1.

Lumbar myelogram in neutral position showing a smooth indentation on the anterior aspect of the dural sac at the L5-S1 level.

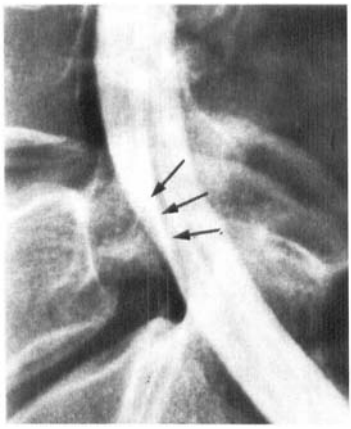
In flexion the anterior contour of the sac is straight and no indentation can be seen.



T1-weighted MRI scan of L5-S1 showing a large anterolateral epidural soft tissue mass, a disc herniation (arrow). The herniation extends to the lateral recess and fills the neural foramen.

Proton density MRI scan showing a disc herniation (arrow) extending posterocranially. The herniated disc material intrudes on the anterior aspects of the dural sac in the upper portion of the L5-S1 interspace.

Case 2.



Sagittal myelogram showing a spondylolisthetic 7 mm slip at the L5-S1 level. There is a wide gap between the posterior margin of the L5 body and the dural sac. At this level there is a barely visible, shallow indentation of the dural sac (arrows), suggesting a cranially migrated disc herniation.

CT showing small bone fragments at the pars articularis defects, and a large herniation (arrow) extending from the midline to the right lateral recess. The herniation mass just touches the dural sac.

reduced, but there were no reactive changes in the adjacent vertebral endplates. A lateral myelogram taken in a recumbent position revealed an indentation in the wide dural sac at the L5–S1 level. The indentation disappeared completely on flexion, and the finding was interpreted as a disc protrusion. In the frontal myelogram, the L5 nerve root sleeves were short and curved sharply posteriorly.

An MRI examination was performed on a Magnetom (Siemens) operating at 1.0 Tesla. A sagittal scan revealed an ascending herniation at the L5-S1 disc space. The posterior longitudinal ligament seemed to be intact. The herniation protruded into the left neural foramen, apparently causing impingement on the left L5 nerve root.

The L5 lamina was excised. The disc was clearly bulging on the left side in the interspace between the L5 and S1 roots. A sequestrated disc mass was removed from the space under the longitudinal ligament, after which the L5 root moved freely. A lateral L5-S1 fusion was also performed.

The radicular pain disappeared immediately after the operation, and the low back pain half a year later. At that time there was a solid fusion between the L5 transverse processes and the S1 alae.

Case 2

A 33-year-old man, a heavy labourer, had suffered from low back pain and discomfort for 15 years. 5 months before admission to the hospital he had an acute attack of low back pain radiating to the right leg and calf. The knee and ankle jerks were symmetric, but the extension strength of the right lower leg was decreased. The Lasègue test of the right leg was positive at 60° and negative to the left. A plain radiograph revealed a 7-mm spondylolisthesis of the L5 disc. As the low back and radicular pain continued despite conservative treatment, the patient was admitted to the hospital.

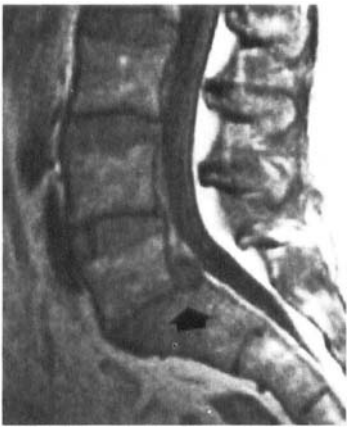
A myelogram showed a wide space between the dorsal margin of the L5 vertebral body and the dural sac. A subtle indentation in the sac was suggestive but not conclusive of a disc herniation. A subsequent CT scan displayed a large herniation above the L5–S1 disc level to the right of the midline. The patient underwent surgery, the right portion of the L5 lamina was removed and the herniation compressing the L5 root anteriorly was removed. After the procedure the root moved freely. Postoperatively the radicular pain vanished immediately. As the patient is still suffering from low back pain, however, he is currently undergoing a rehabilitation program preparing him for lighter work.

Case 3

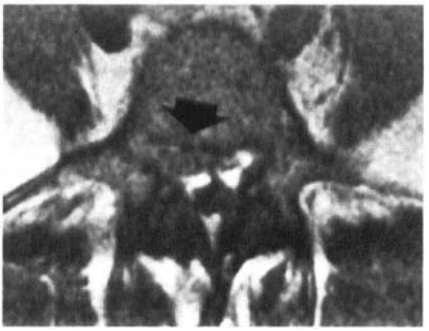
A 40-year-old woman, a sales manager, was seen at the out-patient clinic for acute low back pain with radiation to the right leg and foot. Prior to this episode she had suffered from diffuse low back discomfort for 9 months. On the day after the onset of acute pain, it suddenly waned, while a marked weakening of the extension strength of the dorsal extension of the foot and first toe appeared. On examination the patient was unable to stand on her toes. The skin sensibility of the lateral aspect of the right lower leg and foot was decreased. The right ankle jerk was impaired. The Lasègue test and the knee jerks were negative bilaterally.

As there was strong clinical evidence for acute disc herniation, an MRI examination was performed on a

Case 3.



T1-weighted MRI scan showing a L5-S1 spondylolisthesis of 7 mm, a narrowed L5-S1 disc and a large posterior herniation (arrow) extending cranially halfway up the L5 body.



T1-weighted image showing a large herniation (arrow) extending both posteriorly and into the lateral recess, compressing the right L5 nerve root.

1.0 Tesla Magnetom (Siemens) scanner. The sagittal T1-weighted and T2-weighted scans revealed a bilateral spondylolysis of L5 and a 7-mm anterior slip of the L5 vertebral body. A large herniation mass welled out from the degenerated lumbosacral interspace and extended proximally midway up the L5 vertebral body, causing impingement on the right L5 nerve root. The transaxial T1-weighted cuts of the same disc space disclosed a large herniation extending medially as well as laterally, obliterating the right lateral recess.

The patient was treated conservatively with bed rest for 4 weeks. When she returned to her job 6 weeks after the acute onset of pain, the only complaint was a sensation of tiredness in the low back and a slight muscle weakness of the foot extensor muscles occurring after walking or standing for hours.

Discussion

The prevalence of spondylolisthesis in adults in Finland is 6 percent (Virta 1991). The majority of people with spondylolisthesis are asymptomatic. When there are low back symptoms, these are thought to originate from segmental degeneration, instability, or facet joint osteoarthrosis. Radicular symptoms are considered to be due to nerve root compression or impingement at the pars interarticularis defect (Davis and Bailey 1976).

However, the anterior displacement of a vertebral body in spondylolisthesis may lead to errors in the diagnosis of disc herniation in myelograms. Herniated disc masses may lodge in the gap between the displaced vertebral body and the dural sac, without subsequent compression of the sac. In Cases 1 and 2, the herniation was large enough to compress the dural sac in the neutral position, although in Case 1 the indentation disappeared on flexion. This phenomenon is considered a useful radiological sign of a disc bulge (Pilling 1979, Shapiro 1984); but obviously, as our case shows, this rule is not applicable to patients with spondylolisthesis. Furthermore, the root sleeves at the level of the slipping are usually short, owing to stretching, sharp angulation and pedicular kinking (MacNab 1977) under the pedicles. Therefore, disc herniation in the anterior portion of the widened spinal canal is not likely to compress the dorsal nerve root sleeves.

If the myelography finding is indecisive, as in Case 1, we prefer MRI to CT in the subsequent diagnostic work-up as it is quite difficult to obtain proper CT cuts parallel to the spondylolisthetic L5-S1 intervertebral space. Both the steep anterior tilt of the L5-S1 interspace and the often pronounced lordosis present in spondylolisthesis frequently lead to confusing tomograms in which the posterior edges of L5 and S1 appear close to each other, and both the disc and any possible herniation are hard to detect. However, CT is excellent for demonstrating the bony conditions at the pars interarticularis defects.

Very few studies have been made of the morphology of spondylolisthetic discs. MRI provides a useful tool to examine the morphology of discs noninvasively (Schlenzka et al. 1991). However, a plain radiography should be used for primary examination, as it provides sufficient information about the lysis, the degree of vertebral displacement, and degenerative changes. MRI has additional advantages in the evaluation of the intervertebral neural foramina in spondylolisthesis (Annertz et al. 1990). Currently, if operative treatment of spondylolisthesis in an adult is to be considered, MRI is recommended as the second examination modality after plain radiographs.

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