

Cause of radiating back pain

Wei-Yang LIM and Wilfred C. G. PEH

Department of Diagnostic Radiology, Singapore General Hospital, Singapore

Case history

A 63-year-old Chinese man presented with pain in the lower back. The pain was persistent and radiated to both lower limbs. Pain was worse on prolonged standing and exercise. On examination, there was no neurological deficit. Radiographs of the lumbar spine were obtained.

Q.1 What are the radiological findings?

The lateral radiograph of the spine (Fig. 1) shows a mild forward slip (or spondylolisthesis) of fifth lumbar (L5) vertebral body over the first sacral segment (S1). The L5/S1 disc space is narrowed, as are the L5/S1 intervertebral neural foramina. There is also a clear break in the L5 pars interarticularis (also known as spondylolysis). No destructive change or vertebral body collapse is seen.

Q.2 What is the diagnosis?

The diagnosis is lumbar spondylolisthesis as a result of L5 spondylolysis. Spondylolisthesis refers to a forward shift of a segment of one vertebra over another. The shift normally occurs between the L4 and L5 vertebrae, or between the L5 vertebra and the sacrum. The normal laminae and facet joints form a locking mechanism that prevents the vertebrae from moving forwards on the one below. In spondylolisthesis, this mechanism is disrupted, and is often due to spondylolysis, as seen in the present patient.

Q.3 What are the different types of this condition?

There are 6 types of spondylolisthesis, namely:

- 1 Dysplastic
- 2 Lytic isthmic
- 3 Degenerative
- 4 Post-traumatic
- 5 Pathological
- 6 Post-operative

The lytic type is most common. In this type, there are bilateral defects in the pars interarticularis (spondylolysis), usually the fourth or fifth lumbar vertebra. This allows a forward slip of the vertebral body, pedicles and superior articular processes onto the adjacent lower vertebral body. In the degenerative type, the spondylolisthesis can occur without spondylolysis as the angulation of the articular facets are changed, allowing a forward slip.

Q.4: What is the role of radiological imaging?

Diagnosis of spondylolysis can be made on radiographs which demonstrate bony defects on the lateral and oblique views. Lateral radiographs permit assessment of the degree of forward displacement (spondylolisthesis). Oblique views may also reveal a 'Scotty dog' sign in which the defect in the pars interarticularis likened to the collar of the dog. On occasions where radiographs are equivocal or unhelpful, thin-section computed tomography with oblique reconstructed images are helpful in showing the pars defects (or spondylolysis) as well as the degree of neural foramina narrowing. Spinal canal stenosis and nerve root compression can be directly visualized on magnetic resonance imaging. Surgery may be required to correct the malaligned vertebra.

Correspondence: Professor Wilfred CG Peh, Programme Office, Singapore Health Services, 7 Hospital Drive, #02–09, Singapore 169611.
Email: wilfred.peh@singhealth.com.sg

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Fig. 1. Lateral radiograph of the lumbar spine shows slight forward slip of fifth lumbar (L5) over first sacral (S1) segments. The L5 pars defects (arrow) are noted. There is narrowing of the L5/S1 intervertebral neural foramina, compared with the more cranial lumbar levels. Narrowing of the L5/S1 disc space is also noted.

Q.5 Could osteoporotic compression fracture give this radiological appearance?

Osteoporosis is a disorder in which a reduction of bone mass and the associated structural changes leads to increased bone fragility. Osteoporosis may be localized or can involve the entire skeletal system. In osteoporosis, there is generalized osteopenia which is most prominent in the vertebral column. There is thinning and accentuation of the cortices. The vertebral bodies have a striated appearance due to the loss of secondary trabeculae and reinforcement of primary trabeculae. The loss of trabecular bone accentuates the cortical outline resulting in a 'picture framing' appearance. The weakened vertebral bodies may undergo wedging or compression fractures with minor degrees of trauma. On radiographs, there is loss in height of the affected vertebral body. Varying degrees of protrusion of the intervertebral disc into the adjacent vertebral body may result, ranging from buckling of the endplates (biconcave appearance) to herniation of disc material into the vertebral body (Schmorl's node). None of these features are present in the current patient.

References

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