

Successful treatment of a combined bronchial and aortic trauma

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ABSTRACT

Tracheobronchial injury is an uncommon but severe complication of blunt thoracic trauma. In this study, we present a patient who developed complete avulsion of the left main bronchus with a vertical rupture toward the carina accompanying a contained rupture of the descending aorta after being run over by a van. We performed a left upper lobectomy and reimplantation of the lower lobe to the left main bronchus. Subsequently, an endovascular stent was placed to cover the pseudoaneurysm. The patient was discharged on day nine after an uneventful postoperative course. Tracheobronchial trauma complicated with concomitant major injuries apparently requires a rapid and challenging multidisciplinary approach in a well-developed and experienced trauma centre for a successful treatment.

Keywords: Blunt chest trauma; endovascular stent; rupture of the aorta; tracheobronchial injury.

INTRODUCTION

Tracheobronchial injury (TBI) developing upon blunt chest trauma is rare, counting for only 1–2% of all blunt thoracic trauma cases but notably life-threatening.^[1] TBI from blunt trauma more commonly involves distal trachea or main bronchi.^[1,2] The right main bronchus is more susceptible to blunt trauma, perhaps as an outcome of relative protection of the left main bronchus warranted by the aorta.^[3] Although injuries of intrathoracic major vascular structures frequently develop upon penetrating trauma, thoracic aorta is the vessel that most commonly sustains damage from blunt thoracic injuries.^[4] Regarding that, 30–80% of the deaths arising from TBI occur at the scene of the trauma, rapid diagnosis and surgical management of these patients are mandatory.^[5]

Herein, we present a case with a complete transection of the left main bronchus and rupture of the descending aorta who was successfully treated with a left upper sleeve lobectomy and endovascular repair of the aorta.

CASE REPORT

A 22-year-old male was admitted to a rurally located emergency centre after being run over by a van. The patient was transferred to our unit after two chest drains were placed, one in each hemithoracic cavity. A computed tomography (Fig. 1a) revealed a contused right lung and a chest drain in the left main bronchus (LMB) extending toward the trachea. Fiberoptic bronchoscopy confirmed that the chest drain was in the LMB (Fig. 1b). The intubation tube was introduced into the right main bronchus. Although the computed tomography was not contrast-enhanced, a contained aortic rupture could be recognized (Fig. 2).

An exploratory thoracotomy revealed a complete avulsion of the LMB with a vertical rupture toward the carina and complete avulsion of the two segmentary pulmonary arteries to the upper lobe (Fig. 3). An immediate left upper lobectomy and reimplantation of the left lower lobe to the LMB was performed after the repair of the LMB.

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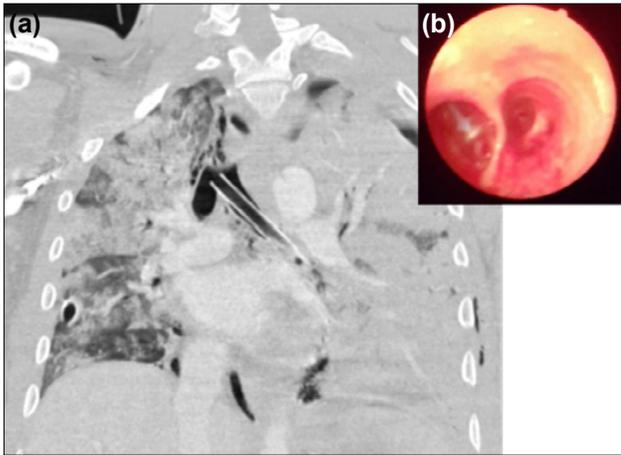


Figure 1. Images of the computed tomography (a) and fiberoptic bronchoscopy (b) revealing a chest drain in the left main bronchus.

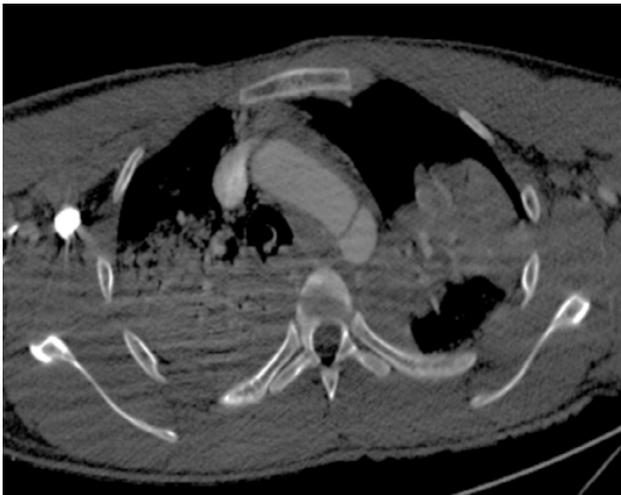


Figure 2. Contained rupture of the descending aorta.

The patient was stabilized in the intensive care unit; then, an endovascular stent (Medtronic, Minneapolis, USA) was placed in the descending aorta to cover the pseudoaneurysm. After an uneventful postoperative course, the patient was discharged on day nine (Fig. 4). Consent was obtained from the patient for this case report.

DISCUSSION

Several mechanisms were introduced for TBI in blunt trauma, including pressure upon the sternum reflecting on the vertebral column crushing the trachea or the main bronchi, widening of the chest transversely causing the traction of the trachea, sudden deceleration of lungs fixed at the hilum or increased airway pressure resulting from the closure of the glottis bringing out a rupture in the wall of trachea and/or main bronchi.^[4-6]

The initial assessment of a potential airway trauma should proceed rapidly for the diagnosis, particularly paying attention to the airway stability. A chest X-ray is helpful in dis-

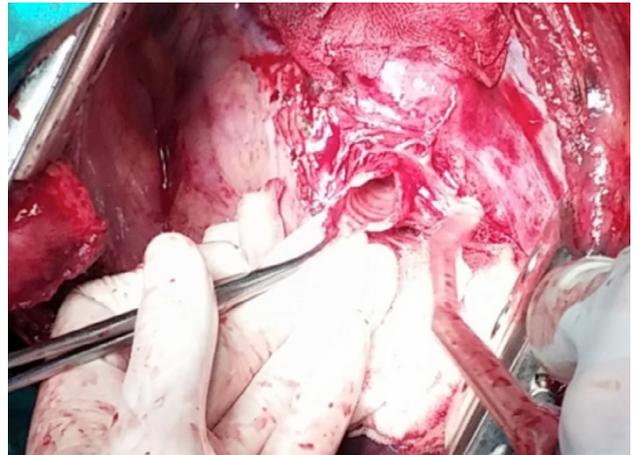


Figure 3. Avulsion of left main bronchus with a rupture toward the carina.



Figure 4. Chest X-ray of the patient before the discharge.

playing pneumomediastinum and pneumothorax, which is present in approximately 60% of the patients with TBI.^[7-9] Furthermore, computed tomography can elaborate on the injury and identify associated injuries helping to plan the priority management.^[10] Examination of the tracheobronchial tree with a fiberoptic bronchoscope allows assessment of the site and the extent of the injury, making it the only study that can reliably exclude central airway trauma.^[11] The purpose of the surgical repair includes patching up the airway defect to maintain ventilation, preventing mediastinal infection and avoiding healing complications, such as airway stenosis and pulmonary infections. Small tears and lacerations should be repaired with direct sutures while complete or partial transections require debridement of the devitalized tissues and end to end anastomosis.^[10-12] Moreover, tissue flaps e.g., muscle flaps, mediastinal fat, pericardium covering the sutures, may be applied to provide continuance of the vascular supply. However, serious bronchial damage, accompanying pulmonary vascular damages, and/or irreversible destruction of lung parenchyma may necessitate lung resections.^[12] Regarding that most of TBI arising from blunt trauma occurs

around the carinal level and main bronchus and needs technically challenging surgical reconstruction,^[12] it is obvious that appropriate strategy for treatment in an experienced trauma centre is necessary.^[13]

Traumatic aortic injuries are estimated to be lethal in 80–90% of the cases. Treatment options are open surgical repair, endovascular repair and medical management.^[14] Open surgical repair is still the first procedure of choice for the injuries of the aortic root, ascending aorta and aortic arch while endovascular repair shall be preferred as a management option for the injuries affecting aortic isthmus, descending thoracic or abdominal aorta.^[14,15] The results of thoracic endovascular aortic repair for blunt traumatic aortic rupture are very successful and allow us to treat multi-trauma patients avoiding high-risk open repair.^[15]

Conclusion

TBI is an infrequent but serious complication of blunt chest trauma demanding high-level suspicion in diagnosis and effective strategy in treatment. It becomes evident that complex cases as presented in our paper can be safely treated by technically sufficient and experienced surgeons in well-equipped medical centres.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review: Internally peer-reviewed.

Authorship Contributions: Concept: M.S.; Design: M.S.; Supervision: M.S.; Materials: B.Ö.; Data: B.Ö.; Literature search: M.S.; Writing: M.S.; Critical revision: A.T.

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OLGU SUNUMU - ÖZET

Bronş ve aortun müşterek yaralanmasının başarılı tedavisi

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Trakeobronşiyal yaralanmalar күnt göğüs travmalarının nadir ancak ciddi komplikasyonudur. Yazımızda kamyonet tarafından ezilme sonucu karınaya doğru vertikal rüptürle beraber sol ana bronşu tamamen kopan ve inen aortasında kendini sınırlamış rüptür gelişen hastayı sunmaktayız. Hastaya sol üst lobektomi ve alt lobun sol ana bronşa tekrar takılması ameliyatını uyguladık. Bunu takiben aortadaki psödoanevrizmayı kapsayacak şekilde damar içi stent yerleştirildi. Hasta ameliyat sonrası sorun yaşanmadan dokuzuncu günde taburcu edildi. Yandaş büyük yaralanmalarla komplike olmuş trakeobronşiyal travmaların başarılı tedavisi gelişmiş ve tecrübeli travma merkezlerinde hızlı ve mücadeleci multidisipliner yaklaşım gerektirmektedir.

Anahtar sözcükler: Aort rüptürü; damar içi stent; күnt göğüs travması; trakeobronşiyal yaralanma.

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