

## Concomitant Thoracic and Spinal Injuries in Politraumatized Patient, a Frequent but Few Discussed Entity. A Case Report

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### Abstract

Polytrauma is a syndrome with multiple injuries of defined severity. Patients with chest injuries have a higher possibility to have a spine trauma. In patient with vertebral fracture the prevalence of concomitant thoracic injuries is 2.9%. Thoracic trauma is a common cause of morbidity and mortality in polytraumatized patient and acute spinal cord injury is one of the most causes of disability especially in young people. Although this nosological entity is very common, it is not very described in literature. In this article we affirm that after respiratory stabilization, spine surgery, if it is needed, must be affected early to avoid neurological disability.

**Keywords:** Polytrauma, Chest injury, Thoracic trauma, Acute spinal cord injury, Vertebral fractures, Spine trauma

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### Introduction

Polytrauma is a syndrome of multiple injuries of defined severity [injury severity score (ISS)  $\geq 16$ ] with consecutive systemic reactions, which may lead to dysfunction of the organs [1], thus interfering with the response to the injury. The term polytrauma derived by Greek words poly (multiple) and trauma (wounds) that indicates a complex injury pattern of different anatomical regions. In this article we analyzed patients with concomitant thoracic and spinal trauma because the first is one of most causes of mortality and the second is one of the most causes of disability.

Thoracic trauma is a common cause of mortality and mortality in polytraumatized patients and is thought to account for 20% to 25% of all traumatic deaths [2]. It is estimated that acute spinal cord injury affects some 40 per million people each year [3] although estimates of incidence may vary considerably between countries. In all countries this is an injury affecting primarily young males, typically aged 20 to 35 (a 4:1 male to female ratio is common). The permanent paralysis that follows leads to major disability, a shorter life expectancy and significant economic cost [4].

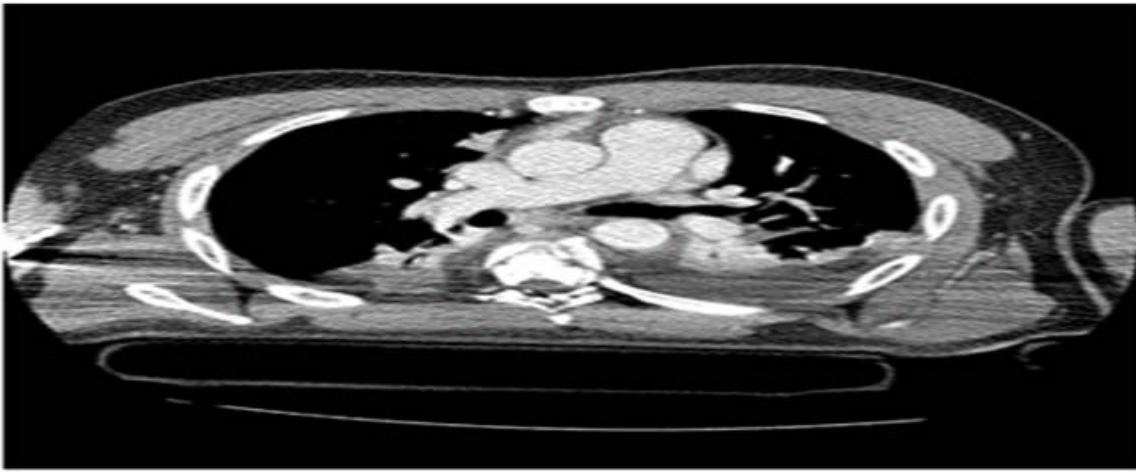
Opinion in clinical studies is divided about whether operative treatment of spinal fractures offers an advantage over non operative treatment. Concomitant trauma is rarely discussed in terms of decision making about surgical timing. To date, urgent treatment of spine fractures in polytrauma patients has not been considered in the literature [5].

### Methodology

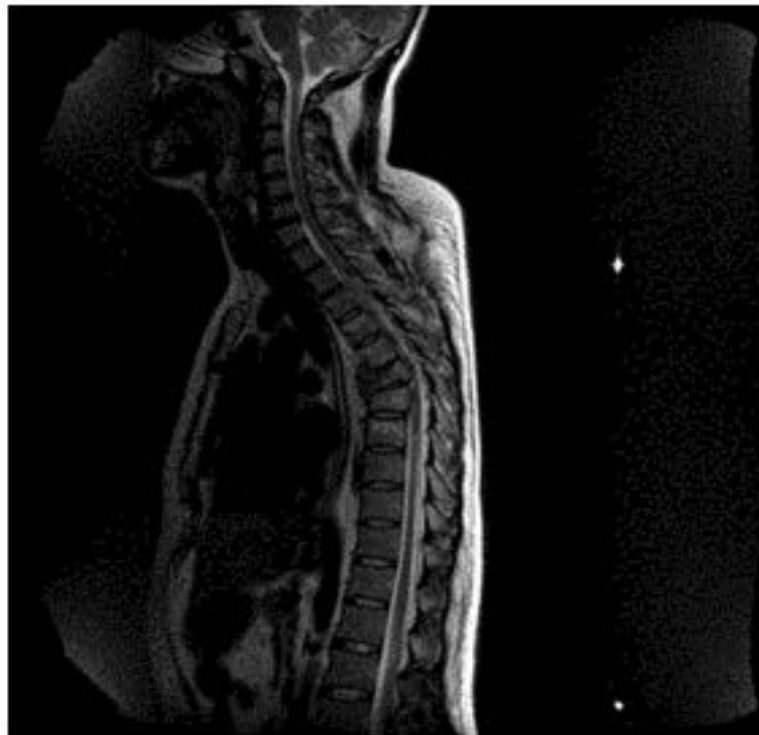
We report a case of spine trauma in polytraumatized patients with concomitant severe chest injury. A literature search using PubMed MEDLINE database has been performed. The search terms: "spine trauma", "management of spine fracture", "acute spinal cord injury" was combined with the following terms: "polytrauma", "thoracic trauma", "and chest injury".

### Case report

The male patient, aged 30 was transferred in emergency room of our hospital from a periferic hospital, because his present history of major trauma for a fall from about 10 meters that has determined multiple injuries. The most relevant problems are thoracic and spinal lesions. Upon admission to our trauma unit, the patient presented increasing dispnea, diffuse pain, hemoglobin desaturation, anemia, preservation of consciousness, isocoria, appropriate pupillary reactivity, appropriate tendon reflexes, GCS 15 (E4, V5, and M6). In emergency room, general surgeon diagnosed bilateral hemothorax and inserted a chest tube in right chest wall. After primary survey and patient stabilization, he underwent imaging examination. CT scan showed bilateral hemothorax drained in right digging pleural, sixth thoracic vertebra fracture, multiple ribs fractures, clavicle fracture [Figure 1]. Upon eleven days we removed the right chest tube and we treated left hemothorax with another chest



**Figure 1** CT scan showed bilateral hemothorax drained in right digging pleural, sixth thoracic vertebra fracture, multiple ribs fractures, clavicle fracture.



**Figure 2** MNR shows wedging of sixth thoracic vertebral body.

tube. During respiratory recovery he underwent neuroimaging examination to study spine damages. MNR shows wedging of sixth thoracic vertebral body (**Figure 2**). Patient was diagnosed with unstable amyelic somatic fracture. After complete recovery of clinical conditions he underwent surgery for stabilization of D5-D7 tract with pedicle screws for spine fusion. The postoperative course was uneventful; patient underwent spine and chest x-ray postoperative control that showed respectively absence of liquid in pleural digging and a correct position of spine osteosynthesis means. Patient was discharged in good condition and without neurological deficit.

## Discussion

Vertebral injuries are usually a result of trauma, and some spinal injury patients also sustain injury to other parts of the body in addition to spinal trauma. Patients with a traumatic spine injury and polytrauma have poorer short and long-term outcomes [6]. The prevalence of associated thoracic injuries was 2.9% [7]. About half of severe spine injuries reported are not suspected in the pre-hospital setting [8]. Identification of spinal injuries during initial trauma evaluation is challenging, as patients often

have a reduced level of consciousness due to other injuries or are under the influence of sedative and/or analgesic medication. Early detection of spinal injuries in the Emergency Department is important in order to initiate further diagnostic testing and treatment and to avoid additional spinal injury. Patients with chest injuries have a higher possibility to have an acute spine injury. An analysis from the German Trauma Registry in 772 spinal trauma patients showed that 96% of severe injuries of the chest were associated with injury to the thoracic spine [9]. Life of patients with spine and thoracic trauma depends, particularly, by rapid resuscitation therapy and prevention of pulmonary and thromboembolic complications. In patient with severe thoracic injury the breathing status can deteriorate very rapidly, and cannot be suitable to delay the insertion of chest-tube. We emphasized again that the most number of patients affected by spine fracture can be treated in a timely fashion, with a reliably satisfactory outcome. The purpose of this article is to determine whether there is a compelling reason not to operate these patients when there are other conditions that could press for urgent treatment. Few retrospective studies have been reported on management of pulmonary function and timing

of spine stabilization to have a better neurological outcome in concomitant thoracic and spinal trauma [10]. Early operation might allow immediate mobilization, facilitate care, and lead to pain reduction and prevention of secondary trauma to the spinal cord caused by local instability. Clinical experience shows that the gap between improvement of pulmonary function after trauma and development of pneumonia is narrow. In contrast, a later operation might not alter perioperative pulmonary function due to activation of inflammatory mediators thus reducing the risk of further pulmonary deterioration.

## Conclusion

Spine surgery, if needed, should be performed as soon as possible, particularly for unstable amyelic spine fracture within the constraints of the patient's overall medical condition. If the condition of the patient does not allow extensive surgery, low-impact minimally invasive stabilization and decompression might be helpful tools to avoid secondary damage. If any surgical approach is prohibited by a patient too sick to be operated, closed reduction and eventually external fixation (e.g., halo traction) can bridge the time until surgical stabilization is appropriate.

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