

tachycardic (Pulse rate: 138 bpm), afebrile, mildly tachypneic (Respiratory rate: 20 breaths/minutes) and his SpO₂ reading was 90% under room air.

The right chest wall was dull to percussion and there was reduced air entry all over the right lung field. Urgent chest X-ray revealed right lung opacity up to the middle zone with blunting of right costophrenic angle (Figure 1B). Right thoracostomy tube was inserted (Figure 1C), draining 800 ml of frank blood upon insertion and a total of 1,250 ml within the next 12 hours.

Urgent computed tomography (CT) angiogram of the thorax revealed signs of pulmonary laceration at the right lower lobe (Figure 2A) with multiple rib fractures and right comminuted scapular fracture. Minimal right pneumothorax was also noted (Figure 2B).

The complex rib fractures include multiple two-part fractures of the right second to eighth ribs and bilateral first rib fractures. Packed cell was transfused accordingly and tranexamic acid 1 g 8-hourly was given in the emergency setting. Adequate analgesia was addressed throughout hospitalization. The patient was subsequently transferred to the cardiothoracic center for definitive management.

Discussion

We report a case of delayed massive hemothorax due to pulmonary laceration and multiple rib fractures caused by a blunt thoracic trauma following moderate impact motor-vehicle accident.

With regards to trauma cases in emergency setting, timely localization of vascular, skeletal, or airway injury following trauma allow early diagnosis, and represent the cornerstone of medical-surgical treatment and planning of clinical management [6]. CT scan plays a key role in the diagnostics of chest trauma with a considerable impact on the ensuing therapeutic decisions.

Delayed massive hemothorax may result from intercostal or phrenic artery tearing, laceration of the diaphragm, or fractured ribs [2]. However, our patient presented to us with signs of acute respiratory failure due to massive hemothorax resulting from pulmonary laceration and multiple complex rib fractures.

The possibility of delayed sequelae following blunt chest trauma should continually be communicated to the patient and the family to encourage vigilance and monitoring even after being discharge home from the initial hospital

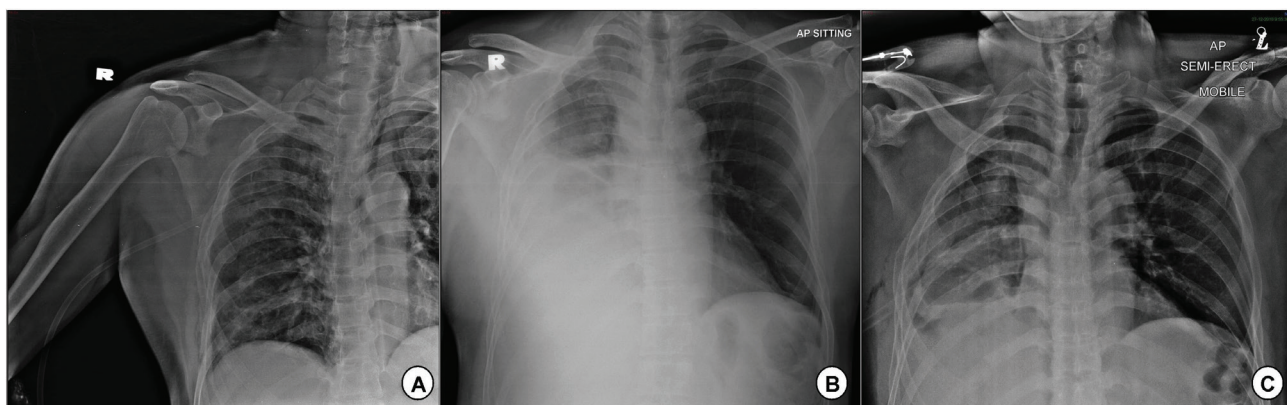


Figure 1. Chest radiographs. (A) The first chest radiograph following MVA showing right second to eighth rib fractures. (B) Chest radiograph taken at Day-7 post-trauma showing homogenous opacity up to the right middle zone. (C) Chest radiograph post-chest tube insertion at the Emergency Department showing signs of clearing up of the right lung field.

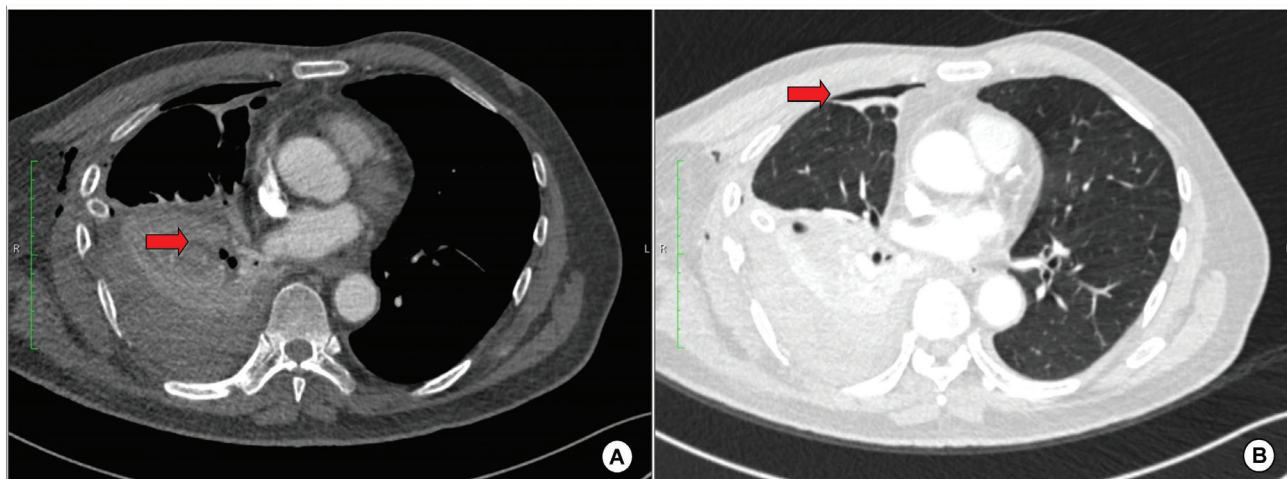


Figure 2. CT thorax. (A) Multiple areas of hypodense lesions (red arrow) in the right lower lobe suggestive of pulmonary laceration. (B) Minimal right pneumothorax (red arrow).

monitoring, as the delay between the trauma and the onset of presentation of sequelae typically vary from 18 hours to 11 days [7]. In our case, despite being initially admitted under close monitoring for the first 5 days following injury with no red flags, he came in 2 days later with abrupt clinical deterioration.

It may be helpful to stratify the patients at higher risk to develop delayed complication with hemothorax, particularly in patients with sharp edges broken ribs [8,9]. In such cases, earlier CT scans may alert the clinicians of possible complications that could be anticipated. In our case, no detailed radiological assessment was done during the initial in-patient monitoring.

Additionally, in cases of minimally displaced rib fractures, the sharp edges of the broken ribs may still injure the surrounding viscera, particularly with continuous physical movement, hence patient education and counseling upon discharge is of utmost importance.

Thoracocentesis and chest tube placement are often sufficient to manage the clinical symptoms and save the lives of many thoracic trauma patients affected by lung or airway injuries [6]. Despite rarely requiring emergency surgery, delayed massive hemothorax is still potentially life threatening [10].

Conclusion

All patients with blunt chest trauma should be informed of the need for a close observation upon admission, even if the fractured ribs are not severely displaced. Fractures involving three or more sequential ribs and a flail chest are considered as complex thoracic injuries and are frequently associated with a significant degree of hemothorax.

Rapid and accurate diagnoses with timely intervention are keys to success in the management of trauma patients with complications. Herein, we report this case to share our valuable experience and to encourage our colleagues in emergency settings and physicians worldwide to practice vigilance when encountering patients with blunt thoracic trauma.

What is new?

Despite the uneventful initial monitoring following motor-vehicle accident, our patient presented to us again with overt hemothorax, highlighting the need for early detailed radiological evaluation in the presence of complex rib fractures.

List of Abbreviations

CT Computed tomography
MVA Motor-vehicle accident

Consent for publication

Informed consent was retrieved from the patient.

Ethical approval

The study was registered with the National Medical Research Registry, Ministry of Health Malaysia with the registration ID: NMRR-19-2538-50224.

Author details

Lui Sze Yee¹, Nurkhairulnizam Abd Halim¹, Ida Zaliza Zainol Abidin¹

1. Emergency and Trauma Department, Hospital Tuanku Fauziah, Perlis, Ministry of Health, Malaysia

References

1. Al-Koudmani I, Darwish B, Al-Kateb K, Taifour Y. Chest trauma experience over eleven-year period at al-mouassat university teaching hospital-Damascus: a retrospective review of 888 cases. *J Cardiothorac Surg.* 2012;7:35. <https://doi.org/10.1186/1749-8090-7-35>
2. Chen CL, Cheng YL. Delayed massive hemothorax complicating simple rib fracture associated with diaphragmatic injury. *Am J Emerg Med.* 2014;32:818. <https://doi.org/10.1016/j.ajem.2013.12.060>
3. Ahn HJ, Lee JW, Kim KD, You IS. Phrenic arterial injury presenting as delayed hemothorax complicating simple rib fracture. *J Korean Med Sci.* 2016;31(4):641–3. <https://doi.org/10.3346/jkms.2016.31.4.641>
4. Chang SW, Ryu KM, Ryu JW. Delayed massive hemothorax requiring surgery after blunt thoracic trauma over a 5-year period: complicating rib fracture with sharp edge associated with diaphragm injury. *Clin Exp Emerg Med.* 2018;5(1):60–5. <https://doi.org/10.15441/ceem.16.190>
5. Yap D, Ng M, Chaudhury M, Mbakada N. Longest delayed hemothorax reported after blunt chest injury. *Am J Emerg Med.* 2018;36(1):171–e1. <https://doi.org/10.1016/j.ajem.2017.10.025>
6. Guerrero F, Antonacci F, Renaud S, Oliaro A. Pleural, lung and tracheal injuries 20. *Operative Techniques and Recent Advances in Acute Care and Emergency Surgery.* Cham, Switzerland: Springer, Cham; 2019. pp 281–93. https://doi.org/10.1007/978-3-319-95114-0_20
7. Yokosuka T, Kobayashi T, Fujiogi M, et al. Clinical analysis of delayed hemothorax due to diaphragmatic injury treated by emergent video-assisted thoracic surgery. *Kyobu Geka.* 2014;67:954–8.
8. Hsu YP, Chen RJ, Bullard MJ, Fang JF, Lin BC. Traumatic thoracic aortic injury caused by a sharp edge of left fractured rib on body position change: case report. *Changcheng Yi Xue Za Zhi.* 1998;21(3):343–6.
9. Igai H, Kamiyoshihara M, Yoshikawa R, Ohsawa F, Yazawa T. Delayed massive hemothorax due to a diaphragmatic laceration caused by lower rib fractures. *Gen Thorac Cardiovasc Surg.* 2019;67(9):811–3. <https://doi.org/10.1007/s11748-018-1033-8>
10. Chinnan NK, Shabaan AI, Palkar SD. Delayed lifethreatening hemothorax without rib fractures after blunt chest trauma. *Indian J Crit Care Med.* 2006;10(4):254–6. <https://doi.org/10.4103/0972-5229.29845>

Summary of the case

1	Patient (gender, age)	Male, 65
2	Final Diagnosis	Delayed massive hemothorax complicating multiple rib fractures
3	Symptoms	Shortness of breath, chest pain
4	Medications	Analgesic, tranexamic acid
5	Clinical Procedure	Thoracostomy
6	Specialty	Emergency care