Case report

Bulla or pneumothorax? - A radiological dilemma

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Abstract

Diagnosing and treating pneumothorax can be an emergency life-saving situation. However, differentiating pneumothorax from bulla may be difficult in some circumstances and requires careful attention to details on the chest radiograph. We report a case of loculated hydropneumothorax which initially presented like a bulla. We wish to highlight the atypical radiographic presentation of pneumothorax empasising the importance of careful interpretation of chest radiograph. Follow up radiologic imaging or computed tomogram/magnetic resonance imaging would be required in such cases if the clinical and radiographic diagnosis do not match.

Keywords: Bulla, pneumothorax

Case report

A 51 year old male patient, who had undergone abdominoperineal resection of carcinoma rectum about 2 years back, presented with complaints of sudden onset of breathlessness and one episode of haemoptysis. He was found to have hepatic, pulmonary and bone metastasis and had received 5 cycles of chemotherapy. The sixth cycle was aborted as he developed fever and diarrhoea. Two days later he started having cough with scanty white sputum. A diagnosis of lower respiratory tract infection was made and initiated on cefepime. However, on the same day, he started desaturating on room air and was administered 60% oxygen *via* Venturi by face mask, in response to which oxygen saturation improved to 60-70 % . On auscultation, air entry was found to be reduced in the middle and lower zones of the right lung field. Noninvasive ventilation (NIV) was commenced and his saturation improved up to 85-90% on FiO_2 of 0.6. Chest X-ray done two days prior to the onset of the breathlessness had revealed a cavity with well demarcated rim which was interpreted as a bulla (*Figure 1*). However, on careful examination, an air-fluid level was noticed raising a suspicion of hydropneumothorax. A repeat chest X-ray was done which showed collapse of the right lung, a band of tissue anchoring a part of the lung to the diaphragm elevating that part of the diaphragm and mediastinal shift, together suggestive of a loculated tension pneumothorax (*Figure 2*). An intercostal drain was inserted under fluoroscopic guidance and, air under tension along with approximately 100 ml of haemorrhagic fluid was drained. Following this, the dyspnoea reduced and oxygenation showed a progressive improvement (*Figure 3*).

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Discussion

A loculated pneumothorax is a pocket of pleural air trapped in a small area of the pleural cavity. Normally, pneumothorax spreads to most of the anterior and superior position of the thoracic cavity on the affected side of the chest. However, patients with significant parenchymal lung disease often develop adhesions in the pleural space which

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Figure 1: X-ray of loculated pneumothorax appearing like a bulla

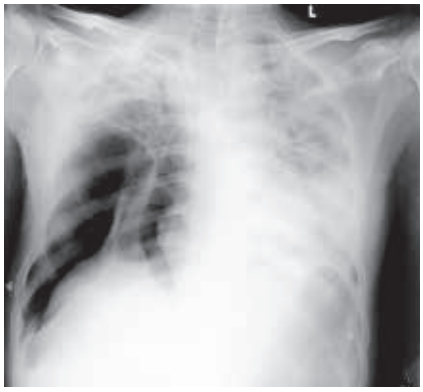

Figure 2: Loculated tension pneumothorax

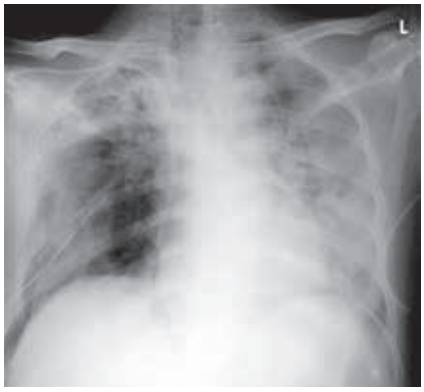

Figure 3: Resolution of pneumothorax after ICD insertion

segment the pleural space into 'sections,' leading to loculation of air in the pleural space. In fact, a chest tube in one section may not evacuate air in another section-even when the chest tube is patent and properly functional.[1]

Large subpleural bullae can mimic a loculated pneumothorax. Both bullae and pneumothoraces usually have a visceral pleural contour that is either straight or convex laterally, but unlike pneumothorax, bullae typically have a medial border that is concave to the chest wall. Exceptions to this occur with subpulmonic collections of gas, loculated pneumothorax, or pleural adhesions confusing the radiological picture.[2]

Hydropneumothorax is a collection of fluid and gas within the pleural cavity. In erect chest x-ray, hydropneumothorax is seen as opacity with blunting of costo phrenic angle and having a definite horizontal upper margin with hyperlucency above it. It is the air fluid interface that creates this definite horizontal margin. Although the collapsed lung margin can be delineated, often it will be the only sign of a pneumothorax.[3]

Loculated pneumothorax frequently occurs in patients with pleural adhesions, acute respiratory distress syndrome (ARDS) and in patients with autoimmune vasculitis affecting the pulmonary system. They pose a challenge to the physician as they do not present with classic clinical features. Air entry would be heard essentially normally on the affected side and the chest radiograph would not present with major mediastinal shifts. In fact, they would be missed on initial X-rays until they progress to tension pneumothorax.[4] Even small areas of compression on the lung can have a significant impact on pulmonary function when the lungs are so dysfunctional to begin with.

Normally, tension pneumothorax is managed by insertion of an intercostal drain (ICD) which would rapidly decompress the lung, resulting in re-expansion and improvement of oxygenation. However, the same may not happen with the loculated ones as the ICD, if not inserted properly into the loculation, would not relieve the pneumothorax at all. Hence, loculated pneumothorax is decompressed by insertion of ICD under computed tomography (CT)/fluoroscopic guidance. Boland *et al*, have demonstrated improvement in oxygenation in ARDS patients who had image-guided decompression of such loculated air collections.[5]

To conclude, loculated pneumothorax presents with subtle clinical or radiological signs confusing the picture with bullae. ICD insertion under image guidance is recommended as it results in properly guided placement of the tube leading to decompression and improvement in oxygenation.

References

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