

# Unusual Traumatic Midthoracic Spondyloptosis and Its Surgical Management: Case Report

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## Abstract

Posttraumatic spondyloptosis develops as a result of complete subluxation of the vertebral bodies and causes complete transection of the spinal cord. Severe trauma-related spondyloptosis of the upper-mid thoracic region is a rare form of spinal trauma. Traumatic midthoracic spondyloptosis is quite rare, and radiology plays an important role in the diagnosis and treatment of this condition. Surgical reconstruction and stabilization are required for early mobilization and rehabilitation of patients with this injury. Here, we report the clinical features, radiographic findings, and management of an unusual case of traumatic midthoracic spondyloptosis that showed complete spinal cord transection and was operated.

Key words: trauma, spondyloptosis, thoracic, management

## Introduction

Thoracic fractures are common trauma-induced spinal injuries that frequently occur in combination with internal organ injuries (especially hemo-pneumothorax). The relatively less width of the spinal cord in the thoracic region results in an increased incidence of neurological findings in cases of thoracic fractures. Spondyloptosis developing due to severe trauma are very rare spinal injuries of the upper-mid thoracic region.<sup>4,9)</sup> The rarity of these injuries can be primarily attributed to the contribution of the sternum in maintaining stability in the upper-mid thoracic region. Anterior corpectomy (cage placement if needed), posterior transpedicular screw fixation, and fusion are employed in the surgical treatment of ptotic deformities. However, access to the surgical site in the upper-mid thoracic region during thoracotomy is difficult due to the restricting effects of the sternum anteriorly and the scapula posteriorly. Furthermore, the operation is quite risky because of the heart and the great vessels. The decision for surgery should be made after considering the age, neurological condition, and degree of instability of the patient.<sup>3,4,9)</sup>

## Case

A 20-year-old male patient who suffered a thoracic spine injury following a motorcycle road crash was admitted to the emergency department of our hospital. He was

conscious and cooperative on admission. Neurological examination revealed paraplegia with anesthesia below T4 (Frankel A). Thoracic computed tomography (CT) revealed hemothorax in the left lung (Fig. 1). CT images of the thoracic vertebrae showed spondyloptosis at T5-6. The sixth thoracic spine was observed to slide into the spinal cord (Fig. 2). Thoracic dislocation was caused by flexion-compression trauma. The patient was diagnosed with T5-6 fracture dislocation and instability, and an urgent operation was undertaken. Initially, a thorax tube was installed in the supine position and then turned to the prone position. T3/4/5-T7/8/9 transpedicular screwing, T6 total T5/T7 Smith-Peterson osteotomy, and T5-T6 bilateral partial rib resection were performed by proceeding through a C7-T7 median vertical incision from the posterior aspect only. There was a laceration on the dura. The spinal cord was complete transection and duraplasty was performed. The rod was positioned in an appropriate manner. First, the rod was placed on screws on the fracture. The screw caps were screwed, after which the subjacent screws were fixed through the rod compression maneuver. A 6-mm rod was used for the operation and reduction was achieved using the rod-compression maneuver (Fig. 3). Two units of erythrocyte suspension were used in the operation, which lasted for 2 hours. After the operation, the patient was followed up in the intensive care unit. The thorax tube was removed on the seventh postoperative day and a rehabilitation program was started. At the second postoperative month, the patient was paraplegic with anesthesia below T4, but

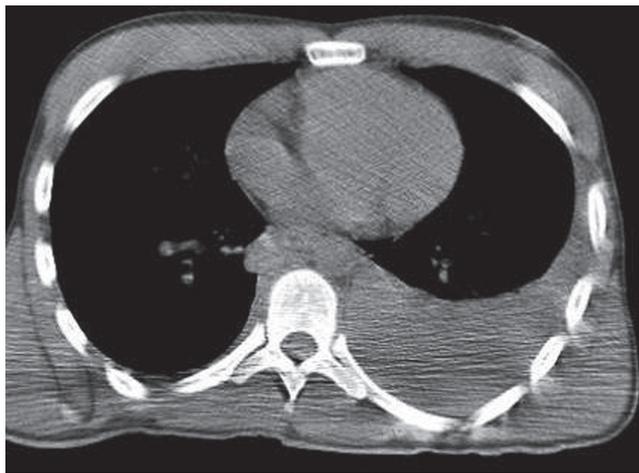


Fig. 1 Hemothorax is seen on thoracic computed tomography (CT).

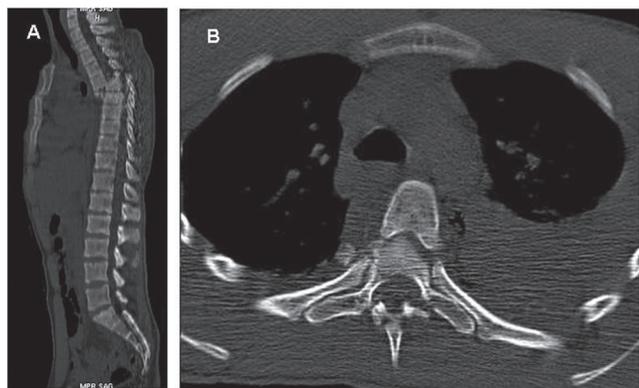


Fig. 2 A: On sagittal computed tomography (CT), complete anterior dislocation at the T5-6 level and complete disruption in the spinal cord are seen. B: On axial CT, T5-6 spondyloptosis is seen.

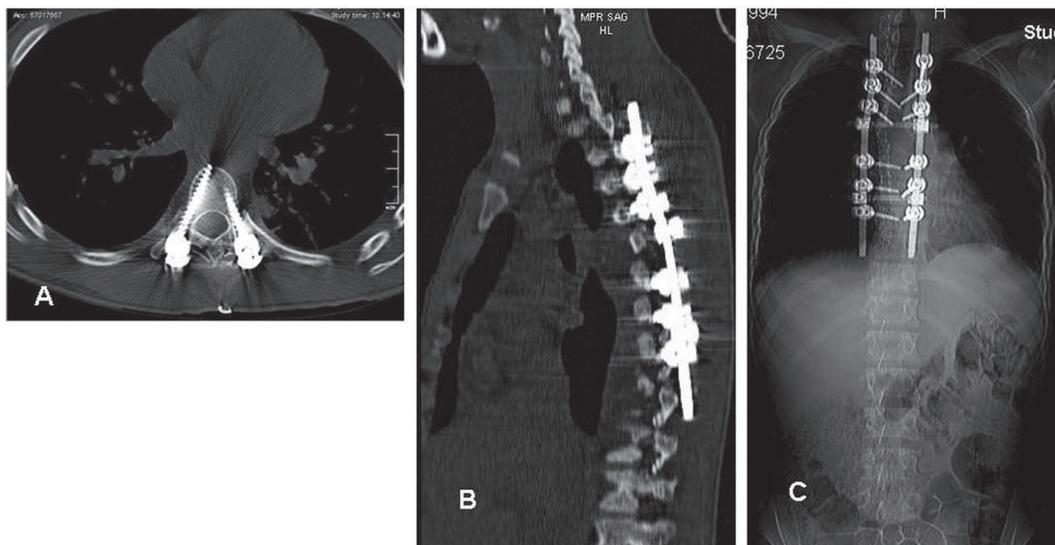


Fig. 3 A: Postoperative axial and B: sagittal computed tomography (CT) shows proper alignment of the spinal column after pedicle screw fixation. C: Spinal axis is seen to be aligned on post-op radiograph.

he was mobile with a wheelchair.

## Discussion

Traumatic spondyloptosis is the term used to describe sagittal and coronal subluxation of more than 100% of the spine. It is a rare but serious spinal injury. Traumatic spondyloptosis of the lumbosacral junction or lower lumbar spine has been described by authors of previous reports. However, traumatic spondyloptosis of the thoracic or thoracolumbar junction is extremely rare. To our knowledge, only a few cases have been reported in the literature. The thoracolumbar junction is involved in 15% of all spinal cord injuries.<sup>5,7,8)</sup>

Upper-mid thoracic spondyloptosis is quite rare due to the stabilizing effect of the sternum.<sup>3,4,9)</sup> Corpectomy through an anterior approach, and transpedicular fixation and fusion through a posterior approach are the recommended surgical approaches for treating this injury.<sup>5,7)</sup> However, operations of the upper-mid thoracic region are quite difficult and have a high mortality rate due to presence of bifurcation of the great vessels and the heart.<sup>2-4)</sup> Thus, we recommend reduction plus fusion with a transpedicular screw and rod compression maneuver from the posterior aspect only, as in our case. In addition, the presence of hemothorax in our patient was a disadvantage for an anterior approach.

Smith-Peterson osteotomy is performed to correct kyphosis and spondyloptosis by reducing the space between laminae and facilitating reduction. The Smith-Peterson osteotomy was first described in 1945 for treatment of sagittal deformity. The procedure is performed by posterior resection of the facet joints and portions of the laminae, with controlled osteotomy or opening of the anterior structures.<sup>1,5,8)</sup> The rod compression maneuver is a method mostly applied

in post-laminectomy kyphosis or Schuermann kyphosis. Long-segment instrumentation should certainly be used to avoid screws from breaking away, and the screws should be as thick as possible to avoid loosening. As wide osteotomies are performed in axial loading, the screws should be placed bicortically, if possible, and 6-mm rods should be used to avoid rod breakage.<sup>3,6,9)</sup>

In conclusion, traumatic midthoracic spondyloptosis is quite rare, and radiology plays an important role in the diagnosis and treatment of spondyloptosis. Surgical reconstruction and stabilization are required for early mobilization and rehabilitation of patients with these conditions.

### Conflicts of Interest Disclosure

We have no conflicts of interest to disclose.

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