The space between: pneumothorax or bulla

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ABSTRACT

Background: Distinguishing between a bulla and pneumothorax can sometimes be difficult especially in the absence of preexisting lung disease, leading to inappropriate intervention.

Case Presentation: We report the case of a well 32-year-old male who presented with a year's history of insidious onset breathlessness. A routine chest radiograph was thought to show a large pneumothorax. He had chest drains placed with no radiological improvement. A video-assisted thoracic surgery procedure revealed a giant bulla.

Conclusion: This case highlights the importance of correlating clinical assessment with radiological findings. Early Computerised Tomography (CT) imaging should be considered prior to pleural intervention in clinically stable patients.

Keywords: Pneumothorax, bulla, chest drain, chest X-Ray, vanishing lung syndrome.

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Background

A pneumothorax is a collection of air in the pleural space. It can be primary or secondary as a complication of underlying lung disease [1]. A bulla is a large thin-walled cyst within the lung [2]. It is sometimes difficult to distinguish between the two, especially in the absence of pre-existing lung disease. We discuss the case of a young man who presented with persistent breathlessness and unusual radiology.

Case Presentation

A 32-year-old male non-smoker with no history of recreational drug use was referred to the radiology department for a routine chest X-ray (CXR), to investigate a year's history of breathlessness. He also described left chest wall pain and an awareness of "crackling" within the chest. The CXR (Figure 1) raised concern for a large left pneumothorax and he was admitted to the emergency department for assessment.

On examination, he was of average stature with a BMI of 40. He was comfortable at rest with no signs of respiratory distress. Vital signs were within normal range with a respiratory rate of 16 and oxygen saturation of 97% on air. On auscultation, he had reduced air entry over the left hemithorax. There were no features of a connective tissue disorder.

After two failed attempts at conventional needle aspiration, a 12F Seldinger chest drain was inserted anteriorly in the second intercostal space. The following day a CXR showed a presumed enlarging pneumothorax. The existing drain was replaced with an 18F Seldinger drain which was subsequently changed to a 28F surgical drain with suction following advice from the cardiothoracic team.

The chest drain continued to bubble sporadically with no radiological improvement. A high-resolution CT (HRCT) scan was requested to help differentiate between a chronic pneumothorax and bulla. This showed a large air space within the left anterior thoracic cavity with septations and a faint rim of air in keeping with a small pneumothorax (Figure 2a,b). The unusual appearance though not conclusive favored this being a large upper lobe bulla. His alpha-1-antitrypsin level was normal.

He underwent a video-assisted thoracic surgery (VATS). This confirmed a $95 \times 65 \times 50$ mm left upper lobe giant bulla. A bullectomy, apical pleurectomy, and mechanical abrasion of the parietal pleura were performed. The histology of the specimen was in keeping with a bulla. Post-operative recovery was uneventful. He had completely recovered at 6-week clinic follow-up.

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Figure 1. Initial CXR showing large air lucent area of the left hemithorax (black arrow).



Figure 2. HRCT showing large air space within the left hemithorax (orange arrow), septations particularly inferiorly and tip of the intercostal drain is within the large air space peripherally (blue arrow). Axial (a) and coronal (b) views.

Discussion

Giant bulla, giant bullous emphysema, or vanishing lung syndrome is well reported in the literature [2,3]. By definition it occupies more than a third of the hemithorax [3,4]. It is commoner in men and smokers and onset is usually, insidious with progressive dyspnea over several months [5]. Less frequent associations include alpha-1 antitrypsin deficiency, drug use, and connective tissue disease [3]. The natural history is one of progression with worsening breathlessness. Bullae can rupture resulting in pneumothorax as an acute presentation. They can also become infected [6]. Some improve with medical management. Surgery can be considered for symptomatic patients with significant functional impairment or when complications arise. In general, with bullae, a concave lung surface is seen [4]. However, this is not always true as noted in this case where the bulla appeared as a crescent-shaped outline on CXR, leading to diagnostic uncertainty.

Some of the features of this case: the patients' youth, absence of lung disease, and the appearance of the CXR favoured a pneumothorax. The history and clinical presentation though were slightly incongruent. With the benefit of hindsight, one could argue that the year's history of breathlessness favored a less acute diagnosis. Early CT imaging would have helped avoid unnecessary pleural intervention. It also raises the question of whether we overemphasize the importance of the size of pneumothorax on imaging as a guide to intervention. New studies have shown that conservative management, in select groups with moderate to large spontaneous pneumothorax is noninferior to intervention, leading to fewer adverse events [7].

Conclusion

Bullae can mimic pneumothorax. Distinguishing between the two can be difficult and may lead to inappropriate initial management. The patient may not always have the typical phenotype and risk factors associated with bullae, as noted in this case. A high index of suspicion is necessary especially when clinical findings do not correlate with CXR appearance. Early CT imaging will prevent unnecessary pleural interventions and adverse events and aid in timely referral to the surgical team.

List of Abbreviations

СТ	Computerised Tomography
CXR	chest X-ray
BMI	Body Mass Index
HRCT	High-Resolution Computerised Tomography
VATS	Video-Assisted Thoracic Surgery

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent for publication

Verbal consent was sought from the patient for publication.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

Author's contribution

Dr Lydiya Thomas: Specialty registrar involved in clinical care and chest drain insertion, concept and design of the case report, drafted the manuscript, final approval of the version to be published.

Dr Ratna Alluri: Consultant responsible for clinical care, concept and design of case report, revision of manuscript draft, final approval of the version to be published.

Dr Mahendran Chetty: Consultant responsible for clinical care, concept and design of case report, revision of manuscript draft, final approval of the version to be published.

Mr Mohammed Khalil: Consultant surgeon who performed the VATS procedure, revision of manuscript draft, final approval of the version to be published.

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Summary of the case

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1	Patient (gender, age)	Male, 32-year-old
2	Final diagnosis	Giant bulla
3	Symptoms	Persistent breathlessness, left chest wall pain, and "crackling" sensation
4	Medications	Nil
5	Clinical procedure	Multiple chest drains followed by VATS.
6	Specialty	Respiratory, cardiothoracic