



# Seatbelt-induced extrathoracic lung herniation

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## Abstract

Traumatic lung herniation is an uncommon complication of blunt chest trauma due to seatbelt injury. High index of suspicion, adherence to ATLS guidelines, and cooperation between different surgical specialties for the prompt stabilization of flail chest and primary or prosthetic closure of the defect may ensure a favorable outcome.

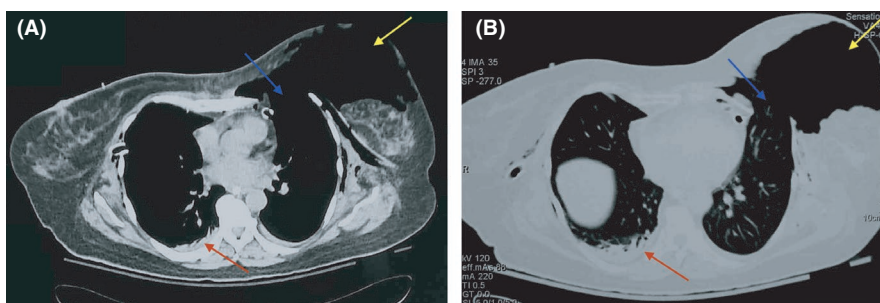
## KEYWORDS

cardiothoracic surgery, emergency medicine, flail chest, orthopedics

## 1 | CASE PRESENTATION

A 63-year-old woman involved in a road accident presented with blunt chest trauma and worsening respiratory distress. Her left pectoral region was deformed and hyper-resonant, and paradoxical chest motion was noticed. The ATLS guidelines were followed, chest drains were placed bilaterally, and endotracheal intubation was performed. The CT revealed flail chest with a sternal body and multiple left-sided rib fractures, sternocostal disruption of the upper ribs, a small hemothorax, and a large herniation of the left lung (Figure 1).

She was taken to the theater later the same day and a midline skin incision extended to the left inframammary region was performed. The herniation was revealed under the subcutaneous fat, through the pectoralis major, which was then elevated from the chest wall (Video S1). The herniated lung was found to be viable. The second and third costal cartilages were re-approximated using sternal wires. The fourth and fifth ribs had segmental fractures and were fixed with reconstruction plates and screws (Figures 2 and 3). Any remaining defects were secured by a transosseous-sutured polytetrafluoroethylene mesh. The chest drains were removed on the fifth

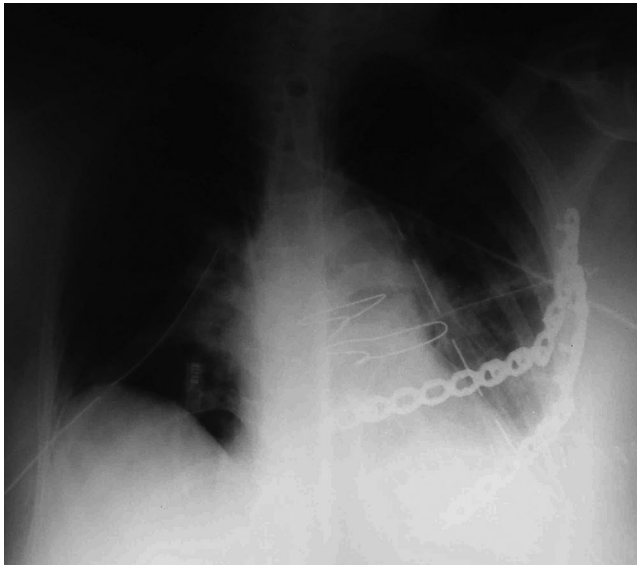
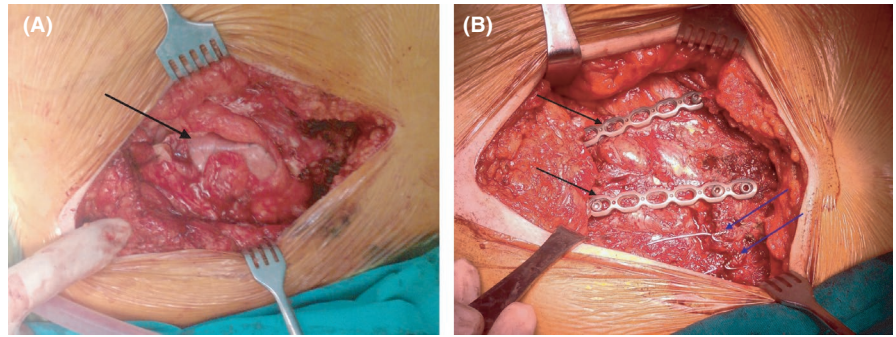


**FIGURE 1** CT scan images of the patient's chest showing large left parasternal lung herniation (yellow arrow), costochondral disruptions (blue arrow), and a small left hemothorax (red arrow)

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**FIGURE 2** Intraoperative images showing the lung herniation (black arrow) under the subcutaneous fat (A), the reapproximation of the costal cartilages with wires (blue arrows) and the fixation of the ribs with reconstruction plates and screws (black arrows) (B)



**FIGURE 3** Postoperative radiograph showing the second and third costal cartilages approximated with sternal wires, and the fourth and fifth ribs fixed with reconstruction plates and screws

postoperative day, and the patient was discharged on the seventh day; no activity restrictions were recommended.

## 2 | DISCUSSION

Seatbelt use is associated with blunt chest trauma, and traumatic lung herniation is a rare complication.<sup>1</sup> It usually occurs in the anterior thorax, where the intercostal muscle layer is thinnest.<sup>2</sup> The management consists of ensuring stabilization of flail chest and primary or prosthetic closure of the defect.<sup>1</sup>

### ACKNOWLEDGMENT

Informed consent was obtained from the patient for the photographs to be published in this article, without identifying information.

### CONFLICT OF INTEREST

There are no conflicts of interest associated with this publication, and there has been no financial support for this work that could have influenced its outcome.

### AUTHOR CONTRIBUTIONS

DK: drafted and submitted the manuscript. TK: obtained the photographs and contributed to patient care. BC: extracted patient history and assisted in completing edits. NG: critically reviewed the paper. PG: contributed to patient care and critically reviewed the manuscript.

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### SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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