

## CASE REPORT

# Delayed Presentation and Surgical Management of a Bronchial Tear

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### ABSTRACT

Tracheobronchial injuries following blunt trauma to the chest can be life-threatening. However, failure to diagnose can lead to various acute or chronic complications. A delayed presentation is quite rare and its surgical correction is highly challenging. We present here two cases, which came to us after four and six months of trauma respectively. In these patients, successful surgical repair of totally obstructed right main bronchus in the first case and left main bronchus in the other was carried out. The post-operative course was uneventful with improvement in the respiratory status of both the patients. High degree of suspicion and awareness of the possibility of bronchial tear are required for proper management of such cases.

**Key words :** *Bronchial tear, Bronchoplasty, Delayed presentation.*

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### INTRODUCTION

It is difficult to establish the true incidence of tracheobronchial injuries in patients with blunt trauma because many patients sustaining trauma severe enough to cause such injuries die before reaching the hospital<sup>1</sup>. However, in an analysis of 585 fatal traffic accidents in the metropolitan New Orleans area, only five had a lacerated trachea and there was no mention regarding bronchial tears<sup>2</sup>. Whenever diagnosed, these injuries merit immediate surgical intervention. Nevertheless, sporadic cases have been reported when the diagnosis of these injuries is missed initially and yet the patient survives<sup>3-5</sup>. We report here two such patients in whom successful surgical repair

could be done four to six months after the trauma.

### CASE REPORTS

#### Case 1

A 16-year-old male was referred to this institution for decortication of suspected diagnosis of post-traumatic fibrothorax. The patient had sustained blunt trauma to the chest four months ago. A careful study of chest radiograph done at that time showed features of subcutaneous emphysema and pneumomediastinum (Figure 1). This was somehow missed and no surgical intervention or tube thoracostomy was done. He developed gradually

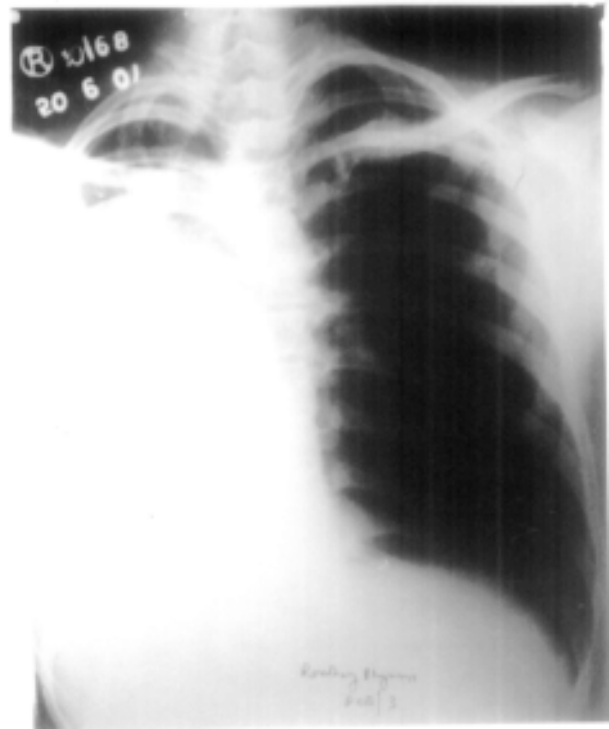
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**Figure 1.** Chest radiograph (postero-anterior view) at the time of trauma showing subcutaneous emphysema and pneumomediastinum.



**Figure 2.** Chest radiograph (postero-anterior view) of the same patient four months following the trauma showing opaque hemithorax on the right side with mediastinal shift to the right.

increasing breathlessness and was referred to us after four months. Chest radiograph at this time (Figure 2) revealed opaque hemithorax on the right side with mediastinal shift to the right. On videobronchoscopy, total obstruction of the right main bronchus with thick fibrous tissue was visualized beyond which the bronchoscope could not be negotiated. Computerized tomographic scan (CT-scan) of the chest revealed collapse of the right lung, herniation of the left lung to the right side and mediastinal shift to the right side.

The patient was taken up for right-sided thoracotomy. The right lung was totally collapsed. However, there was no evidence of any fibrothorax or previous haemothorax. After mobilizing the lung from all around, the right main bronchus was palpated. An apparent defect could be palpated in right main bronchus. Right azygous vein was divided between two rows of sutures to gain better access to the trachea and tracheobronchial junction. After minimal dissection, distal trachea and right

main bronchus were opened. A thick fibrous ridge was completely obstructing the passage. The right main bronchus was re-implanted into the distal tracheal end with 2-0 interrupted silk sutures. The site of anastomosis was buttressed with a pleural flap. The lung expanded completely at the time of surgery. Post-operatively, the patient improved substantially. The lung expanded significantly (Figure 3) but not completely. The post-operative course was uneventful. Bronchoscopy done after three weeks of surgery confirmed the security of anastomosis and patency of all bronchial orifices. The patient is asymptomatic after a follow-up period of six months.

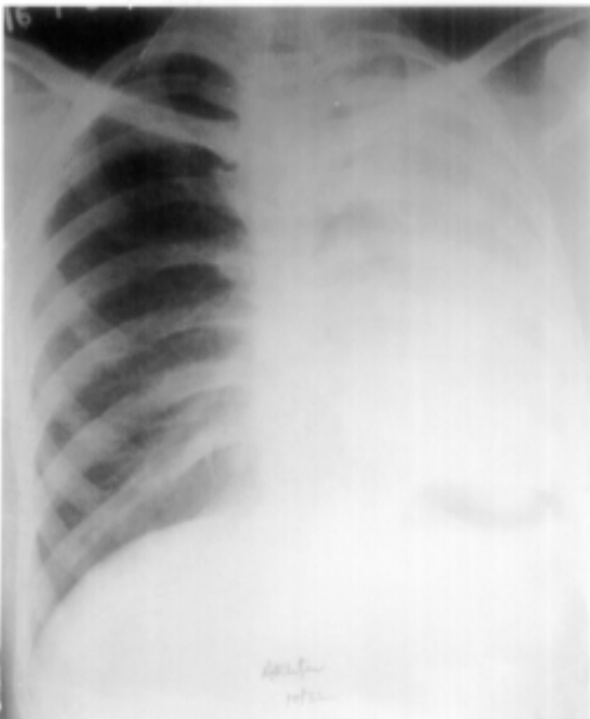
## Case 2

A 25-year-old male had sustained blunt trauma six months before presentation. He developed breathlessness and was presumed to be suffering from pulmonary tuberculosis and sent to our institution. Chest radiograph



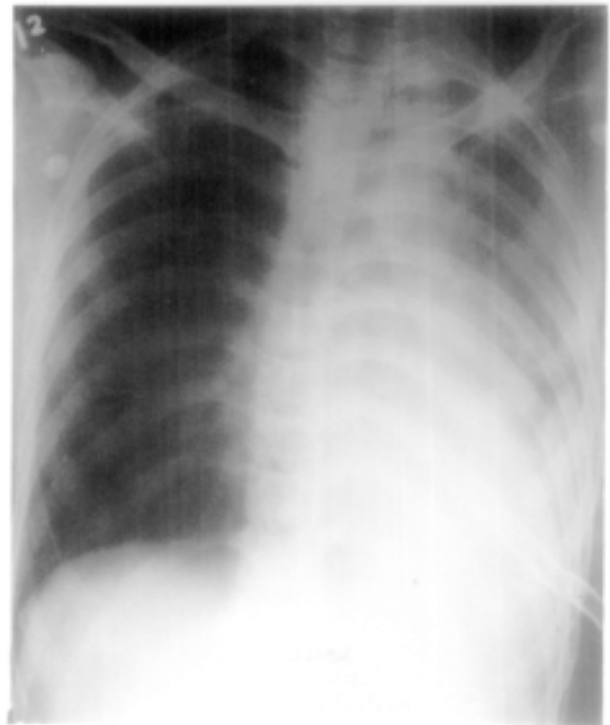
**Figure 3.** Chest radiograph (postero-anterior view) of the same patient following surgical repair showing significant expansion of the right lung.

(Figure 4) revealed opaque left hemithorax. Videobronchoscopy was carried out which showed total obstruction of the left main



**Figure 4.** Chest radiograph (postero-anterior view) at the time of trauma revealing opaque hemithorax on the left side.

bronchus. The patient was taken up for thoracotomy. The left lung was totally collapsed with no evidence of any adhesions. Mediastinal pleura was dissected below the arch of the aorta. A thick fibrous ridge was palpated. On either side of this ridge proximal and distal openings of the severed left main bronchus could be dissected. Both the ends were joined by bronchoplasty technique. The lung expanded well after the procedure. The repair site was buttressed with surrounding vascular tissue. Post-operative course was uneventful and the chest radiograph exhibited considerable expansion of the lung (Figure 5).



**Figure 5.** Chest radiograph (postero-anterior view) of the same patient following surgical repair showing considerable expansion of the left lung.

## DISCUSSION

The possibility of bronchial rupture following thoracic injury has been recognised for many years. For many years, rupture of distal trachea and the main bronchi was thought to be necessarily fatal. Krinitzki described rupture of right main bronchus and total atelectasis of the right lung, found at necropsy in a 30-year-old

woman, the aftermath of injuries sustained twenty years earlier<sup>6</sup>. This was the first indication that these injuries may not be always fatal. The cases presented here were, however, successfully treated by surgical intervention. Frimpong-Boateng and Amoah<sup>3</sup> from Ghana reported similar cases treated after 18 and 29 months.

The mechanism of these injuries is not very clear. Bertelsen and Howitz<sup>7</sup> have discussed the possible mechanisms in their review of this condition. A crush between sternum and spinal column may be responsible for such an injury. Sudden deceleration of the relatively free lung may be the cause of such tears. Compression of thorax in the saggital plane rupturing relatively fixed and stiff tracheobronchial system is another proposed mechanism. Blunt trauma of the chest with a closed glottis produces a sudden rise in airway pressure and can produce a longitudinal tear of the bronchi.

In cases where an early diagnosis of bronchial tear is not made and repair not done, one of the two clinical courses may follow : (a) an incomplete laceration heals with stricture formation and results in recurrent atelectasis, infection and bronchiectasis. This may require resection or bronchoplastic procedure; and (b) when complete transection occurs, both ends of the severed bronchus granulate and heal. The distal bronchial tree fills with mucus, and the lung collapses. Infection does not occur and the parenchyma of the lung remains undamaged. The prognosis is, therefore, better.

Surgical correction in the later phase poses a complex challenge<sup>8</sup>. Success of the bronchoplasty depends upon how satisfactorily the technical procedure can be carried out. Early diagnosis of these injuries rests on an awareness

of the possibility of bronchial tear following blunt trauma. Subcutaneous emphysema and pneumomediastinum if detected should alert the treating physician to look for these possibilities<sup>9</sup>.

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