CASE REPORT

Cystic lung disease as a complication of post-tuberculosis infection in young patients: A rare manifestation of a common disease

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Abstract
Tuberculosis (TB) is a common disease which is still endemic in many countries including Malaysia. Acquired cystic lung disease is a rare complication of post-TB infection. We aim to describe two cases of young patients who developed cystic lung disease during treatment for TB, which were further complicated with recurrent pneumothorax. We reiterate the need to consider TB in the differential diagnoses of cystic lung disease in the appropriate clinical context.

KEYWORDS
complication, cystic lung disease, pneumothorax, tuberculosis

INTRODUCTION

Lung cysts are well-defined airspaces within the lung parenchyma, are usually thin-walled and can be congenital or acquired. Cystic lung disease as a complication of pulmonary tuberculosis (PTB) is rare and has not been frequently reported. In PTB, the evolution of cystic lung disease is variable; the cysts may regress, persist or even progress following disease treatment.

CASE REPORT

The first case was of a 17-year-old young man with no prior medical illness, who was admitted with 2 weeks history of cough. There was associated loss of appetite and weight of 2 kg in 2 weeks. His father had PTB 6 years ago and completed 6 months of treatment. He denied fever, night sweats or haemoptysis. Upon examination, he had low-grade fever with crepitations over right upper lung zone. Chest radiograph (CXR) (Figure 1A) showed right upper zone consolidation. The sputum acid-fast bacilli (AFB) was positive (3+), and fixed-dose combination tablets for treatment of tuberculosis (TB; ethambutol, isoniazid, rifampicin and pyrazinamide) was started. Two months later, a decision was made to prolong his intensive phase as he had worsening radiological changes and did not improve clinically. Mycobacterium tuberculosis complex culture with only streptomycin resistance was isolated. Computed tomography (CT) scan after 4 months of treatment (Figure 1B) showed dense consolidation with cystic airway dilatation and cavities affecting most of the right lung, and part of the left upper and lower lobes. Lung nodules were also seen. He was then converted to maintenance therapy after 5 months. One month later, the patient was admitted with left pneumothorax. This episode was followed by multiple admissions for left-sided pneumothorax which was treated conservatively. Due to significant abnormalities in both lungs, he was deemed not suitable for any surgical intervention. He had completed his anti-TB after 10 months of treatment. CT thorax 1 year post diagnosis (Figure 1C,D) showed thin-walled cysts occupying the right upper lobe and lateral segment of the right middle lobe and left upper lobe with some paracutiacial emphysema. Left pneumothorax was seen with collapsed apical segment of the left lower lobe. These changes correspond to the sites of initial TB changes seen in the earlier imaging examinations.

The second patient was a 17-year-old young lady with underlying childhood asthma, who presented with 3 months history of productive cough and fever. Her brother and father were recently diagnosed with PTB. Her sputum AFB was 3+ and she was started on fixed-dose combination tablets for treatment of TB (ethambutol, isoniazid, rifampicin and pyrazinamide). One month after commencement of intensive phase, she re-presented with high-grade fever and...
breathlessness. CXR showed bilateral lung consolidation with cavitation (Figure 2A). CT confirmed bilateral lung consolidation with cystic airway dilatation and cavities (Figure 2B). She was treated for bacterial pneumonia. Her treatment regime was converted to maintenance phase after smear conversion at 2 months. However, 2 months later, she was admitted for respiratory distress needing intubation due to severe hypoxia. CXR showed bilateral pneumothorax and chest tubes were inserted. CT thorax (Figure 2C) during this admission showed bilateral pneumothorax secondary to cystic lung disease as a complication of post-TB infection. She needed prolonged chest tube insertion due to persistent air leak. Her case was discussed
for surgical intervention but she was deemed not suitable due to significant lung involvement. Her anti-TB was prolonged to a total of 9 months of treatment.

DISCUSSION

TB is an airborne communicable infectious disease which continues to be a major public health problem in Malaysia with an incidence rate of 92 cases per 100,000 people in 2019.1

Active TB can occur as primary TB developing not long after initial infection, or as post-primary TB developing after a quiescent period of latent infection. It may manifest with symptoms that are only minimal initially, becoming insidiously apparent over several months.2 Typical symptoms of active TB include productive cough, haemoptysis, weight loss, fatigue, malaise, fever and night sweats. Our patients fit the clinical features of PTB along with history of close contact exposure.

Despite initiation of TB treatment, multiple complications and sequelae can develop both in the pulmonary and extrapulmonary portions of the chest. These can be divided according to the structures involved: the parenchyma, airway, vessels, mediastinum, pleura or chest wall. End-stage parenchymal destruction in PTB usually manifests as fibrosis with cicatrization atelectasis after post-primary TB.3

Lung cyst is defined as well-defined, thin-walled airspace within the lung parenchyma, which can be congenital or acquired. The causes of lung cysts are numerous; however, TB is not usually included in the list. Cystic lung disease as a parenchymal complication of PTB has not been frequently reported in the literature and is among the rarest presentation of this disease. The development of cystic lesions in TB has been postulated to be due to several causes. Scarring of larger bronchi due to TB may lead to proximal stenosis with distal end dilatation and retained secretions due to secondary bacterial infections, subsequently causing inflammatory destruction of the bronchial wall leading to cyst formation. Other possible causes include caseating necrosis of the bronchial wall leading to cystic bronchiectasis, granulomatous involvement of the bronchioles resulting in cyst formation due to retained air, re-lined healed tubercular cavities by ciliated epithelia forming cysts and, less commonly, cystic changes due to the TB drug isoniazid.4 In TB, cystic lung disease that develops during the course of the disease may persist following treatment with variable extent, severity and unpredictable outcome. Some authors4 reported that the cysts in their patient resolved with treatment over time, and others5 reported that the cysts persist.

Both reported patients had persistent cysts which had replaced the previously consolidated lung parenchyma. They also developed recurrent pneumothorax as a sequelae, likely due to rupture of the thin-walled cysts. It was noted that most patients with lung cysts post TB had extensive parenchymal infiltrates during the initial phase of the disease,5 as demonstrated in our patients. It is also worthwhile to note that both our patients are young in their teenage years, another fact that is similar to previously reported cases.4,5 Multidisciplinary team discussions are being held to determine the best course of long-term management for these young patients, which is proving to be difficult due to the extent of parenchymal destruction.

In conclusion, although cystic lung disease is a rare complication of TB, it is imperative that we recognize this unusual complication in young patients. This condition can be a life-threatening lifelong complication with recurrent episodes of pneumothorax that require multiple chest tube insertions, hospital admissions and uncertain long-term management plans, as seen in our patients.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTION

KBH drafted the manuscript. BJ and RFAK revised the manuscript and prepared the images. ANM revised the manuscript. All authors agreed on the final manuscript.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no data sets were generated or analysed during the current study.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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