

## Case Report

# Spontaneous Pneumothorax in a Patient with Complex Bullous Lung Disease after Blunt Trauma: A Case Report

Huda AlManfouhi<sup>1</sup>, Murugan Sukumar<sup>2</sup>

<sup>1</sup>Department of Surgery, Amiri Hospital, Kuwait

<sup>2</sup>Chest Disease Hospital, Kuwait

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### ABSTRACT

The management of spontaneous pneumothorax (SP) in a patient with complex bullous lung disease may be difficult initially. We report a 32-year-old man who presented to the emergency room with head injury after blunt trauma.

The patient had a clinical evidence of SP without chest trauma. He was managed initially with a chest tube but later required surgical intervention to stop the air leak.

KEY WORDS: bullous lung disease, chest tube, pneumothorax

### INTRODUCTION

Spontaneous pneumothorax (SP) can be divided into primary SP resulting from rupture of subpleural blebs, and secondary SP, which is related to the presence of an underlying lung disease (e.g., emphysema and bullous lung disease)<sup>[1]</sup>. The diagnosis and treatment of secondary SP due to bullous lung disease may be difficult initially. The complex appearance of the lungs themselves, partial adherence of the lung to the chest wall, and the clinical presentation may result in an unusual configuration of the pneumothorax or may mask the presentation. Computed tomography (CT scan) is very useful in the diagnosis of bullous lung disease and in the management of complex pneumothorax in such patients<sup>[1,2]</sup>. CT scan will demonstrate the area of pneumothorax, the area of bulla and indicate the best place to insert the chest tube<sup>[2]</sup>.

Numerous therapeutic options are available for the treatment of secondary SP, including chest tube thoracostomy, thoracotomy, and video-assisted thoracoscopic surgery. The indications for surgical treatment include persistent air leak, recurrent SP, and presence of an underlying lung disease<sup>[3]</sup>. We describe a case and the management of a complex secondary SP in a young patient after blunt chest trauma.

### CASE REPORT

A 32-year-old previously healthy Kuwaiti gentleman, smoker, was brought to surgical casualty after a road traffic accident. He suffered

a closed head injury and no other apparent organ injuries. Clinically he had decreased air entry on the right side of the chest and his oxygen saturation was 86%. A chest tube was inserted by open technique for a clinical suspicion of pneumothorax. He was intubated and mechanically ventilated. Subsequently, the lung failed to expand and there was evidence of continuous air leakage. Another chest tube was inserted and connected to low pressure suction (Fig. 1). Urgent CT scan of the chest showed bilateral apical complex bulla and right pneumothorax (Fig. 2). There were no rib fractures and no lung injury. Over the following days, the air leak and right sided pneumothorax persisted and he underwent thoracotomy on day 14 of admission. Multiple bulla on the right side were excised by GIA stapling device (Auto suture Company; United States Surgical Corp, Norwalk, CT). Then, a parietal pleural abrasion by gauze was performed. A 28 F chest tube was inserted and connected to underwater seal suction with a negative pressure of 20 cm H<sub>2</sub>O. Patient was extubated in the operating room and transferred to intensive care unit. The intercostal drain was removed after five days when the underlying lung was fully expanded with no air leakage (Fig. 3).

### DISCUSSION

Primary pneumothorax occurs in young patients with no obvious lung disease while secondary SP occurs when a bulla ruptures in grossly diseased lung and is common in elderly patients. Among

*Address correspondence to:*

*Dr. Huda Al Manfouhi, Senior Registrar, Department of Surgery, Al Amiri Hospital, Kuwait. Tel: 9829820, E-mail: surgeon66@hotmail.com*

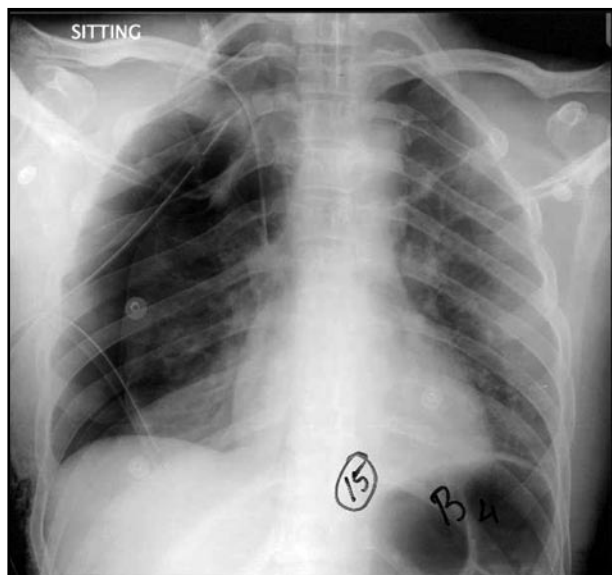


Fig. 1: Postero-anterior chest radiograph showing two chest drains on the right side and pneumothorax

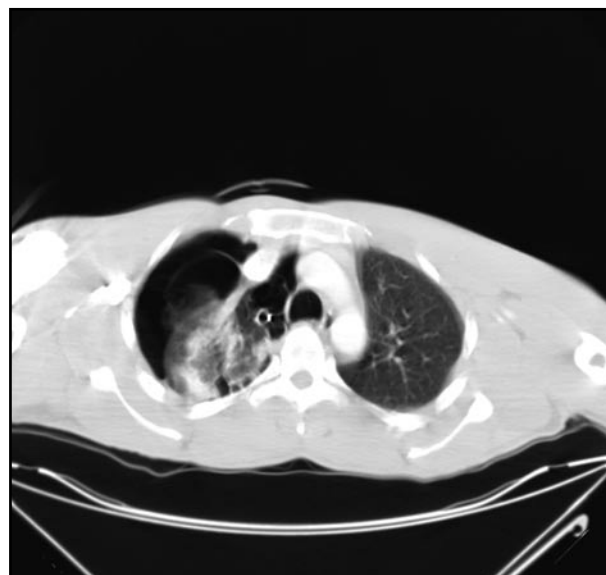


Fig. 2: CT scan of the chest showing pneumothorax on the right side with bulla in the apex of right upper lobe



Fig. 3: Postoperative chest radiograph showing one chest drain and fully expanded right lung

the commonest causes of secondary SP are chronic obstructive lung disease (COLD), bullous lung disease and tuberculosis<sup>[1]</sup>. Bullous lung disease is an air-filled space within the lung parenchyma resulting from deterioration of the alveolar tissue. These lesions have a fibrous wall and are trabeculated by the remnants of alveolar septa. They can develop in a lung that is otherwise normal.

We describe a patient with bullous lung disease who had chest trauma and presented with pneumothorax managed initially with chest tube thoracostomy. Further treatment was indicated because of persisting air leak due to presence of a bulla.

Plain chest X-ray is not always reliable in evaluating the extent of pneumothorax and the number and size of the bullae. It might also fail to identify the safe site to insert chest tube. CT scan

can give more information regarding the anatomy and size of the pneumothorax. It can also be useful before surgical intervention<sup>[2]</sup>.

Initial treatment of secondary SP is by inserting a chest tube and if the lung fails to expand, it should be connected to low pressure suction. The American College of Chest Physicians (ACCP) recommended surgical intervention if air leak is persistent for more than 4-7 days in secondary SP<sup>[3]</sup>. Schoenenberger *et al* reported 60% air leak termination rate for chest tube kept for up to 48 hours. Keeping the chest tube for more than two days and up to 10 days did not change this rate. This might suggest a more aggressive approach in treating persistent air leak in secondary SP<sup>[4]</sup>. On the other hand, patients with secondary SP are usually from the older age group and at higher risk from surgery. The ACCP recommended continuing conservative treatment in secondary SP before encouraging the patient to go for surgical intervention. But if the patient is medically fit, surgical intervention might be considered earlier<sup>[3]</sup>.

Persistent air leak is one of the indications for surgical intervention in cases of SP. We believe that the present report is to demonstrate that early surgical intervention is indicated in the management of SP in a group of patients who have complex bullous lung disease. Because of the existence of bullous lung disease and adhesions to the lateral chest wall, CT scan can be done prior to chest tube insertion. This will provide information about the extent of lung disease, the amount of pneumothorax and, the best place for the chest tube insertion.

Tanaka *et al* reviewed 123 episodes of secondary SP and reported 80.5% success rate of non-operative approach while only 19.5% were treated by

thoracotomy. Persistent air leak was the indication for surgical intervention in 62.5% of the patients.

Persistent air leak is commoner in secondary SP compared with the primary SP because of underlying lung disease. Andre's *et al* reported air leak rate of 75% in secondary SP compared with 36% in primary SP<sup>[5]</sup>.

Surgical intervention can be done by open thoracotomy or Video Assisted Thoracic Surgery (VATS). ACCP recommends both methods. Identifying the air leak by thoracoscopy can be difficult because of a smaller field after lung collapse. It can be a cause for persistent air leak postoperatively. Waller *et al* compared the two approaches. For SP the success rate was 97% for thoracotomy and 90% for VATS. All failures were in the secondary SP group. He concluded that VATS was superior to open thoracotomy for primary SP but is less reliable in secondary SP<sup>[6]</sup>.

## CONCLUSION

We advocate the use of CT scan in patients

suspected of pneumothorax in a diseased lung and early surgical intervention in cases of secondary SP.

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