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Case Report

Spontaneous regression of the lung bulla

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Abstract

Blebs and bullae are gas-containing spaces commonly found in many conditions and usually cause no symptoms, but may progress over time resulting in respiratory distress; pneumothorax and superimpose infections are common complications of bullae. Spontaneous regression of the bulla is rarely encountered, and its mechanism remains unclear. However, a few case reports suggest that it usually occurs after an infection or a rupture.

We present a 72-year-old male ex-smoker who presented with progressive dyspnea for 1 month. His chest radiograph showed a few lung blebs and bullae in the right upper to middle lung field. Bronchodilators and anti-inflammatory medications were prescribed and he was referred to the pulmonologist. His first chest CT also showed multiple blebs and a large bulla in the bilateral upper lobes and he was scheduled for bullectomy because his bullae were symptomatic. However, at a 17-month follow up, his symptoms spontaneously improved and his chest CT showed regression of the bulla with only a few small calcifications and pleural thickening in the right upper lobe remaining.

Keywords: Bulla, Bleb, Regression, Spontaneous, Rupture.

Introduction

Blebs and bullae are gas-containing spaces commonly found in many conditions. Blebs are usually located within the visceral pleura or in the subpleural lung and are smaller than 1 cm in diameter while a bulla is described as a sharply demarcated region of emphysema larger than 1 cm in diameter with walls less than 1 mm thick [1].

Bullae usually cause no symptoms but may progress over time resulting in respiratory distress; pneumothorax and superimpose infections are common complications of bullae. Spontaneous regression of bulla is rarely found. Only 4 of 49 patients with decrease in size of bullous lesions during the x-ray follow up have been reported [2]. The mechanism in which this occurs remains unclear. A literature review and case report by Chang WH suggests that spontaneous regression of bullae usually occurs after an infection or a rupture [1].

Case summary

A 72-year-old male, 25-pack years ex-smoker who had quit for 5 years, presented with progressive dyspnea for 1 month. He complained of chest pain and dyspnea on exertion. The physical examination showed expiratory wheezing while the rest of his pulmonary and cardiovascular examination was unremarkable. His chest radiograph revealed multiple thin-walled lung lucencies, up to 6.1 cm in diameter, in the right upper to middle lung zone which was suspected to be bullae (Figure 1). Because of his history of chest pain on exertion, an electrocardiogram, cardiac enzyme test, as well as an echocardiogram were performed which found no abnormality. Bronchodilators were prescribed and he was sent to the pulmonologist.

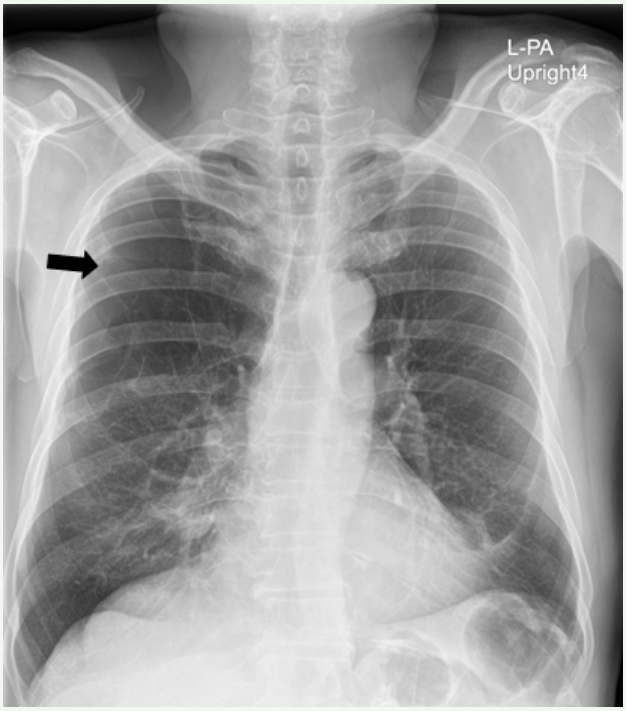

Figure 1. *Chest radiograph PA upright showed multiple lung blebs and bullae (black arrow) in the right upper to middle lung field.*

His pulmonary function test revealed an FEV1/FVC of 45% with an irreversible obstructive pattern and his postbronchodilator FEV1 was 75%; compatible with chronic obstructive pulmonary disease (COPD). He was treated with short and long-acting bronchodilators and inhaled corticosteroids. During a follow-up, his symptoms got worse. A chest CT was performed which revealed diffuse lung emphysema with multiple thin-walled blebs and bullae in the bilateral upper lobes (Figure 2A). He was discharged with bronchodilators and instructed to inhale corticosteroids and was scheduled for a bullectomy.

A few months later, he developed acute dyspnea with fever and was diagnosed with pneumonia at another local hospital where he received intravenous antibiotics for 3 days and was discharged once his symptoms improved. He then presented at our hospital for his follow-up chest CT (17 months after the previous study) which showed regression of the bullae with only a few residual small calcifications and pleural thickening in the right upper lobe observed (Figure 2B and 2C).

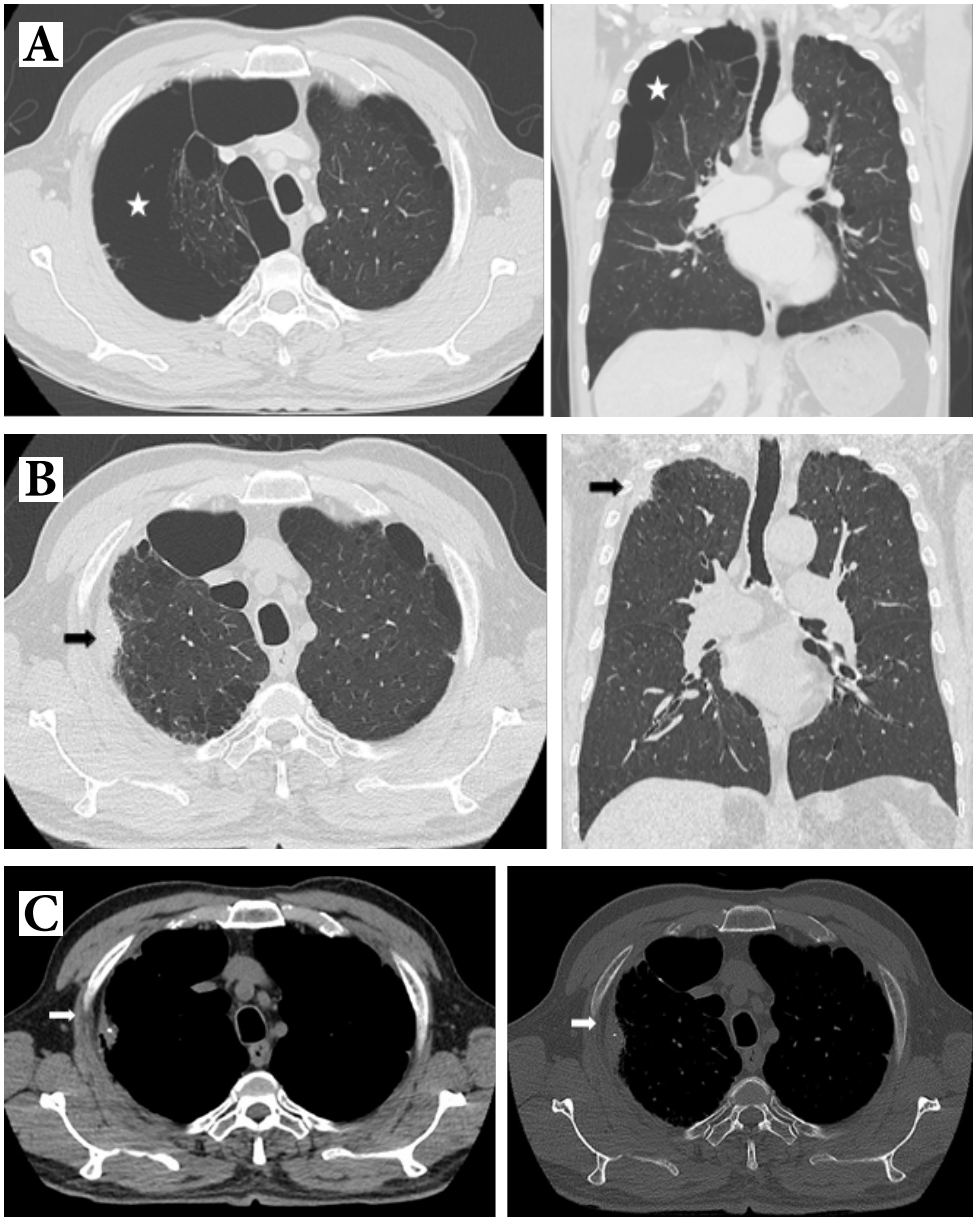

Figure 2. *Conventional chest CT in (A) lung window on axial and coronal views shows a few lung blebs (white stars) both upper lobes. 17 months later, his follow-up chest high resolution computed tomography (HRCT) in (B) lung window on axial and coronal views shows regression of the lung bullae (black arrows) in both upper lobes with new pleural thickening and a few small calcifications visualized in (C) axial mediastinum and bone window (white arrow) in right upper lobe.*

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Discussion

In the literature review by Chang [3], most cases of spontaneous regression of lung bullae occurred after an infectious process which could then result in inflammation of the airway and thus the closure of communication between the airway and bullae, converting the bullae into a closed space. The air within the closed-off bullae was then reabsorbed resulting in the disappearance of the bullae. Our patient reported a brief history of pulmonary infection before his follow-up chest CT which may precipitate the spontaneous regression of lung bullae in our case. However, no medical records and imaging evidence of his pulmonary infection was made available.

Chang [3] also suggested that smoking cessation and medical treatment could be associated with the regression of bullae. Tobacco smoke causes airway irritation and inflammation; smoking cessation combined with anti-inflammatory medication could decrease airway inflammation and relieve the check-valve obstruction of the airway, resulting in regression of bullae [3]. Our patient had a history of smoking cessation and also began continually receiving bronchodilators and anti-inflammatory medications after his first visit at our institution, prior to his initial chest CT. This seemed like the most probable explanation for the spontaneous regression of the bullae observed in our patient as his prior history of pulmonary infection remained questionable.

A few remaining small calcifications in the right upper lobe observed after the regression of bullae in our case also corresponded with the previous case report described by Benito Bernáldez et al [4]. However, no clear explanation about the pathophysiology of the calcification is described.

Despite the pathophysiology behind the spontaneous regression of the bullae remaining unclear, we suspect that bronchodilators and anti-inflammatory medications in conjunction with cessation of smoking may play a significant role in this particular case. Therefore, bronchodilator and anti-inflammatory medications with a close follow-up may be a good treatment option for patients with symptomatic bullae who refused surgical treatment, or in cases where bullectomy may not be a viable option due to surgical comorbidities.

References

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