

## X-ray quiz: a middle-aged man with low back pain

### X 光照片猜謎：一名腰背痛的中年男子

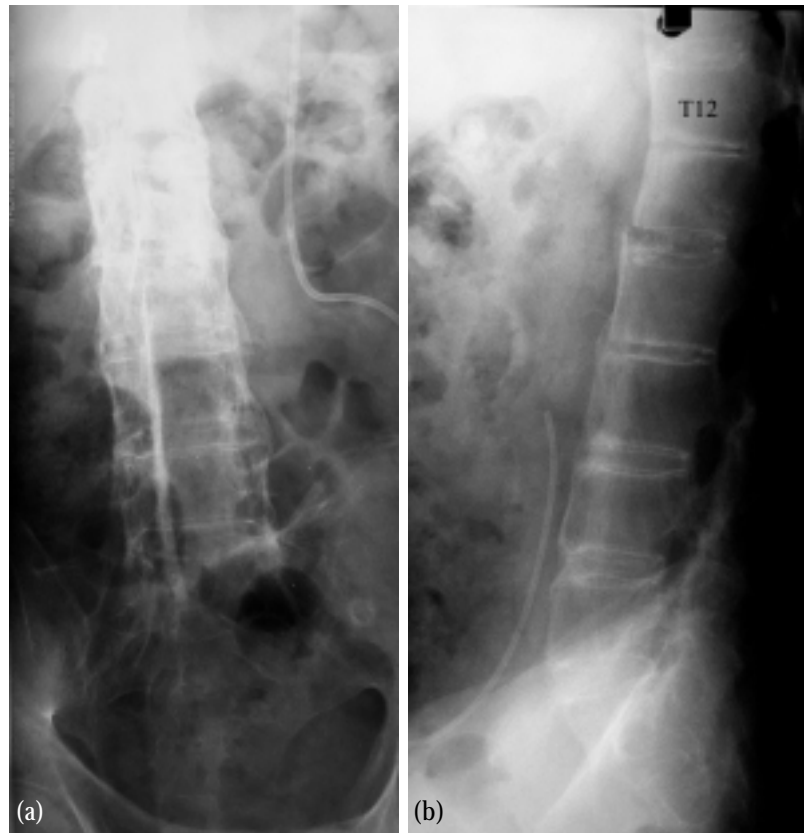
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#### Case

A 41-year-old man with history of intracranial arteriovenous malformation had a convulsion and fall one week ago. There was no back pain immediately after he regained consciousness. He claimed to have mechanical back pain of insidious onset subsequently. There was no accompanying lower limb numbness or weakness. He had no fever. At the time of presentation, there was tenderness at the upper lumbar spine region. There was no neurological deficit in the lower limbs and the anal tone was normal. Plain radiographs of the lumbar spine were obtained (Figures 1a & 1b).

#### Questions

1. What are the radiological findings in the radiographs (Figures 1a & 1b)?
2. What is the underlying chronic disease in this patient?
3. What further radiological investigation would you suggest?



Figures 1a & 1b. What are the radiological findings?

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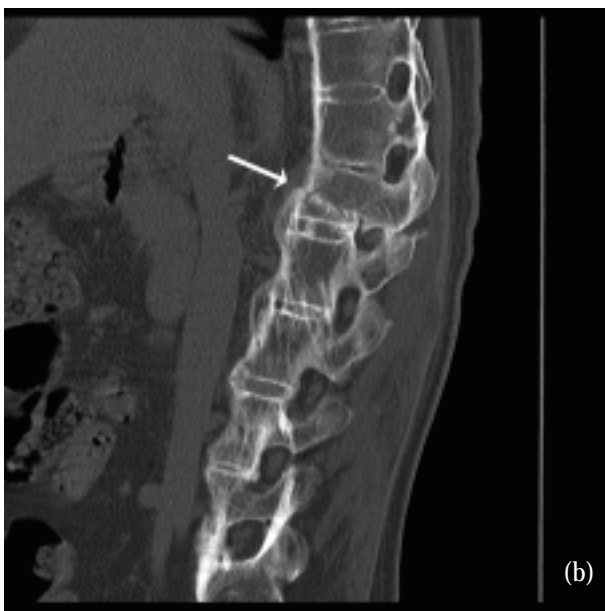
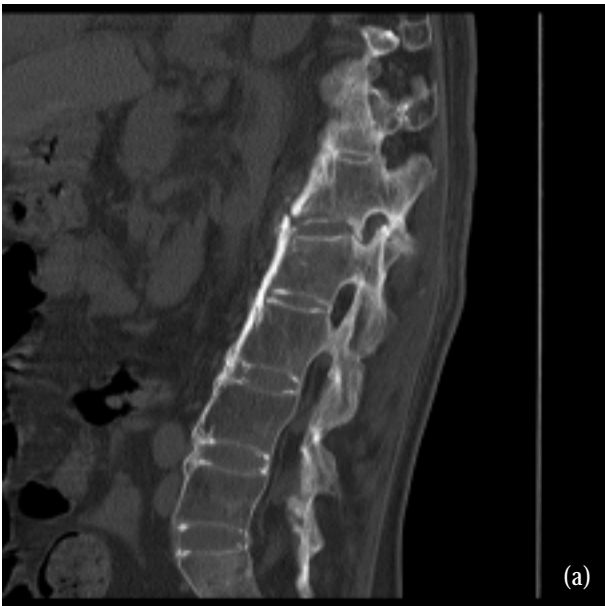
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## Answers

1. There is bilateral symmetrical fusion of the sacroiliac joints. Straightened anterior margins of the vertebral bodies are suggestive of "vertebral squaring". Marginal syndesmophytes with features of "bamboo spine" are seen. The "trolley-track" sign is noticeable (A vertical central radiodense linear



**Figures 2a & 2b.** Transvertebral fracture in the lower L1 vertebral body just above the inferior endplate (arrow).

line along the spinous processes on the frontal radiograph is related to ossification of supraspinous and interspinous ligaments. In addition, there are two more lateral vertical linear lines, which represent ossification of the apophyseal joint capsules. The three vertical ossified lines together make up the trolley-track sign.). Marked osteoporosis and degenerative changes are also present in the lumbar spine. In addition, there is a horizontal lucency with cortical break suggestive of fracture projected just below the L1 vertebral body. A ventriculoperitoneal shunt is seen in the left side of the abdomen.

2. Ankylosing spondylitis.
3. Computed tomography (CT) is helpful in delineating bony fracture of the spine. CT scan of the lumbar region revealed syndesmophytosis, which is consistent with the known ankylosing spondylitis. A fracture line with partly sclerotic border is seen across the lower L1 vertebral body just above the inferior endplate (transvertebral fracture) (Figures 2a & 2b). Fracture is also seen at the spinous process of L2 (Figure 3).



**Figure 3.** Fracture at the spinous process of L2.

## Discussion

Ankylosing spondylitis is a generalised chronic inflammatory disease primarily affecting the axial skeleton, mainly the spine and sacroiliac joints. It is characterised by pain and stiffness of the back. Males are affected more frequently than females (estimates vary from 2:1 to 10:1) and the usual age at onset is between 15 and 25 years. The disease is associated with HLA-B27 antigen in 96%.<sup>1</sup>

Ankylosing spondylitis often begins as an inflammation of the sacroiliac and vertebral joints, and ligaments. Peripheral joints are affected in 10-20%. Pathological changes include inflammation with granulation tissue formation, followed by articular cartilage and bone erosion. The destructive lesion heals by deposition of new bone at the local tendon or ligament interface, causing healing with bone proliferation at non-articular sites, syndesmophytes at vertebral margins and ossification of joint capsules.<sup>2</sup>

Most patients are young men who complain of persistent backache and stiffness, often worse in the early morning. In the advanced stage of the disease, the spine may become absolutely rigid. Atlantoaxial subluxation can be seen if the cervical spine is involved.<sup>3</sup> If the costovertebral joints are involved, respiratory excursion can be diminished. Extra-skeletal manifestations include pulmonary fibrosis and aortitis.

The presence of increased stiffness and rigidity of the spine in patients with ankylosing spondylitis inevitably results in a higher risk of fracture from minor trauma when compared to the normal population.<sup>4</sup> Transvertebral fractures are less common than transdiscal ones. Lumbar fractures in ankylosing spondylitis are less common than cervical fractures. Accompanying neurological complications are less common in thoracic and lumbar spine than in the cervical spine.<sup>5</sup> Simple fractures often healed by moderate immobilisation. Attention should be paid to the possibility of fracture in patients with ankylosing spondylitis, even following minor trauma. CT scan is helpful in assessing the bony fracture, while MRI scan has the added advantage of revealing accompanying soft tissue injuries.

## References

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