

**Case
Report**

Intrathoracic Displacement of a Fractured Humeral Head due to Blunt Trauma

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The incidence of a fractured humeral head penetrating into the thoracic cavity is extremely rare. A 46-year-old woman presented with moderate respiratory distress at the emergency department after being involved in a motor vehicle accident. Radiographic examinations revealed fractures of the second to fifth ribs on the left side along with hemopneumothorax and fracture-dislocation of the humeral head into the thoracic cavity. After initial stabilization, video-assisted thoracic surgery (VATS) was performed to remove the fractured humeral head, and this was followed by a hemiarthroplasty. In this case report, we have discussed significant aspects of this uncommon finding in order to alert surgeons of the potential risks associated with intrathoracic displacement of the fractured humeral bone in trauma patients.

Keywords: intrathoracic displacement, humeral fracture, trauma, video-assisted thoracic surgery, hemiarthroplasty

Introduction

Intrathoracic fracture-dislocation of the humeral head caused by blunt trauma is a rare clinical issue that can be easily overlooked. It is particularly life threatening when accompanied with hemothorax or pneumothorax due to high-energy trauma. However, the appropriate treatment method remains unclear, and some of the reported cases were not undergo surgery to remove the humeral head.^{1,2)} Here, we report the successful management of an intra-

thoracic fracture-dislocation of the humeral head due to blunt trauma through a one-stage operation.

Case Report

A 46-year-old woman presented to the emergency department after a high-speed motor vehicle accident with the chief complaint of chest pain on the left side along with shortness of breath. She denied loss of consciousness and reported no other injuries. Physical examination revealed moderate pain in the left shoulder, subcutaneous emphysema and palpable crepitus over the upper left side of the chest wall, and decreased breath sounds over the left thorax. A chest radiograph showed signs of left-sided hemopneumothorax and a totally collapsed left lung. In addition to the fractures of the second rib to fifth ribs, a comminuted fracture of the left humerus was also noted (**Fig. 1**). We inserted a chest tube, after which, the patient's symptoms improved. A computed tomography (CT) scan of the thorax showed the presence of a fragmented humeral head in the left thoracic cavity (**Fig. 2**). During the secondary survey, the range of motion of the shoulder was found to be limited.

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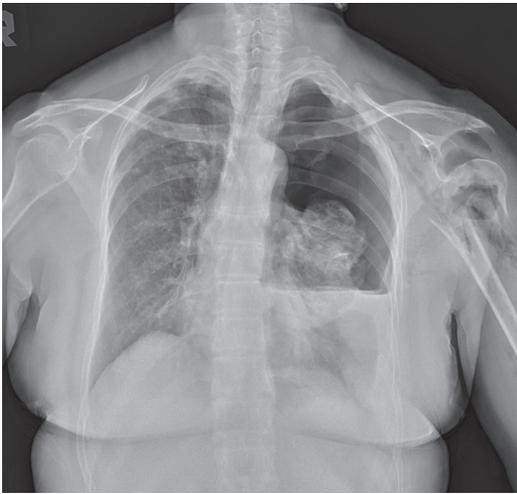


Fig. 1 X-ray revealing both fractures of the second to fifth ribs associated with the left-sided hemothorax and a comminuted fracture of the left humerus.

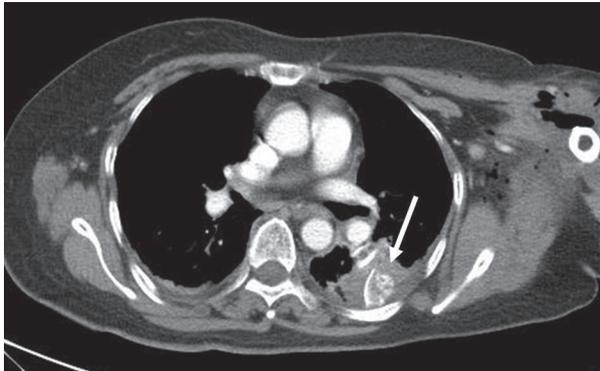


Fig. 2 Chest computed tomography (CT) scan showing the intrathoracic fractured humeral head (white arrow) and subcutaneous air in the left proximal arm.

No neurovascular deficit in the upper limb was noted. Two days later, after stabilization of her vital parameters, the patient underwent video-assisted thoracic surgery (VATS) for removal of the humeral head. A skin lateral incision 3 cm in length was made at the mid-axillary line of the fifth intercostal space. The thoracoscope was inserted via 10.5 mm camera port to explore the thoracic cavity. Blood clots were evacuated, and the defect in the thoracic wall was identified (**Fig. 3A**). The fragmented humeral head 2.5 cm in diameter was found and removed by long-curved ring forceps without wound spreading (**Fig. 3B**). The orthopedist then proceeded with the hemiarthroplasty. The postoperative course was uneventful, and the patient was discharged 14 days after admission.

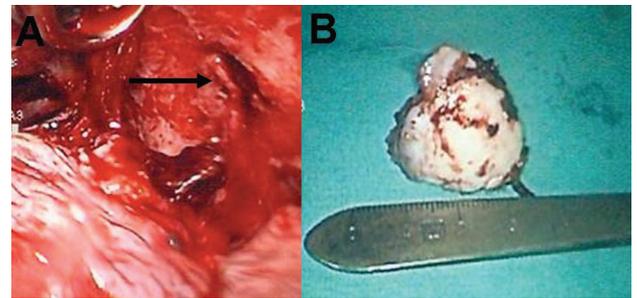


Fig. 3 Intra-operative picture demonstrating (A) the defect in the thoracic wall (black arrow) (B) fractured humeral head.

Discussion

Chest contusion associated with rib fractures and displacement of the humeral head into the thoracic cavity is a relatively rare injury that can go undetected during an initial examination. The first case of an intrathoracic fracture-dislocation was described in 1949.³⁾ Very few cases of intrathoracic fracture-dislocations have been reported in the literature.^{1,2,4,5)} The mechanism of dislocation of the humerus within the thorax is still unclear.⁴⁾ Mechanism of dislocation may be caused by the impact of the sudden high-energy trauma on the arm when it was in the abduction and external rotation position. Sudden force may make the humeral head into the thoracic cavity.^{1,2,4,5)} A fractured humeral head may be detected by direct chest X-ray, and a subsequent chest CT scan with intravenous contrast is helpful to confirm the diagnosis and evaluate the blood vessels;⁵⁾ however, the appropriate treatment method has not yet been established.^{2,4)} Even though the need for removal of the fractured humeral head from the pleural cavity has been questioned, various approaches to remove fractured bone through a thoracotomy or thoracoscopy have been reported.¹⁻⁵⁾ Proximal humeral fractures can be treated by several methods such as open reduction and internal fixation and re-attachment of the rotator cuff tendons to the humeral shaft.¹⁾ The most widely recommended treatment is a hemiarthroplasty;¹⁾ however, cases of delayed prosthetic reconstruction of the proximal humerus have been reported in the literature.^{1,2,5)} In our case, the fractured humeral head was removed through a thoracoscopy, following which a hemiarthroplasty was successfully performed. The outcomes were substantial pain relief and mild mobility limitation as compared to the pre-injury situation.

Conclusion

Intrathoracic displacement of the humeral head caused by serious trauma may be life threatening. After stabilization by performing a tube thoracostomy, early surgical intervention is recommended. One-stage removal of the intrathoracic fractured humeral head through VATS along with reconstruction of the proximal humerus through a hemiarthroplasty is an effective treatment for an intrathoracic humeral fracture-dislocation.

Disclosure Statement

All authors declare no competing financial interests.

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