Bronchopleural fistula and tension pneumothorax after pneumonectomy

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Bronchopleural fistula (BPF) is a well-recognised complication following pneumonectomy with an incidence reported to be between 0.6% and 4.4%.[1] It is a severe complication with an associated mortality as high as 50%.[1] Here we report a case of BPF presenting to the emergency department with extensive subcutaneous emphysema and pneumoscrotum secondary to a tension pneumothorax.

A 45-year-old male intravenous drug user with a past medical history of hepatitis C underwent a completion left pneumonectomy due to necrotising pneumonia following a prolonged and complicated in-patient stay during which he required veno-venous extracorporeal membrane oxygenation. He presented to accident and emergency three weeks following his pneumonectomy with severe breathlessness, a productive cough and reported left-sided chest pain and swelling. On examination he was in respiratory distress, requiring oxygen therapy. He had extensive subcutaneous emphysema tracking across his chest wall and this extended into his scrotum, which was significantly enlarged with crepitus.

His admission chest radiograph demonstrated an empty pleural cavity in comparison to his postoperative radiograph, which was diagnostic of a bronchopleural fistula (Figures 1a and b).[2] In the short interval between these images there would be no other explanation for the loss of this fluid in this patient. However, more importantly, there was also expansion of the post-pneumonectomy space with mediastinal shift towards the right in comparison to his postoperative radiograph, which together with the subcutaneous emphysema and clinical presentation – including tracking of air as far as his scrotum (Figures 1c and d) – was diagnostic of a tension pneumothorax. The importance of the appearance of the chest radiograph was not immediately recognised by the emergency department.

Following referral to cardiothoracic surgery, chest drainage was subsequently performed with release of significant pressure and immediate clinical improvement followed. The post-drain radiograph (Figure 2) emphasises the extent of mediastinal shift and tracheal deviation on the admission radiograph. The patient was transferred to his cardiothoracic unit where he underwent surgical repair of the bronchopleural fistula.

BPF is a direct communication between the bronchial tree and the pleural space. It is a rare but feared complication following pneumonectomy due to dehiscence of the bronchial stump. It has a high associated morbidity and mortality.[3,4] The clinical presentation is variable, but development of dyspnoea with a cough productive of purulent material or fluid, particularly when lying with the remaining lung dependent, with disappearance of the pleural effusion is classical.[3] Complications of the consequent air leak can also occur. In this case, we observed development of a tension pneumothorax that resulted in the development of subcutaneous emphysema and extended to the scrotum. This would suggest that the bronchopleural fistula must have been functioning as a valve, which allowed accumulation of air within the pleural space leading to subsequent pressurisation and development of mediastinal shift.

The case emphasises the significance of having an awareness of normal radiographic appearances following a pneumonectomy in order to identify post-surgical problems. The expected radiographic findings would be

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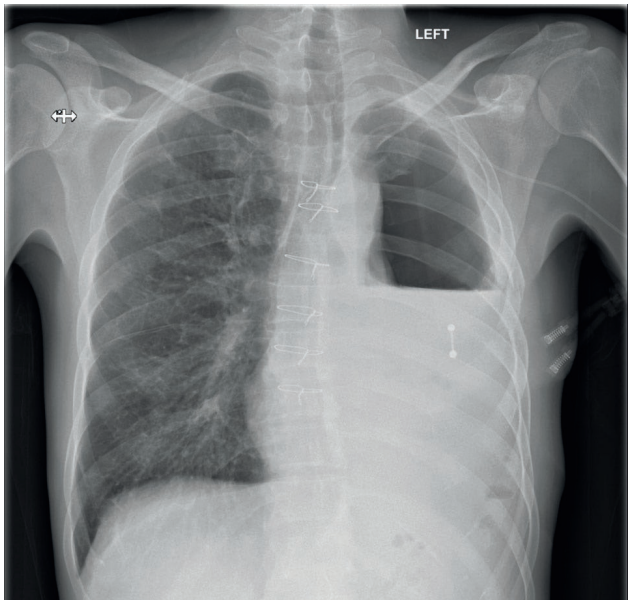
for the contralateral remaining lung to expand, resulting in mediastinal shift towards the side of the pneumonectomy, and for the post-pneumonectomy space to become filled with fluid.[5] Both of these changes were not initially present in this case presentation, highlighting the importance of emergency and internal medicine physicians to be equipped with this knowledge to recognise and promptly manage complications post-pneumonectomy.

Figure 1 Presentation of bronchopleural fistula post pneumonectomy: chest radiographs

a) 10 days prior to presentation demonstrating normal accumulation of fluid within the left-sided post-pneumonectomy pleural cavity



b) on presentation to hospital while acutely unwell demonstrating an abnormal absence of left-sided pleural fluid with evidence of abnormal mediastinal shift towards the remaining contralateral lung

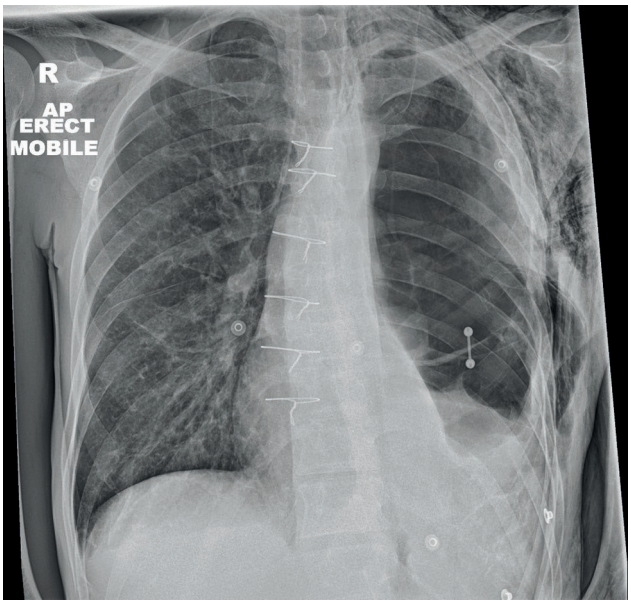
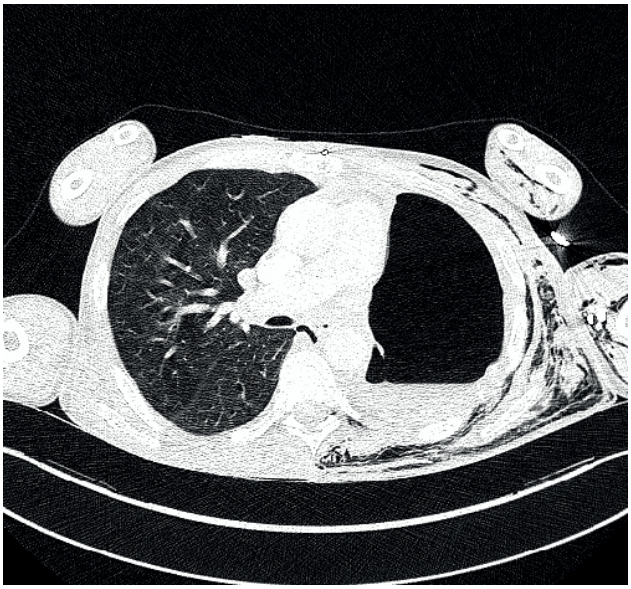


Figure 1 continued Presentation of bronchopleural fistula post pneumonectomy. Computed tomography axial images demonstrating:

c) pneumothorax and subcutaneous emphysema over the left hemothorax and arm



d) air tracking down into the scrotum bilaterally (white arrows)

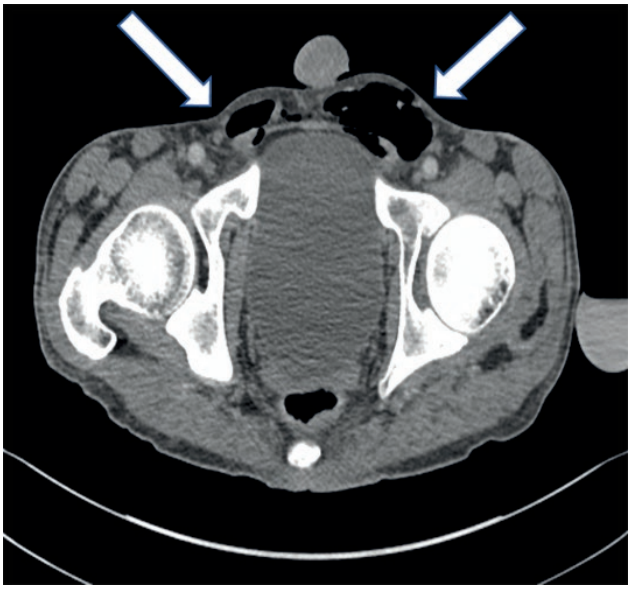
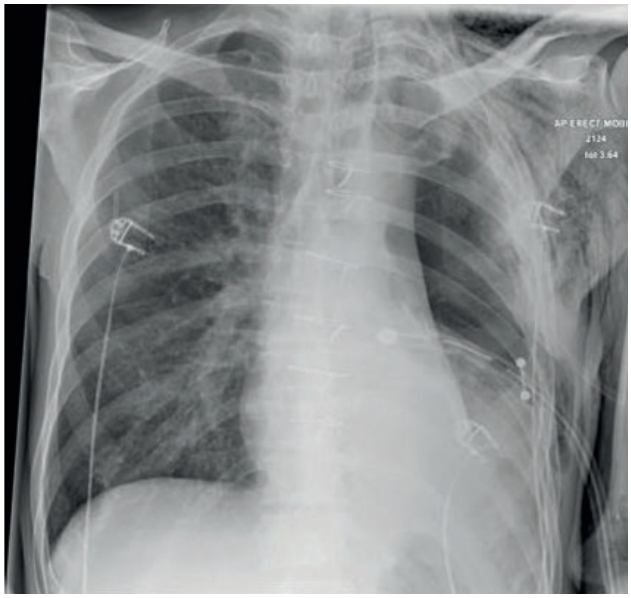


Figure 2 Chest radiograph following drain insertion with resultant improvement in mediastinal shift back towards the pneumonectomy space



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