



CASE REPORT

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Successful management of a cervical fracture in a patient with ankylosing spondylitis by a posterior approach

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Abstract

Patients with ankylosing spondylitis (AS) are at an increased risk of spinal fractures due to the altered spinal biomechanics. Moreover, it is difficult to treat these fractures due to the combination of ankylosis and osteoporosis. We report successful management of a C6-C7 vertebral fracture in a patient with AS. The patient improved in his neurological status and a good fusion was seen at a follow-up of 24 months.

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Full Text

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic inflammatory disease, which mainly affects the sacroiliac joints and the spine. It is characterized by pain and progressive stiffness. It may also involve other large joints including the hips, knees, and shoulders. About 90-95% of patients with AS are positive for human leukocyte antigen (HLA-B27). Men are more often affected than women, with a ratio of 2:1, and the typical age of onset is between the second and the fifth decade of life. [1] Spinal fractures are up to four times more common in patients with AS than in the general population. [2] Most of these fractures result from trivial trauma. [3] The subaxial cervical spine is the most frequent site for acute spinal fractures in AS. These fractures involve all three columns and thus are frequently unstable. [3]

Management of these patients is a challenging task because of the unstable nature of injury, altered biomechanics of spine due to ankylosis and osteoporosis. Coexisting cardiopulmonary conditions further complicate the matters. Both conservative and surgical treatments are advocated, but there is an increasing evidence to suggest that surgical treatment is superior to conservative management. Various procedures, such as anterior approach alone, anterior approach with iliac bone grafting, posterior alone approach, and combined 360° stabilization, have been advocated. [4]

Case Report

A 50-year-old male came with a history of progressively worsening weakness of all four limbs after being hit by a wooden plank 1 month prior to presentation. When admitted, the patient had spastic quadriplegia of grade 2/5. There was hypoesthesia to all modalities of sensation below C7 level. The patient was unable to straighten his neck and was forced to keep it in a hanging flexed position due to severe pain. Three-dimensional computed tomography (CT) scan showed straightening of the entire spine (bamboo spine) with disruption of the anterior, middle, and posterior elements of the spine at C6-C7 level with listhesis of C6 over C7. The fracture line was seen to be passing through the upper portion of C7 vertebral body. There was a complete dysjunction of the vertebral column at C6-C7 level with the column moving as two separate fragments [Figure 1]. There was associated ossification of annulus, disc spaces, anterior and posterior longitudinal ligaments. There was severe osteoporosis of the vertebral bodies. Magnetic resonance imaging showed a fracture with listhesis of C6 over C7 with significant cord compression. A diagnosis of AS was made, and the patient was found to be HLA-B27 positive. Due to progressive neurological deficit and unstable nature of injury, we decided to intervene surgically. We opted for a posterior approach. The patient was placed in prone position under Gardner-Wells traction. A weight of 7 kg was applied. The cervico-dorsal spine was exposed. The C6 vertebra had dipped forward with fracture of the superior portion of the C7 vertebral body. Lateral mass screw and rod fixation was performed 3 levels above and below the listhesis. Intraoperative reduction was achieved by distraction. Bone graft was put over the instrumented spine to achieve fusion. The patient improved neurologically in the immediate postoperative period. Postoperative immobilization was given in the form of Philadelphia collar for 3 months. At a follow-up of 24 months, the patient's neurological recovery was sustained. He was able to ambulate independently and was able to perform all his routine activities. His neck pain had improved significantly. Postoperative CT images performed at this time showed maintenance of the reduction and fusion at the fracture site [Figure 2].{Figure 1}{Figure 2}

DISCUSSION

AS is a seronegative spondyloarthropathy. It starts with the inflammation of sacroiliac joints (sacroiliitis) with cartilage destruction and bony erosions followed by ascending inflammation of the vertebral apophysis and entheses. This leads to formation of bone in the form of enthesophytes and syndesmophytes, which causes progressive stiffening of vertebral column. As the disease advances, it gives rise to the characteristic bamboo spine. [4] Patients with AS have a lifetime incidence of spine fractures ranging from 5% to 15%. The increased susceptibility to fractures is attributed to the loss of flexibility of the spine due to ossification of the spinal ligaments and calcification of the annulus fibrosis and osteoporosis resulting from immobility and

increased bony resorption. [5]

Subaxial cervical spine is the most common site of fracture in these patients because of increased mobility, small vertebral bodies, and oblique articular facets. They are considered highly unstable with an increased risk for neurologic deficits (29-91%) and nearly twice the mortality rate (35%) of the normal population. Respiratory complications such as pneumonia are the most frequent cause of mortality ranging from 18% to 32% in various series. [6]

Patients often present late in the course as they cannot distinguish the pain of an acute fracture from their chronic inflammatory pain. Moreover, preexisting kyphotic deformity with distorted anatomy and high-riding shoulders make it difficult to detect fractures on plain radiographs. [7]

The course of management is determined by both the fracture pattern and the patient's overall medical status. Stable fracture patterns are amenable to conservative approach in the form of external orthoses or traction or halo vest placement. However, there is increasing evidence that AS patients have a higher complication rate when treated conservatively versus surgically. This is due to the highly unstable nature of the fracture, associated osteoporosis, pathological chest rigidity, and poor quality of the skin. [8]

Anterior fixation alone, posterior fixation alone or a combined (360°) single stage, or staged anterior and posterior procedures along with decompression have been described for these fractures. There is a high incidence of screw pullout and construct failure due to osteoporosis and altered biomechanics of spine.

An anterior approach alone does not provide sufficient exposure when multiple level fixation is needed and especially at the cervico-dorsal level. A preexisting kyphotic deformity may interfere with positioning. Finally, the construct (plates and screw) may not provide sufficient strength. Screw pullout is more likely due to small size of screws.

Due to high incidence of cardiopulmonary comorbidities in AS patients, a combined anterior-posterior (360°) procedure increases the surgical time and the likelihood of morbidity and mortality.

A posterior-only approach is reasonable if the anterior column is competent for load-bearing and an indirect anterior bony apposition can be obtained. Another advantage of posterior approach is simultaneous correction of the cervico-thoracic kyphotic deformity by performing a traditional wedge osteotomy at the C7-T1 level in these patients. Posterior exposure is quick and safe. Exposure can easily be extended craniocaudally. Multiple points of fixation both above and below the fracture site are easily possible. Thicker rod diameter and larger size of screws can be used to reduce the chances of construct failure.

Our patient had a fixed flexion deformity, with injury at C6-C7 level. Considering these factors, in our patient, we opted for the posterior approach. We were able to achieve and maintain a good reduction and fusion.

CONCLUSIONS

Fractures in patients with AS are difficult to manage. Surgery is preferable to conservative management in spite of the associated morbidity in this group of patients and can give a gratifying clinical result.

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Conflicts of interest

There are no conflicts of interest.

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