

## A rare case of traumatic penetrating chest injury with hemopneumothorax

Dhruva Sharma<sup>1</sup>, Anil Sharma<sup>2</sup>, Sunil Dixit<sup>3</sup>

From <sup>1</sup>Assistant Professor, <sup>2</sup>Professor and Unit Head, <sup>3</sup>Associate Professor, Department of Cardiothoracic and Vascular Surgery, Sawai Man Singh Medical College and Hospital, Jaipur, Rajasthan, India

**Correspondence to:** Dr. Dhruva Sharma, Department of Cardiothoracic and Vascular Surgery, Sawai Man Singh Medical College and Hospital, Jaipur, Rajasthan, India. E-mail: drsharmadhruva1981@gmail.com

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### ABSTRACT

Thoracic trauma contributes to one-quarter of trauma deaths. Traumatic hemothorax is commonly associated with organ damage, such as rib fracture, lung injury, and diaphragm rupture and usually occurs immediately after trauma. Here, we report the case of an 18-year-old male patient of a road traffic accident. He was admitted with an open chest wound and fractured ribs with exposed heart, left hemidiaphragm, left lung, and left thoracic cavity. He had fractured lower ribs with the contusion of intercostal and pectoral muscles. The wound was explored proper toileting of the wound, and the left chest cavity was done. A tear in the left lung was repaired, ribs were positioned, and the chest wall was reconstructed without using any prosthesis. In the post-operative period, the patient developed partial flap necrosis and so he was referred to plastic surgery where debridement and pedicled latissimus dorsi flap were applied. The patient got discharge after about 1 month of the post-operative period.

**Keywords:** *Hemothorax, Pneumothorax, Traumatic chest injury*

Thoracic trauma contributes to one-quarter of trauma deaths. Chest trauma is a major problem in India because of an increased incidence of vehicular accidents and other accidental injuries [1]. Traumatic hemothorax is commonly associated with organ damage, such as rib fracture, lung injury, and diaphragm rupture, and usually occurs immediately after trauma. The mortality rate in hemothorax with diaphragm rupture reaches 18–50% when complicated with an injury to great vessels and involvement of major organs [2].

Here, we report a rare case of penetrating chest injury with associated hemopneumothorax. A multitude of chest trauma cases has been reported till date, but it is an unusual case because; in spite of multiple rib fracture, the reconstruction was done without the use of any prosthetic rib instead the same ribs fixation was done.

### CASE REPORT

An 18-year-old male patient of road traffic accident came with an open chest wound, fractured ribs with exposed heart, left hemidiaphragm, left lung, and left thoracic cavity. He was admitted to the trauma center of our hospital at Jaipur.

On clinical examination, associated fractures of the humerus and distal radius with swelling of the left upper limb were observed. He was admitted under the vigilance of cardiovascular and thoracic surgery department. His heart rate was 180 beats per minute; blood pressure was 94/64 mmHg in the right upper arm in lying down position and tachypnea with a respiratory rate of 40 cycles per minute. He was alert, conscious, oriented in time,

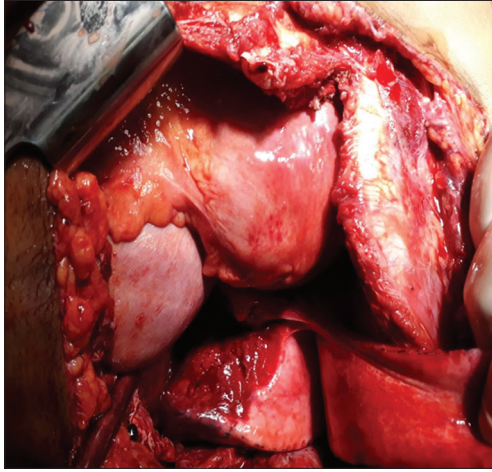
place, and person. The wound was contaminated, 15 cm×10 cm in size and irregular margins with exposed heart, left hemidiaphragm, left lung, and left thoracic cavity as depicted in Fig. 1.

Lower ribs were fractured with the contusion of intercostal and pectoral muscles. There was a collection of blood in the thoracic cavity which was clearly visible from outside. Written informed consent was sought from the patient before the operation. The patient was immediately taken to the operation theater with an arrangement of packed red blood cells for emergency surgery. The wound was explored, and proper toileting of the wound and left chest cavity was done. A tear in the left lung was repaired, ribs were positioned, and the chest wall was reconstructed. Two intercostal drainage tubes were inserted on the left side as seen in Fig. 2.

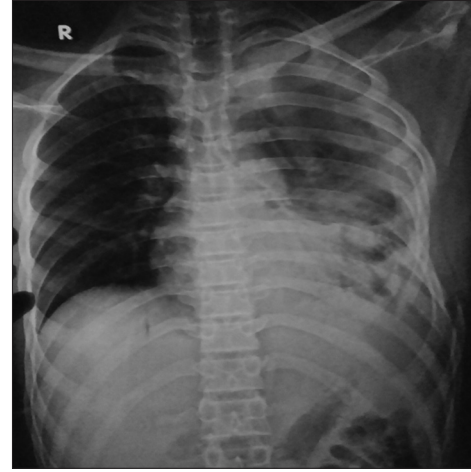
In the post-operative period, the patient developed partial flap necrosis and so he was referred to the plastic surgery department where debridement and pedicled latissimus dorsi flap were applied. Regular dressings were done. Bony injuries were dealt by the orthopedic surgeons. The patient got discharge after about 1 month of the post-operative period. X-ray was done postoperatively which revealed bilaterally expanded lungs and malpositioned ribs due to fracture on the left side and with no gross evidence of hemopneumothorax, as shown in Fig. 3. A follow-up period after 3 months was uneventful and the patient was stable.

### DISCUSSION

Chest penetrating trauma represents a challenge for a cardiothoracic surgeon [2]. One-quarter of trauma deaths occur due to thoracic



**Figure 1:** Intraoperative picture showing contaminated wound of 15 cm×10 cm size, irregular margins with exposed heart, left hemidiaphragm, left lung, and left thoracic cavity



**Figure 3:** Chest X-ray showing bilaterally expanded lungs, malpositioned ribs due to fracture on the left side and with no gross evidence of hemopneumothorax



**Figure 2:** Reconstructed chest wall with two intercostal drainage tubes

trauma. Pneumothorax occurs due to the development of communication between an intrapulmonary airspace and pleural space or through the chest wall between the atmosphere and pleural space [3]. When hemothorax and pneumothorax occur together, it is referred to as hemopneumothorax.

In approximately 60% of all polytrauma cases, chest injuries are found. Hemothorax is most frequently caused by chest trauma, and it can be divided into two categories, based on etiology: Spontaneous and traumatic hemothorax [4]. Collection of blood with a hematocrit value of at least 50% of the hematocrit of peripheral blood, within the pleural cavity, is known as hemothorax [5].

In the majority of cases of hemothorax, a non-operative approach is adequate with a defined group of patients requiring only tube thoracostomy. Very few individuals require operative intervention. The presence of retained hemothorax is well treated by an early intervention with thoracoscopic techniques for both blunt and penetrating injury cases [6].

As far as treatment of hemothorax is concerned, it has been documented by Boersma *et al.* [5] that identification by radiography and thoracentesis is indicated and treatment of the underlying trauma should start immediately. Antibiotic

prophylaxis in trauma patients should be administered for at least 24 h after insertion of a large chest tube. According to the guidelines given by Advanced Trauma Life Support, surgical exploration thoracotomy is recommended if 1.5 L of blood has accumulated and/or an ongoing production of >200 ml of blood per hour is observed. Intrapleural fibrinolytic therapy can be applied if clotted blood retained in spite of tube thoracostomy [7].

It has been suggested in the literature that air elimination, reducing air leakage, healing the pleural fistula, promoting re-expand, and preventing future recurrences in the treatment are the five important principles of pneumothorax treatment. Ogawa *et al.* reported a case of hemothorax without multiple organ damage after blunt trauma. They concluded that enhanced computed tomography scan and interventional radiography are effective procedures for identifying the origin of bleeding into the thoracic space without diaphragm rupture or obvious organ injury [8].

Ludwig C *et al.* found that large bore chest tubes should be inserted into the thoracic space without diaphragm rupture or obvious organ injury [9]. He added that the role of minimal invasive surgery should not be under or overestimated in the management of chest trauma. Video-assisted thoracoscopic surgery (VATS) can be performed in hemodynamically stable patients with small perforating wounds [9]. VATS is also beneficial if there is a suspicion of associated diaphragmatic rupture.

## CONCLUSION

We suggest that thoracic surgeons have a very important role in preventing deaths of the patients by providing prompt treatment. Care of trauma patients is very complex and should be treated very meticulously. VATS can be performed as a life-saving weapon in case of small perforating wounds and associated diaphragmatic rupture.

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## REFERENCES

1. Joshipura MK, Shah HS, Patel PR, Divatia PA, Desai PM. Trauma care systems in India. *Injury* 2003;34:686-92.
2. Huang HP, Ning CD, Lu B. Penetrating chest trauma with massive hemothorax by a small stone. *Biomed Res* 2017;28:9849-50.
3. Sharma A, Jindal P. Principles of diagnosis and management of traumatic pneumothorax. *J Emerg Trauma Shock* 2008;1:34-41.
4. Richardson JD, Miller FB, Carrillo EH, Spain DA. Complex thoracic injuries. *Surg Clin North Am* 1996;76:725-48.
5. Boersma WG, Stigt JA, Smit HJ. Treatment of haemothorax. *Respir Med* 2010;104:1583-7.
6. Meyer DM. Hemothorax related to trauma. *Thorac Surg Clin* 2007;17:47-55.
7. Huang Y, Huang H, Li Q, Browning RF, Parrish S, Turner JF Jr, *et al.* Approach of the treatment for pneumothorax. *J Thorac Dis* 2014;6:S416-20.
8. Ogawa F, Naito M, Iyoda A, Satoh Y. Report of a rare case: Occult hemothorax due to blunt trauma without obvious injury to other organs. *J Cardiothorac Surg* 2013;8:205.
9. Ludwig C, Koryllos A. Management of chest trauma. *J Thorac Dis* 2017;9:S172-S177.

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