



Traumatic transection of main stem bronchus with unexpected clinical presentation— A case report

Chao-Kun Chen¹, Ying-Chieh Su¹, Chu-Li Tu¹, Chien-Ming Chao², Yao Fong¹✉

¹Department of Thoracic Surgery, Chi Mei Medical Center, Tainan, Taiwan

²Department of Intensive Care Medicine, Chi Mei Medical Center, Liouying, Tainan, Taiwan

ARTICLE INFO

Article history:

Received 20 July 2017

Revision 10 August 2017

Accepted 20 August 2017

Available online 1 September

Keywords:

Trauma

Bronchial transection

ECMO

ABSTRACT

Tracheobronchial injury is very challenging in diagnosis and treatment. Highly suspicious airway injury and early diagnosis is recommended. We present a case of 39 years-old woman suffering from acute respiratory failure with bilateral hemo-pneumothorax and diffuse subcutaneous emphysema initially. She weaned from ventilator a few days later, but dyspnea recurred due to delayed diagnosis of complete disruption of right main bronchus. However, the image study was incompatible with clinical findings. It showed collapse of left lower lung and hyperinflation of right lung, instead of right pneumothorax or fallen-lung sign. Under the assistance of veno-venous extracorporeal membrane oxygenation, primary repair of right main bronchial injury was performed successfully. Finally, she recovered well uneventfully. In tracheobronchial injury, early diagnosis is a positive prognostic factor. The other important point is primary repair, instead of lobectomy or pneumonectomy.

1. Introduction

Traumatic chest injury with complete tracheo-bronchial disruption is uncommon and occurs in approximately 1% of motor vehicle accident [1,2]. Bronchial injury can be easily overlooked in initial evaluation due to more obvious external injuries which may not be of much significance. High index of suspicions and early diagnosis is recommended because of high mortality and morbidity of tracheo-bronchial injury (TBI). Here, we present a case of delayed diagnosis of complete rupture of right main stem bronchus with unexpected clinical presentation.

2. Case report

A 39 years-old woman without underlying disease was sent to our emergency department following traffic accident. She presented with acute respiratory failure with bilateral hemo-pneumothorax with diffuse subcutaneous emphysema. Endotracheal tube intubation and bilateral tubal thoracostomy were performed (Figure 1). She also had left clavicle fracture, right second to third ribs fracture, and T2-T4 spinal process fracture. Then, she was admitted to the intensive care units for further care.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-Share Alike 3.0 License, which allows others to remix, tweak and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

©2017 Journal of Acute Disease Produced by Wolters Kluwer- Medknow

How to cite this article: Chao-Kun Chen, Ying-Chieh Su, Chu-Li Tu, Chien-Ming Chao, Yao Fong. Traumatic transection of main stem bronchus with unexpected clinical presentation- A case report. J Acute Dis 2017; 6(5):232-234.

✉ Corresponding author: Dr. Yao Fong, Department of Thoracic Surgery, Chi Mei Medical Center, Tainan, Taiwan.
E-mail: a.kun.ke@gmail.com



Figure 1. Chest X-ray showed bilateral hemo-pneumothorax with diffuse subcutaneous emphysema following chest tubes placement.

Her hemodynamic status stabilized day by day. There was no air leakage of bilateral chest tubes, accompanied with complete regression of subcutaneous emphysema. She was weaned from the mechanical ventilator successfully 4 days later, and transferred to the ordinary ward. Two days later, progressive dyspnea developed with increasing demand of oxygenation. Re-intubation was decided and chest X-ray disclosed hyperinflation of right lung and collapse of left lower lung (Figure 2).

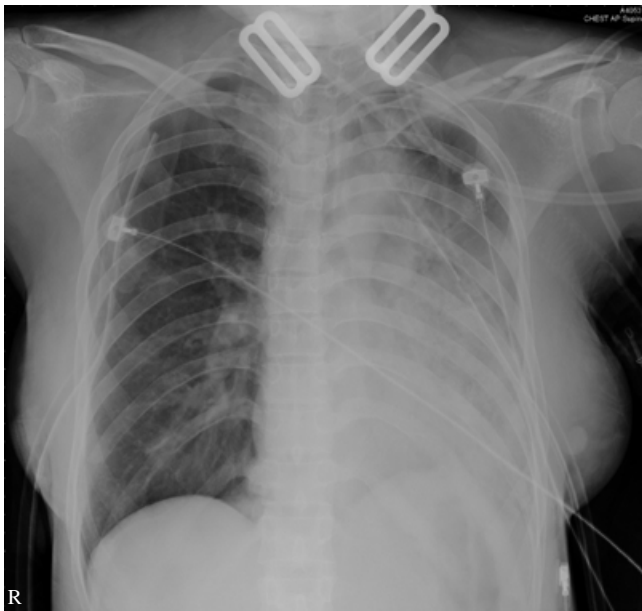


Figure 2. Chest X-ray disclosed hyperinflation of right lung and collapse of left lower lung. There was no fallen-lung sign or pneumothorax noted.

There was no fallen-lung sign or pneumothorax noted. Due to poor oxygenation and retention of carbon dioxide, veno-venous extracorporeal membrane oxygenation (V-V ECMO) was used to facilitate gas exchange. Bronchoscopy

was performed due to suspicious airway injury and revealed mucosa folding/plugs of right main bronchus, resulting in obliteration of the bronchial lumen (Figure 3).

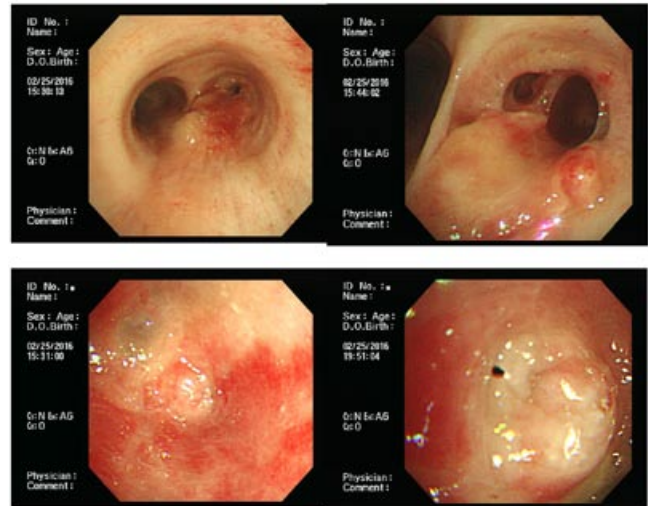


Figure 3. Bronchoscopy revealed mucosa folding/plugs of right main bronchus, resulting in obliteration of the bronchial lumen.

It meant blind end of right main bronchus. Afterward, right side exploratory thoracotomy was performed. Complete rupture of right main bronchus at carina level with a gap about 1.5 cm to 2 cm in distance was found. Primary repair with debridement and anastomosis was undertaken. Postoperatively, the oxygenation and ventilation could be kept in relative stable condition. About 2 weeks later after airway surgery, endotracheal tube was removed, and she was transferred to the ordinary ward under smooth respiratory pattern on the next day. One more week later, she was discharged uneventfully without neurologic sequela. After two months, she got good recovery of pulmonary function and chest X-ray showed full expansion of bilateral lungs (Figure 4).



Figure 4. Chest X-ray demonstrated full expansion of bilateral lungs.

3. Discussion

A tracheobronchial injury (TBI) is a life-threatening condition with non-specific symptoms and signs. The mortality rate is 36% before 1950 and 9% since 1970 according to the literature [3]. From the study, almost three quarters of tracheobronchial injury located within 2 centimeters of carina. Left-sided injuries usually take longer time to diagnosis and treatment than right-sided and tracheal injuries [3]. Patients with TBI usually present with subcutaneous emphysema, pneumothorax, dyspnea, pneumomediastinum, hemoptysis, atelectasis, hemothorax, respiratory distress, etc [4]. Failure to re-expand the lung with a chest tube under water seal drainage or suction should increase the suspicion of airway injury. It is necessary to preserve pulmonary parenchymal function because emergent pneumonectomy is associated with high mortality in the cases of severe chest trauma.

In our patient, her right pneumothorax improved after chest tube intubation and no more air leak noted, even under mechanical ventilation. The chest radiography revealed collapse of left lower lung and hyperinflation of right lung field. Again, progressive dyspnea attacked with poor oxygenation. Because of suspicious TBI, bronchoscopy was performed after setting V-V ECMO. Nearly total obliteration of right main bronchus with mucosal folding was identified. Intraoperative finding disclosed complete rupture of right main bronchus. But, the pleural envelop was intact. This could explain why no collapse of right lung or right pneumothorax noted from the chest radiography. Primary repair of right main bronchus was performed, instead of pneumonectomy. This help to preserve her pulmonary function and decrease the morbidity and mortality related to pneumonectomy. This patient recovered well uneventfully.

Tracing back the history of our case, diffuse subcutaneous emphysema was a significant warning sign of tracheobronchial injury[5]. Even she got stabilized quickly and weaned from ventilator successfully. Bronchoscopy should be performed immediately and promptly if any suspicious signs or symptoms of tracheobronchial injury, just like subcutaneous emphysema, especially cervical areas; pneumothorax with persistent air leak via chest tube; pneumomediastinum, etc. If the injury could be detected early, second episode of respiratory distress and the procedure of V-V ECMO may be avoided. Early diagnosis and primary repair are positive prognostic factors in tracheobronchial injury patients[6].

4. Conclusion

In summary, there are heterogeneous groups of tracheobronchial injuries, requiring skillful and meticulous evaluation and airway management. The injuries often associate with other obvious trauma, and miss or delay diagnosis is common. High level of suspicions and the liberal use of bronchoscopy lead to early diagnosis as soon as possible and better prognosis. Most tracheobronchial injuries can be repaired primarily using tailored surgical approach and techniques to achieve successful outcome. By the way, the morbidity and mortality of resection of lung parenchyma is going to be omitted in a major trauma patient. However, the pro and cons of surgical decisions, primary repair or resection of lung parenchyma, need to be balanced case by case carefully. Not every case is suitable for primary repair method.

Conflict of interest statement

The authors report no conflict of interest.

References

- [1] Zarama V, Velasquez M. Mainstem bronchus transection after blunt chest trauma. *J Emerg Med* 2013;**44**(1):187-188.
- [2] Noda M, Matsumura Y, Hoshi F, Miyamoto A, Ishida I, Sado T, et al. Bronchoplasty without lung resection for the complete transection of the left main bronchus due to blunt trauma. *Kyobu Geka Jpn J Thoracic Surg* 2006; **59**(11): 990-995.
- [3] Andy C. Kiser, Sean M. O'Brien, Frank C. Dettterbeck. Blunt tracheobronchial injuries: Treatment and outcomes. *Ann Thorac Surg* 2001; **71**:2059–2065.
- [4] Gomez-Caro Andres A, Ausin Herrero P, Moradiellos Diez FJ, Diaz-Hellin V, Larru Cabrero E, Perez Anton JA, et al. Medical and surgical management of noniatrogenic traumatic tracheobronchial injuries. *Arch Bronconeumol* 2005;**41**(5):249-254.
- [5] Mariano Scaglione, Stefania Romano, Antonio Pinto, Amelia Sparano, Michele Scialpi, Antonio Rotondo. Acute tracheobronchial injuries: Impact of imaging on diagnosis and management implications. *European J Radiol* 2006; **59**: 336-343.
- [6] Shankar Hanamantrao Hippargi. Traumatic bronchial rupture: an unusual cause of tension pneumothorax. *Int J Emerg Med* 2010; **3**:193-195.