

Clinical and Mechanical Significance of a Rare Injury Complex: Post-Traumatic Bilateral Scapular Fractures in Continuity with Vertebral Involvement

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Abstract

Background: Bilateral scapular fractures are infrequent due to the presence of substantial muscle bulk, and their association with vertebral body fractures adds to their rarity. The occurrence of bilateral scapular fractures aligned with vertebral body fractures is exceedingly uncommon. **Case Report:** In this report, we present the case of a teenager involved in a motor vehicle accident (MVA), who was admitted to our center with polytrauma. This included bilateral scapular fractures and a D5 vertebral body fracture, with an ASIA Grade E neurological status. The patient underwent diagnosis and spinal fusion surgery using posterior spinal reconstruction fixation (PSRF). The patient's recovery proceeded smoothly without complications. **Conclusion:** This case underscores the importance of thorough evaluation for associated injuries in patients with high-velocity impact trauma. A comprehensive approach to patient care, including holistic treatment, is essential for optimal outcomes.

Keywords: Injuries, Teenagers, Motor Vehicles, Multiple Trauma, Spinal Fusion.

Introduction

Bilateral scapular fractures are an uncommon occurrence, often overshadowed by concomitant injuries such as rib and spinal fractures [1]. These fractures typically result from high-velocity trauma to the upper back. In this clinical case, we present an 18-year-old male who suffered a D5 vertebral body compression fracture in addition to bilateral scapular fractures and a mandibular fracture as a consequence of a high-speed road traffic accident, during which he landed on his back. The patient underwent surgical intervention for the D5 vertebral fracture and mandibular fracture, while the scapular fractures were managed conservatively.

Case Report

An 18-year-old male sought treatment for back pain and a painful limitation in raising both arms above his shoulders. He also complained of facial swelling and difficulty in speaking. These

symptoms followed a high-speed road traffic accident in which he was involved, during which he landed on his back after colliding with a car. Upon initial examination, multiple abrasions were observed on his face and back. A thorough clinical assessment revealed tenderness in the scapular and interscapular regions. Fortunately, there were no sensory or motor deficits. Motor strength in both shoulders was intact, but passive movements of the shoulders in abduction caused pain. The patient was promptly resuscitated in the emergency room, and once stabilized, imaging scans were performed.

Non-contrast Computed Tomography (NCCT) of the dorsal spine revealed a compression fracture of the D5 vertebra [Fig.1], with a subsequent MRI of the dorsal spine indicating mild thecal cord compression. Meanwhile, NCCT of the cervical spine ruled out any cervical vertebral injury, and an MRI of the cervical spine ruled out any cervical cord injury. Additionally, NCCT of the

face confirmed a fracture in the body of the right mandible. X-rays of the shoulder and chest regions revealed a fracture line traversing the bodies of both scapulae while leaving the glenohumeral joint intact. A subsequent CT scan of the chest confirmed bilateral fractures of the scapula bodies. Notably, the most intriguing finding was a single fracture line extending from one scapula to the opposite scapula through the D5 vertebra [Fig.2,3].

The patient underwent surgery to address the D5 vertebral fracture, which involved fixation of D4-D6 with four pedicle screws and two rods [Fig.4]. Open reduction and internal fixation with plates and screws were performed for the mandibular fracture. However, the scapular fractures were managed conservatively through shoulder immobilization.

Discussion

Scapular fractures are a relatively uncommon type of fracture, accounting for less than 1 percent of all fractures. However, they are noteworthy due to their association with spine injuries, which occur in approximately 50 percent of scapular fracture cases [1,2]. High-energy trauma is the predominant cause of scapular fractures, often in conjunction with other severe injuries. Bilateral scapular fractures, such as in our case, are exceptionally rare [1,2]. They can be precipitated by various factors including high-energy trauma, electric shocks, and epileptic seizures [3,4], and there has even been a reported case associated with amyloidosis [5].

In polytrauma patients, scapular fractures can be challenging to diagnose, as up to 40 to 45 percent of these fractures may go unnoticed during the initial scans due to their often-inconspicuous presentation, overshadowed by other injuries or anatomical structures [2]. The observation that "associated injuries took precedence over scapular injuries" was astutely made. [2]. Heatly *et al.* were the first to describe bilateral scapular fractures [6], but we believe our case is likely the first to report bilateral scapular fractures in



Fig.1: NCCT dorsal spine showing compression fracture at D5 level.



Fig.2: NCCT Thorax with 3D reconstruction showing bilateral scapular fractures.

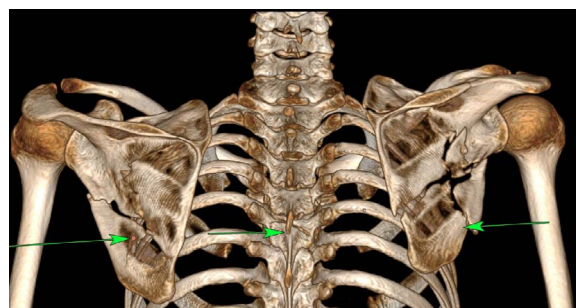


Fig.3: NCCT Thorax with 3D reconstruction showing bilateral scapular fractures and vertebral fracture in a straight line.

a polytrauma patient, with a single fracture line extending from one scapula to the opposite scapula through the D5 vertebrae. In our case, we observed bilateral scapular body fractures at the level of D5, accompanied by a D5 vertebral compression fracture and fractures of the right mandibular body. Remarkably, the scapular fracture went unnoticed during the initial survey, as the difficulty the patient experienced in lifting his upper limbs was initially attributed to a cervical injury, which was later ruled out by CT and MRI scans. Only upon closer examination did we suspect a scapular injury, and a digital chest X-ray confirmed a fracture line on both sides of the scapular body, subsequently confirmed by CT scans.

While CT scans are invaluable for diagnosing scapular fractures, 3D reconstruction provides a more precise understanding of the fracture type [1,2]. Scapular fractures can be categorized as intra-articular or extra-articular, with intra-articular fractures being less common (30 percent) but often requiring surgical intervention. Extra-articular fractures (70 percent) are typically managed conservatively, although open reduction and internal fixation (ORIF) may be considered to alleviate pain, weakness, or functional disability [1,2,7]. Scapular body fractures are typically managed with shoulder immobilization for around 10 days, even in cases of significant misalignment [2].

Conclusion

In summary, we have presented a rare case of bilateral scapular fractures occurring simultaneously with a D5 vertebral fracture, all connected by a single fracture line. Clinicians should consider bilateral scapular injuries in cases of painful arm abduction to facilitate prompt diagnosis of these types of injuries. These injuries often result from high-impact falls onto linear, elevated, or projected surfaces such as iron bars or pillars. The use of CT scans with 3D reconstruction

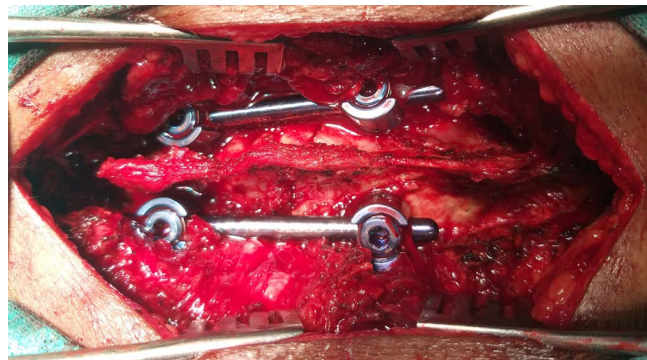


Fig.4: Intraoperative image showing D4D6 pedicle screws fixed with 2 rods.

is instrumental in diagnosing these complex injuries. While the majority of scapular fractures are managed conservatively, surgical corrections may be necessary for unstable articular fractures.

Contributors: VY was responsible for preparation of the manuscript, conducting the literature search, and interpretation of the findings. RSP provided critical inputs into the manuscript. VY will act as the study guarantor and both authors take full responsibility for all aspects of this study. The final version of the manuscript has been approved by both authors.

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