

Surgical Management of Andersson Lesion with Atlantoaxial Dislocation and Cervical Spinal Cord Injury: A Case Report

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ABSTRACT

The prevalence of pyramidal lesions in Ankylosing Spondylitis (AS) is not high. In previous studies, the prevalence of traumatic Andersson lesion (AL) in AS varies dramatically from 1% to over 28%. Cervical AL with high cervical spinal cord injury is particularly rare and can cause severe sensorimotor injuries. The authors describe a rare case of a patient with AL, atlantoaxial dislocation, and high cervical spinal cord injury. Decompression, fusion, and internal fixation were performed on C6/7 via the anterior and posterior combined approach. Posterior long-level decompression and internal fixation were performed on the upper cervical spine. One month after the operation, the patient's neck pain was relieved, and sensation and movement of the limbs were restored. The strength of the deltoid and bicep muscles has returned to normal. Follow-up was conducted for up to one year after the operation.

Key Words: Andersson lesion, Ankylosing spondylitis, Cervical vertebrae, Decompression, surgical, Spinal cord injuries.

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INTRODUCTION

Andersson lesion (AL) is a destructive vertebral or disco-vertebral lesion that occurs as a late non-inflammatory sequel in ankylosing spondylitis (AS). It is usually caused by minor trauma. It represents a state of chronic, mobile non-union involving either posterior element fracture or unfused facet joints associated with the anterior lesion.^{1,2}

Here, a case of a patient with AL who had an accidental fall is presented, which resulted in atlantoaxial dislocation and high cervical spinal cord injury. This is the only case report of a person with AL, atlantoaxial dislocation, and high cervical spinal cord injury in the literature. This case report aims to present the successful surgical management of this patient.

CASE REPORT

A 60-year man presented to the hospital with neck pain, unsteady gait, and numbness in his hands for 4 days following an accidental fall. The patient showed signs of spinal cord injury, such as a tight band sensation around the chest, weakness in the lower extremities, and a cotton-ball sensation under the feet. Historically, he had hypertension for 7 years and AS for many years.

The physiological curvature of the cervical spine was found to be straightened during physical examination, and hence, the neck movement was markedly limited.

A range of physical tests were negative, including cervical induction test, foraminal compression test, and brachial plexus pull test. The muscle tension and the skin sensation of the extremities were normal except hypoesthesia of the palms, fingers, and soles of the feet. Bilateral deltoid and biceps brachii muscles had grade 4 muscle strength, and other upper limb muscles had normal strength. Physiological reflexes of the extremities were present without any hyperactivity. The pathological reflex signs were positive bilaterally for Hoffmann's sign and Rossolimo's sign.

Radiographic examination of the cervical spine showed different degrees of hyperosteoecy and partial bone bridges in the cervical vertebral margins and facet joints. The vertebral body showed a vertebral squaring. The cervical facet joint space was found to be narrow, blurred, and most of the fusion gave the classic radiographic appearance of bamboo spine. The C6 vertebral body was unstable and slid forward as grade I listhesis (Figure 1A-D).

Cervical CT demonstrated that the atlantoaxial joint was displaced. The cervical CT scan also showed that the bilateral facet joint space was narrowed, giving the bamboo spine appearance. The C6 vertebral body appeared to be shifted forward, and the C6/7 vertebral space was widened. The physiological curvature of the cervical spine was found to be straightened (Figure 2A-C). The blood tests showed an increased erythrocyte sedimentation rate (ESR) (28 mm/1st hour).

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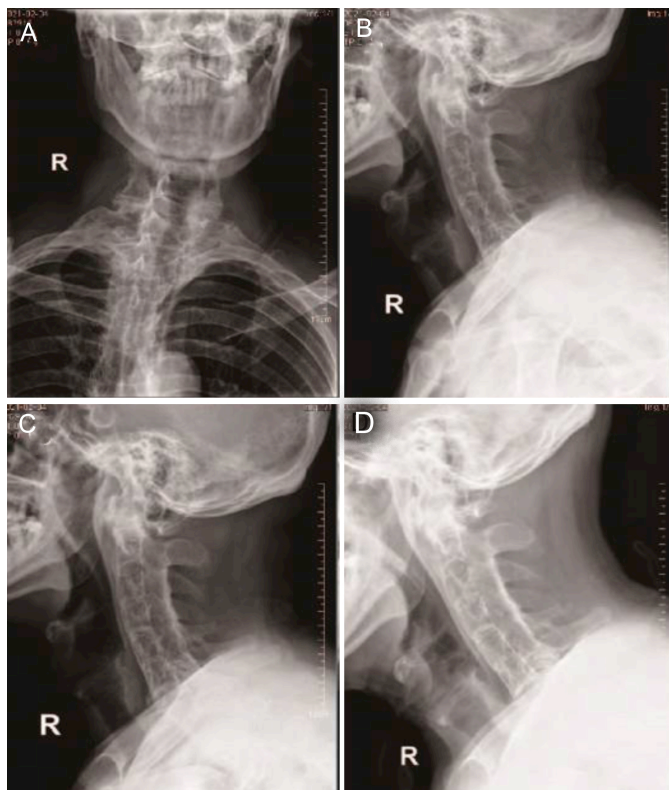


Figure 1: (A, B) Anteroposterior-lateral DR of cervical vertebrae suggest vertebral squaring and 'bamboo spine' appearance of the cervical vertebrae. (C, D) Dynamic DR of the cervical spine indicate C6/7 vertebral instability with displacement.

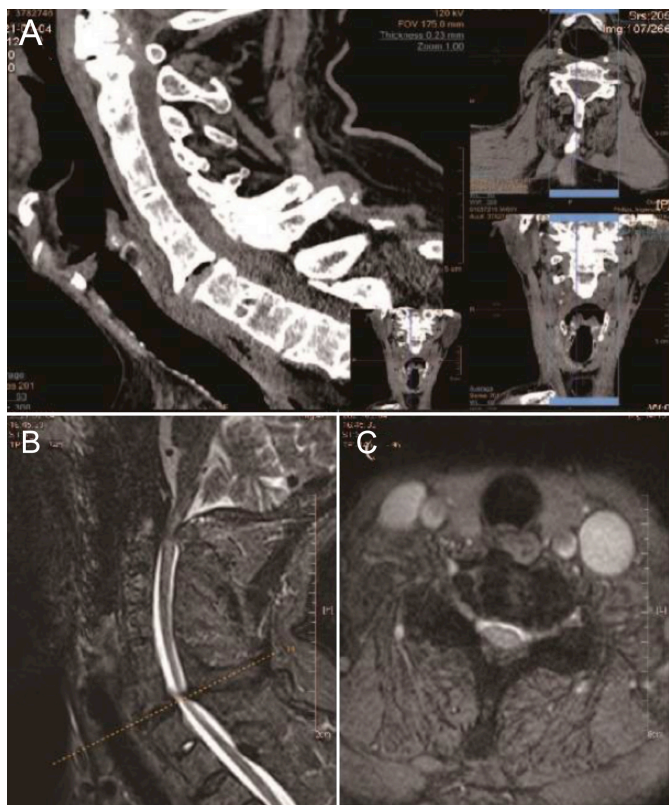


Figure 2: (A) Computed tomography of the cervical spine indicates anterior I° spondylolisthesis of the C6 vertebral body and C6/7 vertebral instability. (B, C) Magnetic resonance imaging of the cervical spine suggests small patchy T2WI hyperintensity in the spinal cord at the C1-2 level.

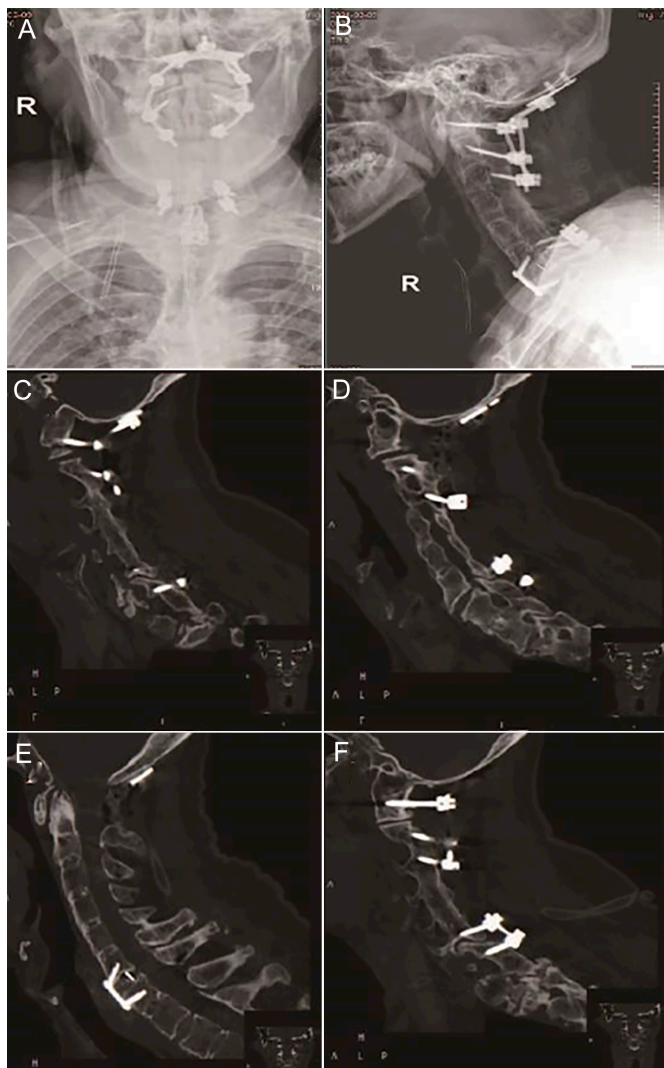


Figure 3: (A-F) Internal fixation of the pedicle is seen at C1-3 and C6-7. High density of internal fixation is seen in the occipital. C6-7 anterior internal fixation of the vertebral body is observed, and no obvious signs of loose fracture are observed in any component. All screws are in good position.

During the surgery, C1, C2, and C3 lateral mass screws were inserted into the lateral blocks in the prone position, and skull screws were fixed just below the occipital protuberance. Two titanium rods of appropriate lengths were selected and placed on the screws on both sides after pre-bending by the bender. The posterior atlas arch was removed, and the C1/2 spinal canal was enlarged by complete decompression. The bone graft was evenly distributed at the posterior arch of C1 and the lamina of C2. C6 and C7 screws were implanted in the same way. After suturing the wound, the patient was placed in the supine position. After locating the C6/7 segment using fluoroscopy, osteophyte hyperplasia at the anterior edges of the C6 and C7 vertebrae was removed. The C6/7 disc was removed, and a cage with the bone graft was implanted into the C6/7 intervertebral space. A suitable length plate was fixed at the anterior edge of the cervical spine.

Four days after the cervical spine surgery, anteroposterior and lateral cervical radiographs were reviewed. Compared with the preoperative cervical x-ray, the C6 vertebra had moved slightly

forward as before, and C1-3 and C6-7 showed pedicle internal fixation shadow and occipital high-density internal fixation shadow, respectively. C6-7 also showed an anterior vertebral internal fixation shadow. No obvious loosening sign was observed in any component. The interbody fusion device shadow was observed in the corresponding C6/7 intervertebral space, and no obvious abnormality was observed in the location. Six months after the operation, the cervical CT suggested changes in the C1-2 and C6-7 vertebral bodies after pedicle screw fixation. No significant narrowing of intervertebral space was observed (Figure 3A-F). The postoperative cervical MRI also suggested similar postoperative changes of the cervical spine.

DISCUSSION

Since the first description of AL by Andersson in 1937, the natural history, pathophysiology, clinical features, laboratory investigations, and imaging findings of AL have been controversial.³ Several aetiologies for AL have been postulated, including infection, inflammation, trauma, and mechanical stress.¹ Of these, inflammation and mechanical stress have wider acceptance. In the present case, the patient with AS presented with AL after a trauma. The cervical vertebrae showed 'bamboo spine' appearance in radiographs and had decreased mobility, but the intervertebral bodies of the cervical vertebrae were relatively stable. The C6 vertebra was shifted and slipped forward, making C6/7 unstable. The atlantoaxial joint also had a relative displacement, which compressed the spinal cord, resulting in changes in the C1/2 signals in the spinal cord. This was the likely cause of the patient's clinical symptoms, such as unsteady gait and numbness in the hands.

Spinal fixation and fusion are considered as the primary management methods for symptomatic AL that fails to respond to conservative treatment. The objective of surgical treatment is to achieve firm fusion of bones, decompression of nerves in patients with nerve defects, and spinal recovery in patients with malformation.⁴ The ideal procedure, however, remains controversial. In this case, AL combined with high cervical spinal cord injury had clear indications for surgery. The C6/7 was completely relieved of spinal canal compression by combined anterior and posterior fixation fusion surgery. The cone was stabilised by bone graft fusion and firm internal fixation. This method has produced excellent results. At the same time, for

high cervical spinal cord injury, posterior long-segment decompression and screw fixation were used. After the operation, the patient's clinical symptoms were significantly relieved without obvious complications. Therefore, this surgical approach can be considered a reliable alternative for the treatment of AL combined with high cervical spinal cord injury.

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PATIENT'S CONSENT:

Informed consent was obtained from the patient to publish the data concerning this case.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

JL: Data curation, visualisation, and writing of the original draft.

XC: Supervision, writing, reviewing, and editing.

DC, BG: Writing, reviewing, and editing.

All authors approved the final version of the manuscript to be published.

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