Diagnostic Dilemma in a 70-Year-Old Man with Fever and Air-fluid Level on Chest X-ray

Abhisheka Kumar, Hanmant Ganpati Varudkar, Arti Julka, J C Agrawat

1Senior Resident, Department of Pulmonary Medicine, All India Institute of Medical Sciences, Patna, Bihar, India, 2Professor and Head, Department of Pulmonary Medicine, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India, 3Professor, Department of Pulmonary Medicine, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India, 4Associate Professor, Department of Pulmonary Medicine, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

Infected bullae are frequently confused with a pulmonary abscess. Their recognition is important to avoid unnecessary interventions. We describe a case of 70 years male patient, who came with complaints of breathlessness since 5 years, cough with a moderate amount of mucopurulent expectoration, pain in back and right shoulder and low-grade intermittent fever all since 20 days. Past history was unremarkable. There is a history of 100 pack-years. On examination, he was tachypneic, having oxygen saturation of 87% on room air. On respiratory examination, the finding was consistent with emphysema with right sided cavitary disease. Chest X-ray showed thin walled cavity with fluid level in the right upper zone with pneumothorax on the left side. Investigations revealed 17,000 white blood cell with neutrophil predominance. He was not responding adequately so high-resolution computed tomography (HRCT) was ordered which showed multiple thin-walled bullae in both lung along with air-fluid level in one large bullae with surrounding pneumonitis on the right side. Infected emphysematous bullae should be suspected when a fluid level appears in a patient with clinical finding suggestive of emphysema. We propose that symptomatic patients with radiological signs of air-fluid level should be evaluated with HRCT to rule out similar condition and assessment of underlying condition.

Keywords: Chronic obstructive lung disease, Emphysema, Infectious giant bullae, Lung abscess, Lung bullae

INTRODUCTION

Lung abscess is defined as necrosis of the pulmonary tissue and formation of cavities containing necrotic debris or fluid caused by microbial infection. The formation of multiple small (<2 cm) abscesses is also referred as necrotizing pneumonia or lung gangrene. Both lung abscess and necrotizing pneumonia are manifestations of a similar pathologic process. Failure or delay to recognize and treat lung abscess is associated with poor prognosis. Lung abscess was a devastating disease in the pre-antibiotic era when one-third of the patients died, another one-third recovered, and the remainder developed debilitating illnesses such as recurrent abscesses, chronic empyema, bronchiectasis, or other consequences of chronic pyogenic infections. The treatment of lung abscess is guided by the available microbiology with consideration of the underlying or associated conditions. Lung abscess the most common runs a sub-acute course with an insidious onset of non-specific symptoms, but it may present acutely with aggressive toxic symptoms. The duration of symptoms before diagnosis is extremely variable, ranging from several days to around 6 weeks. Lung abscess appears as a thick-walled; usually round cavity with irregular margins that forms an acute angle with the chest wall. There are no signs of compression of the surrounding lung. Infected bullae are frequently confused with a pulmonary abscess. Bullae are characteristically thin wall and are a more common in the upper zone. The finding of fluid-containing emphysematous bullae is underreported complication of bullous lung disease. Patient with infected bullae tend to be less sick and toxic than those with lung abscess. Air-fluid levels appearing in lung bullae are always considered to indicate acute infection and, therefore, conservative management with prolonged antibiotics and observation until resolution is the recommended approach. The most common therapeutic approach to infectious bullae of the lung is the administration of systemic antibiotics. Surgical resection was reported to be a contraindication in fluid-filled bullae because of persistent post-operative air leakage due to lung injury. We present a case in which Bullae were not identified previous to this episode. Recognition of infected bullae is important to avoid unnecessary diagnostic or therapeutic interventions. Fluid-containing emphysematous
bullae are an unusual complication of chronic obstructive pulmonary disease (COPD). As patients with COPD can develop a variety of cavitary lung lesions, identifying the correct diagnosis can be challenging.\(^2,5\) The diagnosis of fluid-containing emphysematous bulla can only be made with certainty if there is interval development of a fluid level in a pre-existing emphysematous bulla.\(^5,6\)

**CASE REPORT**

We describe a case of 70 years male patient, who came with complaints of breathlessness (Grade 3, mMRC) since 5 years (increased since 20 days), cough with a moderate amount of mucopurulent expectoration, pain in back and right shoulder and low-grade intermittent fever all since 20 days. Past history was unremarkable except for history of benign prostatitic hypertrophy. He was chronic smoker with history of 100 pack-years. In general examination, he was tachypneic, having oxygen saturation of 87% on room air and poor dental hygiene. On respiratory examination, positive finding includes emphysematous shape of chest, decrease air entry in left infra-axillary region and fine crept in right infra-clavicular region. Chest X-ray showed thin walled cavity with fluid level in right upper zone with small pneumothorax on left side. Laboratory investigations revealed 17,000 white blood cell with neutrophil predominance. Broad-spectrum antimicrobials were administered including ceftriaxone along with metronidazole for anaerobic coverage. Intercostal tube was inserted for pneumothorax. He was not responding adequately so high-resolution computed tomography (HRCT) was ordered which showed multiple thin-walled bullae in both lung along with air-fluid level in one large bullae with surrounding pneumonitis on the right side with an emphysematous change in rest of the lung. Ultrasonography guided Percutaneous drainage was performed in addition to intravenous antibiotic therapy (Figures 1-3).

**DISCUSSION**

Bullae are usually associated with varying degrees of emphysema. Recent advances in high-HRCT add to our knowledge of bullous emphysema. Most bullae increase in size slowly over time. However, there are instances when bullae enlarge rather quickly. Bullae also can rupture or deflate either spontaneously or following an infection or cough.

Although the most common cause for localized air fluid level is lung abscess. Air fluid levels can also be seen in malignancy and in tuberculous cavities from rupture of Rasmussen’s aneurysm. Infected emphysematous bullae should be suspected when a fluid level appears in a patient with clinical finding suggestive of emphysema. A CT scan is more appropriate and required to determine the exact size and to better localize the fluid collection, especially if percutaneous drainage is planned.\(^5\)
Mahler et al., have hypothesized that the fluid in bullae is sterile and is a result of the reaction to inflammation in the surrounding lung. However, this is conflicting as there are other reports, where the fluid culture has grown organisms. There are very few studies regarding isolation of microorganism from fluid. Culture results from the aspirated fluid are available only in four previously reported cases of bullae containing air-fluid levels; three out of these four cases showed Pseudomonas aeruginosa, Staphylococcus aureus, and Bacteroides melaninogenicus, respectively, while one was culture negative. The fluid aspirated from the bulla in our patient grows pseudomonas. However, the patient had received antibiotics for 1 week prior to the aspiration.

CONCLUSION

To conclude patients with severe symptoms like fever and respiratory distress with radiological signs of air-fluid level should be evaluated with high HRCT to rule out similar condition and assessment of underlying condition. In addition, benefit from percutaneous drainage, in addition, to antibiotics. This would not only detect the causative organism if present, but would also decrease the bacterial load.

REFERENCES