
Traumatic Bronchial Rupture - A Clinical Case Report

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Abstract

Blunt chest trauma with post-traumatic tracheobronchial rupture is a rare (0.5-5%) but life-threatening injury. In 25-68% of the cases, the diagnosis of blunt main stem bronchus injuries is delayed, which may lead to complete bronchial obstruction and atelectasis 6 to 21 days after the rupture. Clinical manifestations are variable and non-specific, and 10% of the patients are asymptomatic. An early diagnosis is paramount to reduce its morbidity and mortality. This clinical case emphasizes the major role of flexible bronchoscopy in the approach of patients with blunt chest trauma.

Keywords: Bronchoscopy; Bronchus; Trauma; Rupture

Introduction

Major trauma is still a common cause of death among the younger individuals of the western countries, and it is known that thoracic trauma represents 25% of deaths due to trauma. Blunt chest trauma with post-traumatic tracheobronchial rupture (TBR) is a rare, but life-threatening injury, knowing that its global incidence goes between 0.5 to 5%, as described in the medical literature [1,2]. Most of these injuries still can be missed in the Emergency Department unless the physician suspects it and keeps aware of this diagnosis [3].

Case Presentation

The authors present the case of a 44-year-old male, previously healthy, who suffered blunt chest trauma caused by a high-impact frontal car accident. The patient was intubated on place and transported to the Emergency Room.

The physical examination revealed multiple lacerations and abrasions on the torso and legs, and extensive cervical and thoracic subcutaneous emphysema. He performed a chest roentgenogram (CXR), (Figure 1A) and a full body Computed Tomography scan (CT scan).

The CT scan revealed multiple and bilateral rib fractures, fracture of the sternum and the left ischiopubic joint, bilateral pneumothorax with total collapse of the left lung, pneumomediastinum, right lung contusion and large subcutaneous emphysema. A 20 Fr chest tube was inserted in the left pleural space and the patient was maintained on mechanical ventilation. Seven days after the trauma, pneumothoraces resolved, and the chest tube was removed, with normalisation of the CXR. Ten days after mechanical ventilation, the patient was submitted to tracheostomy with progressive ventilator autonomy gain. Fifteen days after the initial trauma, the CXR revealed partial left lung atelectasis that evolved to total left atelectasis on the next day (Figure 1 - B). A flexible bronchoscopy was performed and revealed abrupt occlusion of the left main bronchus lumen and granulomatous lesions 2.5 cm distally to the main carina, consistent with complete left main bronchial rupture (Figure 1C and D). The patient was referred to the Cardiothoracic Surgery Department and it was decided to perform a left pneumonectomy.

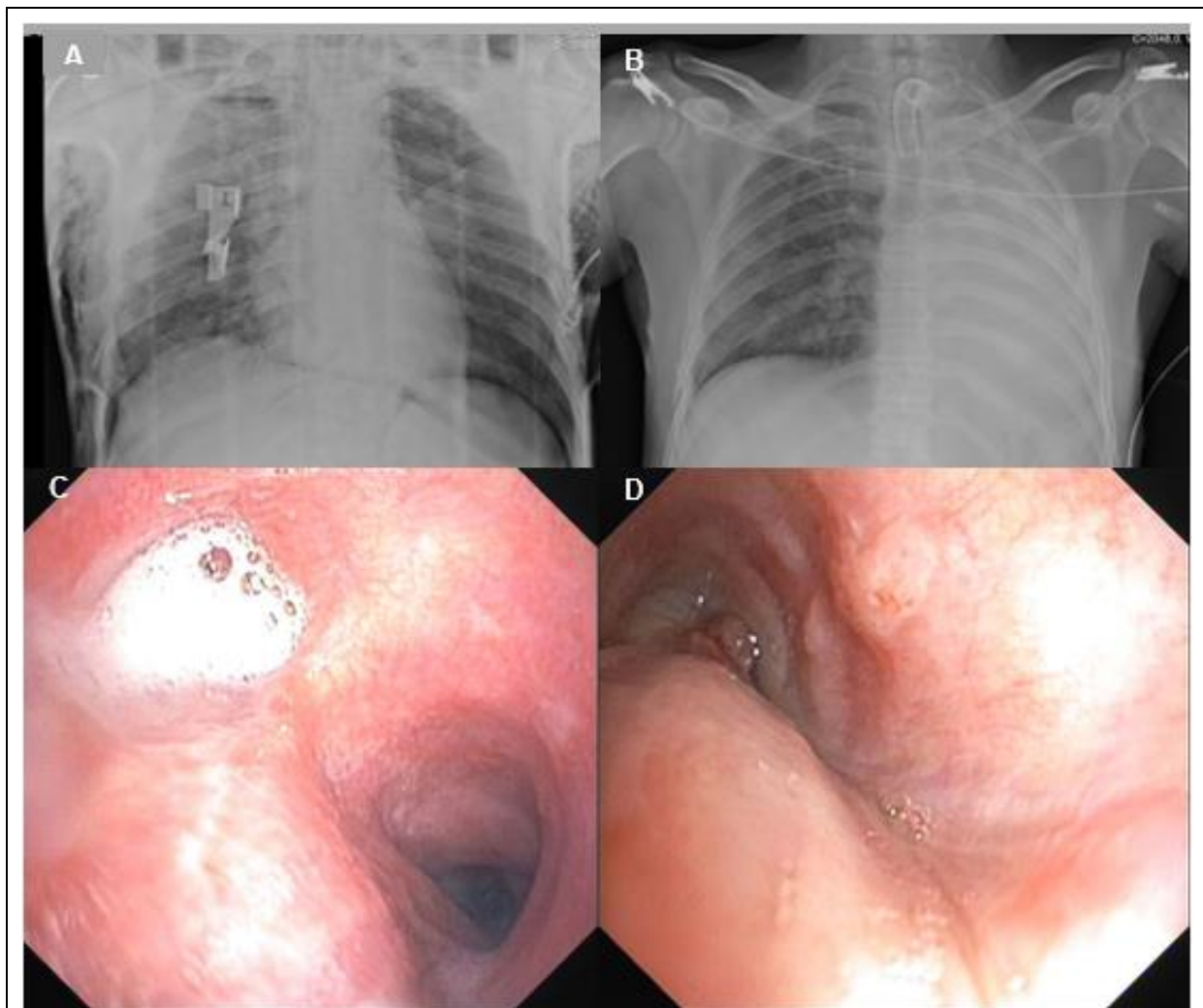


Figure 1: (A): Bilateral pneumothorax with collapse of the left lung and extensive subcutaneous emphysema; (B): Total left atelectasis; (C) and (D): Flexible bronchoscopy showing an abrupt occlusion of the left main bronchus and granulomatous lesions.

Discussion and Conclusion

Tracheobronchial injury is a recognized, yet uncommon, result of chest blunt trauma. The diagnosis may be delayed, since it is rare and sometimes difficult to establish [4,5]. It was reported that, in 25% to 68% of cases, there is a delay in the diagnosis of blunt main stem bronchus injuries, with a medium time to diagnose of approximately 9 days.

This is explained since normal ventilation may be present despite airway injury and due to the unspecificity of the symptoms. Clinical manifestations are variable, and signs and symptoms are non-specific, knowing that it can present with dyspnoea, subcutaneous emphysema, hemoptysis, chest pain, cough, desaturation, hyper-resonance on percussion, decreased or absent breath sounds, hypotension, tracheal shift, distended neck veins and sternal tenderness. About 10% of the patients with tracheobronchial injury may be asymptomatic. Routine radiological exams used in trauma evaluation, such as roentgenogram and CT scan of the chest, are particularly important in the early diagnosis of main stem bronchial injuries [2]. The most common radiological findings are subcutaneous emphysema, pneumothorax, pneumomediastinum and rib fractures. Tracheal and bronchial injuries should also be suspected in patients with persistent or increasing pneumothorax, despite continuous chest drainage. Injuries located in the trachea and the proximal region of the left main bronchus may only present with pneumomediastinum, and not pneumothorax [6,7].

Although the CT scan of the chest may identify larger tracheobronchial disruptions, flexible bronchoscopy is recommended for suspected TBR, being the best and most reliable diagnostic procedure. Flexible bronchoscopy allows not only the diagnosis but also the determination of the exact location and extent of the rupture, when performed by an experienced bronchologist [8]. The most common findings are tearing of the wall, blood in the airway, and collapsed airway with inability to view and access the tracheobronchial tree located distally to the site of injury [9]. The most common location of injury is the lower part of the trachea and the right main bronchus, and about 76% of the lesions are located 2 cm distally to the carina [6,7,10,11]. Right main bronchus injuries are more frequent, since the right main bronchus is shorter and supports a bigger and heavier structure of the lung, with less supporting structures than the left bronchus. Left bronchial tree injuries are less frequent (32% of all cases), due to the close proximity of the aortic arch, which stabilizes the bronchus [6,7,10,11]. A delay in the diagnosis may lead to airway stenosis or complete bronchial obstruction, as the injured bronchus is gradually filled with fibro-granulation tissue, respiratory secretions, and organized haematoma. Atelectasis may occur 6 to 21 days after the rupture [10]. Flexible bronchoscopy is indicated to establish the diagnosis. Surgical intervention is indicated for treatment, and the best results are obtained by the earliest restoration of the continuity of the air passage, which makes an early diagnosis vital for survival.

Any diagnosed TBR, irrespectively of the timing of diagnosis, should be treated surgically if possible [1], and traumatic injuries of the tracheobronchial tree need technically challenging operative reconstructions, in almost every case [8].

This case illustrates a rare complication of blunt trauma – complete left main bronchial rupture, in which flexible bronchoscopy played a major role.

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