Internal fixation for stress fractures of the ankylosed spine[1]

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Summary: Three cases of stress fractures affecting the rigid spine of ankylosing spondylitis are reported. Even without the typical destructive features of the Romanus lesion, symptoms may be very prolonged and disabling and the diagnosis difficult. Internal fixation produces immediate pain relief and rapid fracture union.

Introduction

The first description of a destructive lesion affecting the rigid spine of ankylosing spondylitis was given by Romanus & Yden in 1955. Initially it was thought to be due to infection or a degenerate rheumatoid nodule, but more recently histological studies have correctly identified the aetiology as a stress fracture exhibiting a delayed or non-union response. The typical site of anterior interbody destruction is probably secondary to a posterior arch fracture (Yau & Chan 1974). Our experience suggests, however, that more commonly a peripheral stress fracture exists alone but is still very slow to unite and is a source of prolonged pain and disability.

This paper reports illustrative case histories of three patients – the first with a typical Romanus lesion, and two whose stress fractures responded well to internal fixation.

Case reports

Case 1: A 58-year-old woman had suffered from ankylosing spondylitis for 30 years. The disease had progressively involved the whole spine and had produced a severe rigid thoracic kyphosis. She complained of increasing and disabling pain in the upper thoracic spine and radiographs showed a Romanus lesion at the level of D8–9 (Figure 1A). The lesion progressed over the next 2 years, exhibiting typical destructive and sclerotic features (Figure 1B). Union was only achieved with increased kyphosis, and pain was relieved as rigidity was restored (Figure 1C).

Case 2: A 51-year-old man had suffered from ankylosing spondylitis for 20 years. The entire spine and hip joints were severely involved. Constant low back pain had been present for 4 years. Radiographs of the lumbar spine in 1980 showed a fracture of the anterior syndesmophyte of L4–5. Despite rest in a plaster jacket, serial radiographs showed no sign of union (Figure 2A,B). In addition, destructive and sclerotic features were not seen. In August 1983, posterior spinal exploration was performed and rigidity of the lumbar spine confirmed at all levels except L4–5. Internal fixation (without bone grafting) was achieved by the application of a Meurig-Williams plate to the spinous processes of L3 to S1 inclusive. The pain was immediately relieved and the fracture united within 4 months (Figures 2C,D).

Case 3: A 39-year-old woman had suffered from ankylosing spondylitis for 13 years. The entire spine was severely affected. In April 1983 she suffered an acute chest infection with prolonged coughing episodes, one of which was followed by pain in the upper lumbar spine. Radiographs at this time showed typical features of the disease but no apparent injury (Figure 3A). The pain became constant and disabling over the next 4 months. Radionuclide imaging showed increased isotope uptake in the posterior elements of L3, and tomography confirmed

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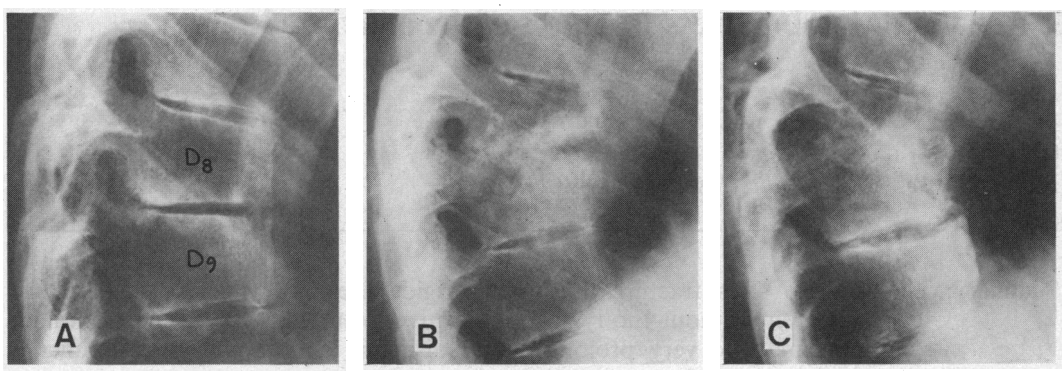

Figure 1. Case 1. A: early Romanus lesion D8–9. B: destruction and sclerosis at 6 months. C: spontaneous union at 2 years

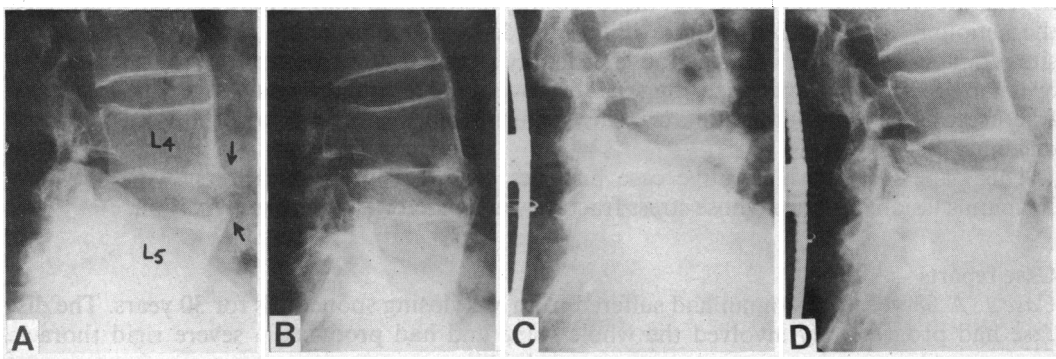

Figure 2. Case 2. A: fracture of anterior syndesmophyte of L4–5. B: non-union at 3 years. C: postoperative view. D: union at 6 months

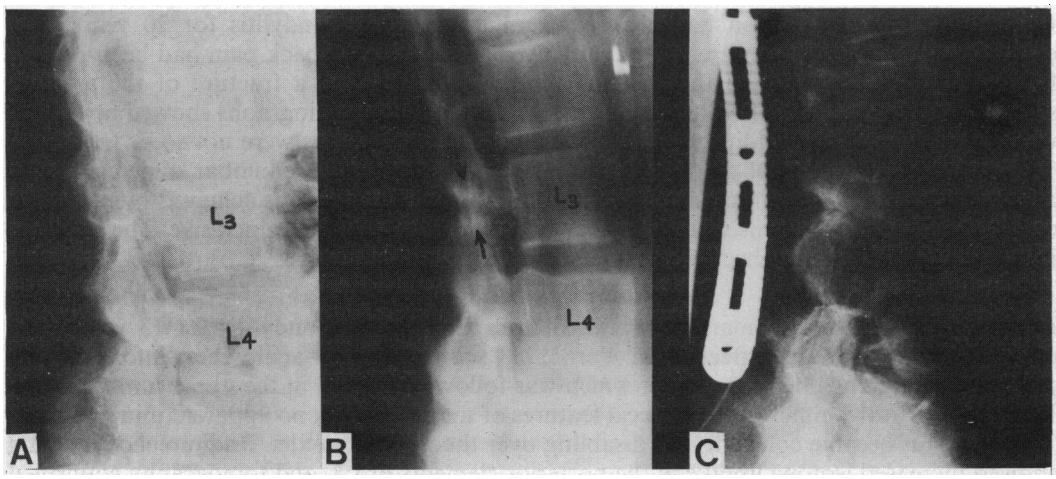

Figure 3. Case 3. A: plain radiograph of lumbar spine. B: tomogram reveals fracture of pars of L3. C: postoperative view of fixation

the presence of a stress fracture (Figure 3B). Internal fixation by a Meurig-Williams plate (without bone grafting) from L2–5 gave immediate pain relief. The fracture was visible postoperatively (Figure 3C) but united within 3 months.

Discussion

Traumatic fractures of the rigid spine of ankylosing spondylitis are reported to unite predictably over a period comparable to those of the normal spine. Conservative measures are sufficient to achieve union and, in the case of cervical spine injuries, the opportunity may even be taken to correct the typical deformity by a suitably adjustable orthosis.

Stress fractures, however, present insidiously at all levels of the spine, though most often at the lower thoracic/upper lumbar region. The behaviour of the rigid spine when subjected to deforming forces can be compared to that of a long bone, and stress fractures here behave comparably. The long period before union is achieved is considered to be due to the concentration of all movement at the fracture site because of rigidity at all other levels. Internal fixation abolishes the movement, with immediate pain relief and rapid fracture union.

It is interesting that these patients had no destructive features typical of the Romanus lesion as illustrated by the first case. Histological studies have drawn attention to the disc/bone interface (Sutherland & Matheson 1975, Hanson & Shagrin 1971) when a destructive lesion is found. Active bone remodelling and sclerosis are seen with an inflammatory infiltrate soon replaced by vascular fibrous tissue. An immune-mediated inflammatory reaction due to disc exposure may well be a necessary aetiological factor in the true Romanus lesion, as suggested by the early lytic process seen in Figure 1A. Even if these features are not seen, symptoms are still prolonged and disabling when treated conservatively.

It is suggested, therefore, that in patients with rigid spines due to ankylosing spondylitis who present with severe back pain and in whom no obvious destructive lesion is present on plain radiographs, a diagnosis of stress fracture be considered and confirmation sought by tomography and radionuclide imaging. Operative treatment by posterior exploration and internal fixation without bone grafting is straightforward and produces immediate pain relief followed by rapid fracture union.

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References

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