Case Report

A Case Report of Neurologically Unstable Fracture of the Lumbosacral Spine in a Patient with Ankylosing Spondylitis

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Abstract

***Introduction**: Fracture/dislocation is uncommonly reported in ankylosing spondylitis involving the lumbosacral spine. **Clinical Picture**: We report an 18-month follow-up of a case of neurologically unstable traumatic fracture of the lumbosacral spine in ankylosing spondylitis. **Treatment/Outcome**: Posterior decompression, alar-transverse fusion and instrumentation were performed. Anterior diskectomy and fusion were done 6 weeks later. There was solid bony fusion on follow-up and the patient had improvement of 2 Frankel grades and was able to ambulate. **Conclusion**: Combined approaches and longer fixations to stabilise the spine may be required. In the lumbosacral spine, this poses a problem vis-à-vis limited levels of fixation in the sacrum.*

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Key words: Combined approach, Frankel grade

Introduction

Ankylosing spondylitis is associated with progressive ossification of the spinal ligaments and ankylosing of the facet joints leading to a totally stiff spine. It is often associated with osteoporosis due to chronic inflammation and disuse. Minor trauma[1-3] can lead to fracture patterns that are different from that in a normal spine. They are easily missed, cause significant neurological deficits and present treatment problems.

Fractures through the cervical spine[4-6] have been well reported. Similar fractures in the thoracic[1,3] and lumbar[1,3,7] spine have not been emphasised as clearly. Fracture/dislocation of the lumbosacral spine was reported only once in the literature.[1]

The objective of this paper was to report our experience with a case of traumatic fracture of the lumbosacral spine presenting with neurological deficits.

Case Report

A 50-year-old gentleman was admitted to our hospital on 5 June 1998. He was unloading several boxes from a lorry when the boxes fell onto his back. He subsequently complained of low back pain associated with inability to micturate and weakness of his lower limbs. The motor power of his knees was graded as 3 based on the British Medical Research Council Nerve Injury Committee classification scheme. The motor power of his ankles was graded as 0. On examination, there was haematoma and tenderness over his lower lumbar spine. The sensory deficit level was at L5, associated with saddle anaesthesia. Both the knee and ankle jerks were absent. The anal tone was lax. The Frankel grade was "A" on initial assessment.

Plain radiographs of the lumbosacral spine (Figs. 1a & 1b) revealed features of ankylosing spondylitis with bamboo spine and fracture at the L5/S1 level with gross displacement. The fracture appeared to be just caudal to the superior end-plate of S1, with some degree of compaction of bone.

The patient was subsequently catheterised. Spinal nursing and intravenous (IV) methylprednisolone were started. An urgent magnetic resonance imaging (MRI) scan (Fig. 2) revealed fracture through the upper end-plate of S1, the L5/S1 facet joint, and the L5/S1 ossified interspinous ligament. There was haematoma extending through the L5/S1 interspinous fracture to the subcutaneous plane. There was epidural haematoma causing thecal sac compression especially at the L5/S1 level. The spinal cord was normal.

Emergency decompression of the L5/S1 level with alar-transverse fusion and Steffee instrumentation (Figs. 3a &

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3b) was performed on the same day. Intraoperative findings were that of completely fused spine with extensive paraspinal haematoma. There was fracture displacement across the L5/S1 level with complete involvement of the 3 columns. Both dural sac and nerve roots were intact.

His neurological status did not improve postoperatively. Check radiographs showed evidence of significant anterior gap and instability in the coronal plane (Figs. 3a & 3b). Anterior diskectomy of the L5/S1 level and iliac crest bone grafting via a transperitoneal approach was performed 6 weeks later. The patient was subsequently referred for rehabilitation. He started ambulation on the third postoperative day. No orthosis was prescribed. He stayed in the hospital 3 months after the second surgery. There was neurological improvement after the second surgery. The motor power of his knees and right ankle had increased to grade 4. Plantarflexion of the left ankle was graded as 4 and dorsiflexion as 1. Sensation was fully restored. Solid fusion at the L5/S1 level was evident on radiographs taken 5 months after the injury (Figs. 4a & 4b). He was then able to walk with the aid of a stick. He had persistent drop foot on his left side and also had incomplete recovery of bladder function. His neurological status remained the same at 18 months follow-up (Frankel C).

Discussion

Fractures of the spine are not infrequently found in association with ankylosing spondylitis. A retrospective review[8] of 105 cases with ankylosing spondylitis found 13 cases with previous spinal fractures, including 8 in whom there were serious associated spinal cord injuries. The combination of stiffness and disuse osteoporosis results in the vulnerability of the ankylosed spine to minor trauma. The fracture pattern is different from that of injuries involving a normal spine. The fracture line goes entirely through the bone, either through the vertebral body or ossified ligaments or disk. Fracture classifications developed for normal spine are not applicable in these instances, especially when the facet joints are completely fused. The entire spine behaves as an osteoporotic long bone. Patients known to have ankylosing spondylitis should be counselled regarding the likelihood of a fracture. Should there be persistent pain after injury, radiographs must be performed to rule out any fracture. Computed tomography (CT) or MRI or both should be done if clear visualisation is not possible by plain radiographs. Back or neck pain after injury should not be assumed to be arthritic in origin.[4]

As mentioned earlier, fractures through the cervical spine in ankylosing spondylitis have been well documented.[4-6] The presence of thoracic and lumbar fractures, particularly at the thoracolumbar[1,3] junction have also been reported, though less frequently.

On the contrary, there has been only one report of traumatic fracture of the lumbosacral junction.[1] From a biomechanical standpoint, both the thoracolumbar and lumbosacral junctions are areas of increased stress concentration.[1] The transitional nature of the spine at these junctions is obvious. In the ankylosed spine, where compensatory disk and facet movements in response to load is not possible, bony deformation and stress will occur most frequently at the thoracolumbar and lumbosacral junctions. In clinical practice, there were far more thoracolumbar fractures reported as compared to that of lumbosacral fractures. The discrepancy in the prevalence of fractures occurring in thoracolumbar and lumbosacral junctions can be explained by the longer lever arm in the thoracolumbar junction, thus predisposing it to fracture more frequently than the lumbosacral junction. In the only other reported case of fracture of the L5/S1 level, the patient did not have any neurological deficit. Treatment was conservative, in a Taylor brace. The fracture through the posterior elements healed 3½ months after the initial trauma.

Our patient had an entirely different presentation. He presented with neurologic deficits i.e. weakness, inability to micturate and a definite sensory level at L5. Radiographs and MRI scans confirmed the diagnosis of fracture displacement at the L5/S1 level. The patient underwent immediate surgery. He had posterior decompression, alar-transverse fusion and instrumentation. As the spine was still unstable and he did not show significant neurological recovery, a second stage anterior diskectomy and fusion were done. This time, he recovered 2 Frankel grades and was able to ambulate with the aid of a walker. Check radiographs showed solid bony union at L5/S1 level 5 months after injury.

We feel that implant loosening and instability is a major concern in the fixation of spinal fractures in ankylosing spondylitis. In our case, the mechanism of injury is thought to be flexion and compression type, leading to some compaction of bone. Due to the osteoporotic skeleton and the stiff spine with long lever arms, and also the fact that the spine only moves at the fracture site, a single approach may not withstand the load imposed on it. A posterior only approach will cause opening up of the anterior column leading to a significant anterior gap, as illustrated in our case. There will also be coronal instability manifested by "windshield wiper" effect of the spinal column. This was depicted on radiographs (Figs. 3a & 3b) in our patient, where there was malalignment of the spinous processes and ossified supraspinous and interspinous ligaments. Restoring the anterior column with a bone block will reduce potential instability of the spine. In our patient, the coronal instability and anterior gap probably contributed to

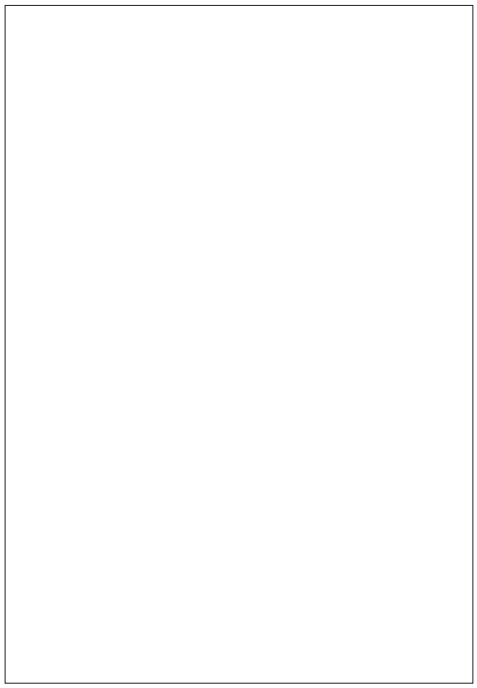

Fig. 1a. Radiograph (AP) of the fracture at the L5/S1 level, depicting the mal-alignment (arrows) of the spinous processes, ossified supraspinous and interspinous ligaments.

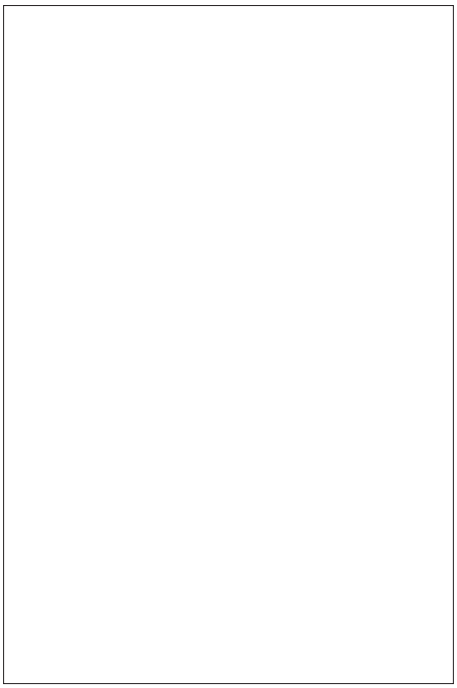

Fig. 1b. Radiograph (lateral) of the fracture at the L5/S1 level, depicting the anterior displacement of L5 (thick arrow) with respect to S1 (thin arrow).

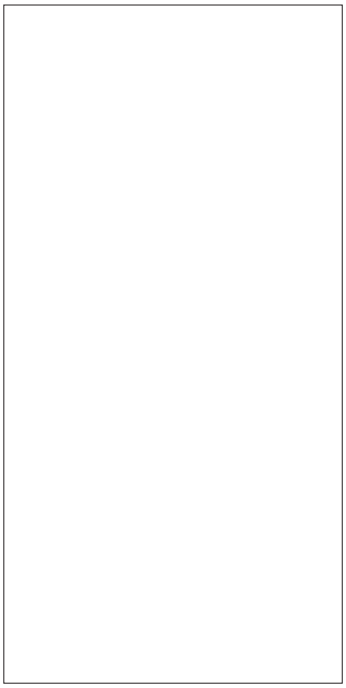

Fig. 2. MRI scan of the lumbosacral spine.

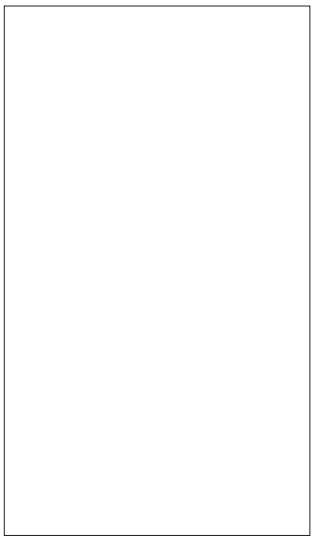

Fig. 3a.

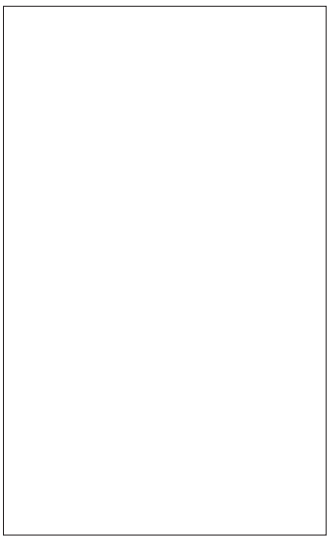

Fig. 3b.

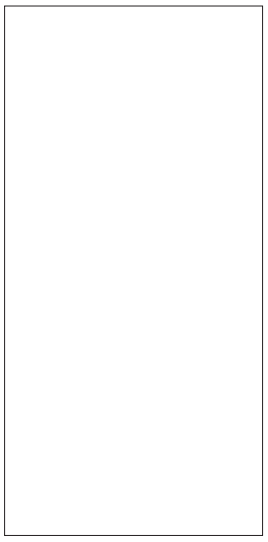

Fig. 4a.

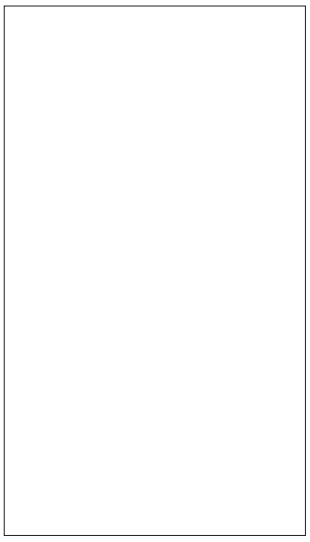

Fig. 4b.

Fig. 3a. Postoperative radiograph (AP) showing posterior decompression, fusion and instrumentation performed. There was residual coronal instability (arrows) depicted by mal-alignment of the spinous processes, ossified supraspinous and interspinous ligaments of L5 and S1.
Fig. 3b. Postoperative radiograph (lateral) showing posterior decompression, fusion and instrumentation performed. There was significant anterior gap present (arrow).

Fig. 4a. Radiograph (AP) 5 months after injury. There was solid bone fusion at the fracture site.
Fig. 4b. Radiograph (lateral) 5 months after the injury illustrating union at the fracture site.

persistent neurological deficits present after posterior decompression and instrumentation. These were corrected with anterior diskectomy and fusion. Check radiographs (Figs. 4a & 4b) revealed that the spinous processes and ossified ligaments were correctly aligned again. A double approach that stabilises the spine from anterior and posterior is more secure and beneficial. Restoration of stability will also aid in the neurological recovery. This restores the posterior tension band and follows the principles of plate fixation of fractures of long bones in which the plate is best

positioned on the tension side of the bone. It may also be advisable to use longer fixations in both directions to have a better and more stable purchase. In the lumbosacral area, this poses a problem vis-à-vis limited levels of fixation in the sacrum. Hence, it is even more important to restore the anterior column in this region to prevent residual instability. In conclusion, we recommend combined approaches when treating unstable fractures/dislocations of the spine in ankylosing spondylitis.

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