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Case Report

A case of dual three-column thoracic spinal fractures following traumatic injury

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ABSTRACT

Background: Thoracic spine fracture-dislocations due to motor vehicle accidents (MVAs) rarely involve double-level, noncontiguous lesions.

Case Description: A 19-year-old male following an MVA was paraplegic; he exhibited full motor/sensory loss below the T4 level (i.e., ASIA scale Grade A). The chest X-ray, magnetic resonance, and computed tomography studies confirmed T3–T5 and T11–12 fractures, warranting T3–L3 thoracolumbar decompression and fusion. Despite surgical intervention, the patient's neurological status remained unchanged.

Conclusion: This case illustrates the rare presentation of noncontiguous, posttraumatic thoracic spinal lesions requiring simultaneous decompression/fixation.

Keywords: Noncontiguous spinal injury, Spondyloptosis, Thoracic spinal injury, Trauma

INTRODUCTION

Noncontiguous double-level thoracic spine fracture-dislocations are quite rare. Typically, they are attributed to high-impact trauma resulting in complete spinal cord injuries.[2] However, there may be significant variability in both the severity of the fractures and the pattern of the two distinct injuries.[1,3-5] Here, the authors present a 19-year-old male with noncontiguous, unstable thoracic spine fractures involving the T3–T5 and T11–12 levels, which warranted T3–L3 decompression/fusion.

CASE DESCRIPTION

A 19-year-old male, following a major motor vehicle accident (MVA), presented with a Glasgow Coma Scale (GCS) of 15. On examination, he was intact in the upper extremities but had a complete American Spinal Injury Association (ASIA) "A" injury below the T4 level (total motor and sensory loss).

EXAMINATION/IMAGING

X-ray and computed tomography (CT) imaging

The chest X-ray revealed left pulmonary contusions and multiple posterior left-sided rib fractures. In addition, spondyloptosis at the T11/T12 level and fracture/left lateral subluxation at T3–T5 were noted

on imaging. From T3–T5, the CT showed a T3 spinous process fracture and left displacement of T4 on T5. The lower injury was accompanied by rotation and 8 mm of traumatic retrolisthesis. Intracanalicular gas signaled the presence of a prevertebral T4–T5 hematoma. At T11/12, there were spondyloptosis, shearing of the superior T12 endplate, obliteration of the spinal canal, intracanalicular gas, and a prevertebral hematoma. There was also a chronic dextroscoliotic deformity of the mid-thoracic spine centered at T8.

Magnetic resonance findings

Magnetic resonance imaging of the thoracic and lumbar spine confirmed traumatic dislocation/spondyloptosis of T11/T12 (i.e., with T11 projecting nearly 3.0 cm anterior to T12). Fragmentation of articular pillars/neural arches at T11–T12 and bone fragments projecting into the spinal canal [Figure 1] were also seen. Edema of the conus medullaris, canal effacement, and an asymmetric T2 signal within the spinal cord indicated a primary cord injury/conus injury with hematomyelia [Figures 2 and 3].

Treatment/Diagnosis

The patient underwent T3–L3 surgical decompression/fusion under fluoroscopic guidance of his spinal fractures from T3–T5, spondyloptosis at T11/12, and scoliotic deformity. This warranted the placement of pedicle screws bilaterally from T3–L2. Unilateral placement of pedicle screws also occurred on the right at T7 and on the left at T8. The intraoperative CT scan showed good reduction/alignment at the T4–T5 and T11–T12 levels. Neuromonitoring signals did not change after the placement of screws, reduction of spondyloptosis, laminectomy, rod placement, or decompression.

DISCUSSION

Classification systems of T3–5 and T11-12 fractures/dislocations

In the setting of trauma, Vacarro *et al*. have proposed two different methods of classification to distinguish injuries of the spinal column.[4,5] This patient's injury at T4–T5 yielded a score of 8 (translation/rotation: three points, injured PLC: three points, and ASIA A: two points) and at T11–12 a score of 9 (distraction: four points, injured PLC: three points, and ASIA A: two points). Using a modification of the original classification system, Vaccaro's revised AOSpine TLICS score applied to this patient as follows: the superior injury was a T3:A0; the translation of the vertebrae; and complete neurological injury with unknown PLC stability resulted in T4–T5: C (N4; M1). The inferior injury at T11–T12 was a C (T12: A3; N4) due to the spondyloptosis and associated incomplete burst fracture.

Figure 1: T2 sagittal MRI of the thoracic spine showing both fractures.

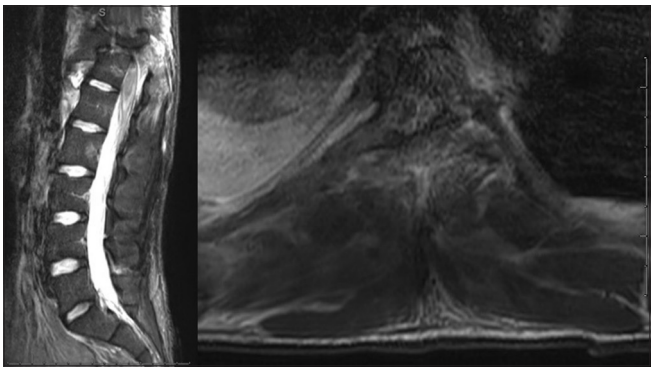

Figure 2: T2 sagittal and coronal magnetic resonance imaging just above the T3–T4 levels on top of conus.

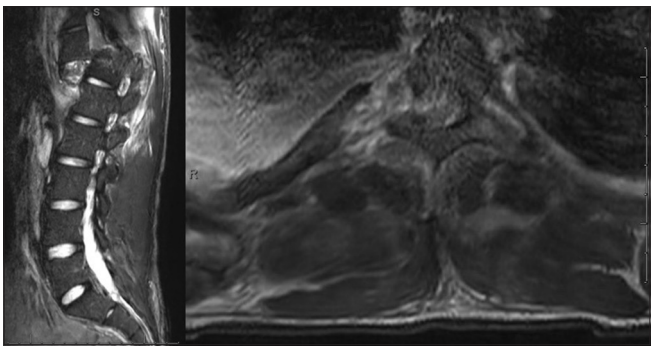

Figure 3: T2 sagittal and coronal magnetic resonance imaging just below the T3-T4 levels and below the conus.

History of missed secondary thoracic spinal injuries

There is a long history of the literature regarding missed secondary spinal injuries.[1,2] On the secondary trauma

survey, a loss of sensation and motor control below the nipple line in this patient correlated with the SCI at the T4 level. However, the most profound anatomic disruption occurred at T11–T12, where there was frank spondyloptosis. Thus, the location, grade, and neurological status of patients must be carefully considered in the determination of whether surgical intervention is warranted. In this case, a decompression/instrumented procedure from T3–L3 was indicated.

CONCLUSION

With complex thoracic trauma due to MVA, patients may have neurological examinations that do not clearly correlate with noncontiguous dual thoracic spinal cord injuries. Nevertheless, they should undergo full thoracic spinal MR/CT screening to avoid missing noncontiguous traumatic lesions, as demonstrated in this case.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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