Türk Göğüs Kalp Damar Cerrahisi Dergisi 2013;21(2):550-552
doi: 10.5606/tgkdc.dergisi.2013.7706



# Traumatic complete avulsion of the right main bronchus: an emergency life threatening clinical entity and its management

## *Sağ ana bronşun travmatik komplet kopması: Yaşamı tehdit eden acil bir klinik durum ve tedavisi*

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Tracheobronchial injuries may vary from a simple tear of membranous trachea to the rupture or avulsion in different locations. A small tear may cause tension pneumothorax sometimes, while main bronchial rupture does not lead to pneumothorax or hemothorax. The diagnosis of tracheobronchial injuries is initially based on a careful history and detailed physical examination of the patient. In case of suspected bronchial injury, diagnostic methods should be carried out rapidly. In this article, we reported a 22-year-old male case of traumatic complete avulsion of the right main bronchus and its successful management technique.

*Key words:* Avulsion; bronchus; chest injury; surgery.

Trakebronşiyal yaralanmalar, farklı yerleşim yerlerinde basit bir membranöz trakea yırtığından rüptür veya kopmaya kadar değişkenlik gösterebilir. Bazen küçük yırtıklar tansiyon pnömotoraksa neden olabilir iken, ana bronş rüptürleri pnömotoraks veya hemotoraksa yol açmayabilir. Trakeobronşiyal yaralanmaların tanısı ilk olarak dikkatli öykü ve ayrıntılı fizik muayene ile konur. Bronşiyal yaralanma şüphesi varsa, tanı yöntemleri hızlıca kullanılmalıdır. Bu yazıda, 22 yaşında erkek hastada sağ ana bronşun travmatik komplet kopması ve başarılı tedavi tekniği sunuldu.

*Anahtar sözcükler:* Kopma; bronş; göğüs travması; cerrahi.

Chest traumas constitute 10-15% of all traumas and are the cause of death in 25% of all trauma-related fatalities.[1,2] Blunt chest trauma accounts for 81% of thoracic injuries in children and 78% in the elderly.[3] The findings connected with blunt chest trauma have vary widely and include rib fractures and associated underlying visceral injuries.[3] Tracheobronchial injuries occur in 0.1-7% of all thoracic trauma,[4] and range in form from a simple tear of the membrenous trachea to rupture or avulsion in different locations.[4] Sometimes a small tear causes tension pneumothorax, but a main bronchial rupture can occur which leads to no pneumothorax or hemothorax. Diagnosis of trachebronchial injuries begins with a careful gathering of the patient's history and a physical examination. If there is any doubt about a bronchial injury, diagnostic methods can then be carried out. Herein, we present a case involving the traumatic complete avulsion of the right main bronchus and describe the successful management technique that was used.

## CASE REPORT AND TECHNIQUE

A 22-year-old male presented with severe respiratory distress, subcutaneous emphysema, and a right pneumothorax after blunt chest injury. Right lung re-expansion was not achieved after a chest tube thoracostomy, and a chest roentgenogram and chest computed tomography (CT) showed the right pneumothorax along with a right fallen lung, a pneumomediastinum, and a right main bronchus rupture (Figures 1a and 1b). An emergency bronchoscopic assessment together with a right thoracotomy revealed a

Available online at
www.tgkdc.dergisi.org
doi: 10.5606/tgkdc.dergisi.2013.7706
QR (Quick Response) Code

*Received:* September 16, 2012 *Accepted*: November 7, 2012

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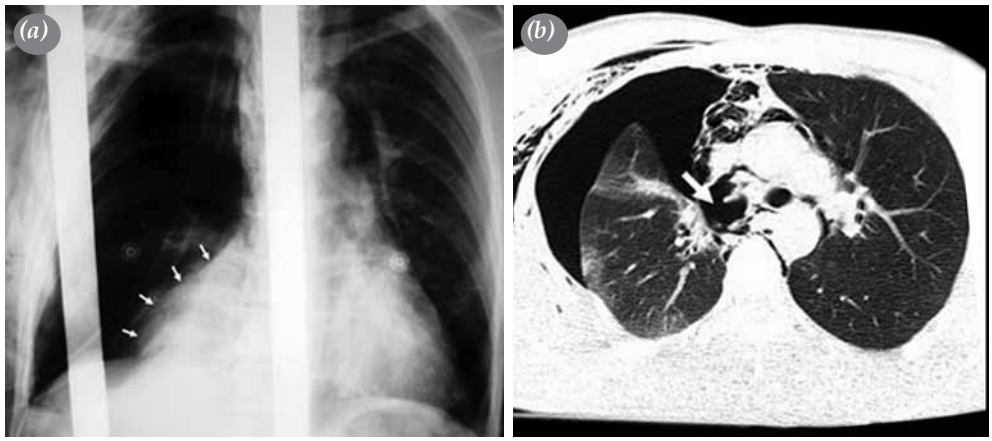


**Figure 1. (a)** A view of the right fallen lung (white arrows). **(b)** A view of the right main bronchus rupture (white arrow).

complete avulsion of the right main bronchus (Figure 2a). Selective left double lumen endotracheal intubation was performed, and the patient also underwent a successful end-to-end right main bronchus reimplantation (Figures 2b and 2c). Extubated was done in the operating room, and the patient was in the intensive care unit (ICU) for only one day. He was discharged on the 10th day uneventfully (Figure 2d). When we performed the lung-sparing surgery in this case, an anastomosis was constructed using a 4-0 prolene suture. The membranous portion was sutured with continuous sutures, and the anterior portion was sutured with interrupted.

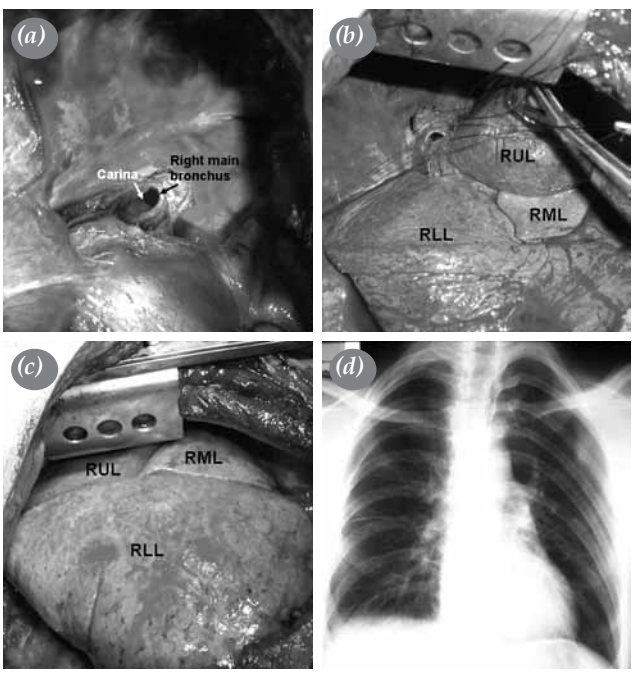


**Figure 2. (a)** A view of the complete avulsion of the right main bronchus. **(b, c)** Successful bronchoplastic repair and re-expansion of the right lung is shown. **(d)** The chest roentgenogram as seen on the postoperative tenth day. RUL: Right upper lobe; RML: Right middle lobe; RLL: Right lower lobe.

## DISCUSSION

The symptoms and roentgenographic signs of acute bronchial injuries, including persistent lung collapse, large air leak, subcutaneous emphysema, and most importantly, increased respiratory distress have been discussed in many reports,[5,6] but they deserve special emphasis since early diagnosis and repair are the keys to preserving lung function.[5,7] An injured lung without its bronchial attachment falling toward the diaphragm is a diagnostic sign of a bronchial avulsion that can be identified on a chest roentgenogram.[5] A bronchoscopic examination is mandatory when traumatic disruption is suspected. This is necessary not only to determine the exact location of the avulsion, but also to ensure proper intubation before repair so as to have anatomical continuity.[5] Additionally, Kaptanoğlu et al.[4] in their study found that the pneumonectomy rate was 12% for patients who underwent a thoracotomy due to tracheobronchial injuries.

In conclusion, the lung-sparing approach that we used in this case should be the operation of choice when there is a traumatic main bronchus rupture. In addition, early diagnostic assessment, proper surgical technique, and cautious anesthetic management are critical for a successful repair.

### Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

### Funding

The authors received no financial support for the research and/or authorship of this article.

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