Endobronchial tuberculosis simulating bronchial asthma

Y H Lee, K N Sin Fai Lam

ABSTRACT

Pulmonary tuberculosis is still a major health problem worldwide, but the principles of diagnosis and treatment are well-established. Endobronchial tuberculosis (EBTB) is known to complicate pulmonary tuberculosis and its importance lies in the potential for bronchostenosis. In the absence of parenchymal disease, EBTB is less well-recognised and can lead to difficulties in diagnosis. We report a 26-year-old woman who presented with symptoms of cough, shortness of breath and wheezing simulating bronchial asthma. Although the chest radiograph did not show any lung infiltrate, a bronchoscopy was carried out. The findings, suspicious of malignancy, were actually due to EBTB, which was confirmed on histology by special stains and on culture for *Mycobacterium tuberculosis*. The patient subsequently developed bronchostenosis, a well-described complication.

Keywords: asthma, bronchial stenosis, cancer, endobronchial tuberculosis

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INTRODUCTION

Pulmonary tuberculosis is a major health problem worldwide and in spite of good progress over the last 30 years in Singapore, the problem still remains. Once suspicion is raised from an abnormal chest radiograph, the diagnosis is usually easily confirmed by bacteriological means. Endobronchial tuberculosis (EBTB) has been well-known to complicate parenchymal tuberculous infection and assumes importance because it may lead to long-term sequelae. What is less well-recognised is that EBTB often occurs in the absence of parenchymal lung disease, giving rise to delayed diagnosis, and simulates other disease conditions. We report a patient with EBTB who demonstrated the difficulties in diagnosis and management of this condition.

CASE REPORT

A 26-year-old Singaporean woman presented with a six-month history of productive cough, worse in the morning and before bedtime, often accompanied by shortness of breath and wheezing. The sputum was mucoid and there was no haemoptysis. The symptoms were affected by the position she adopted when lying in bed. She was a smoker, but had no history of bronchial asthma. She did not complain of weight loss and had been prescribed antibiotics, bronchodilators and short courses of prednisolone by her general practitioner without any improvement. On presentation, there was an erythema nodosum rash over the shins. Bilateral rhonchi were audible on auscultation of the chest. There was no lymphadenopathy, enlargement of the liver or spleen, cardiac murmur or heart failure.

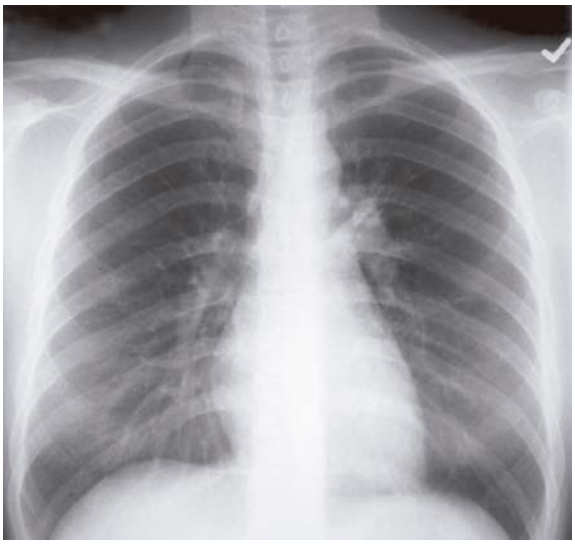

Fig. 1a Chest radiograph shows a prominent left hilum but no pulmonary opacity.

Her erythrocyte sedimentation rate was 45mm/hr. Serum haemoglobin level was 11.6g/dL, total white blood cell count was 8.64 x 10^9/L, platelets were 422 x 10^9/L. Polymorphs were 75%, lymphocytes were 14.3% and eosinophils were 1.8%. C-reactive protein measured 66.8mg/mL. The chest radiograph (Fig. 1a) showed a bulky left hilum, but did not reveal any lung infiltrate. Computed tomography (CT) of the thorax did however show some streaky opacities in the left upper zone (Fig. 1b). The sputum was negative on direct smear for acid-fast bacilli. Spirometry showed that the FEV1 was 1.83L (72% predicted), the FVC

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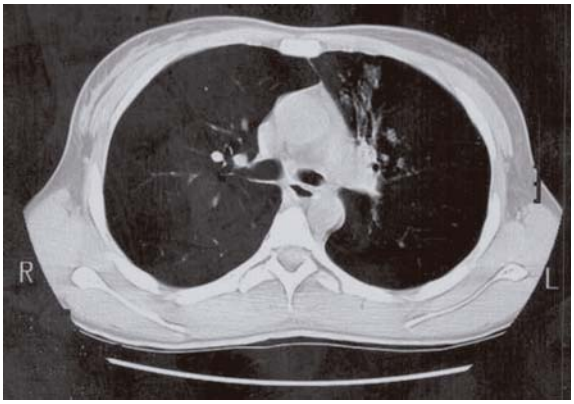

Fig. 1b Axial CT image shows a faint infiltrate in the left upper lobe.

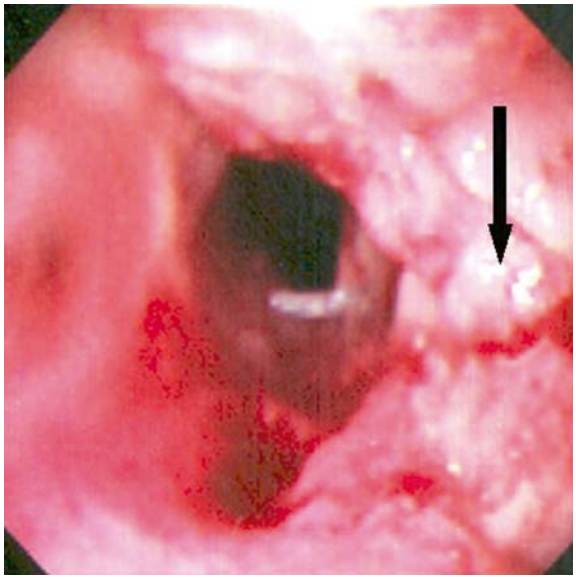

Fig. 2 Bronchoscopic photograph shows swelling and infiltration of the trachea (arrow), producing a tumour-like appearance.

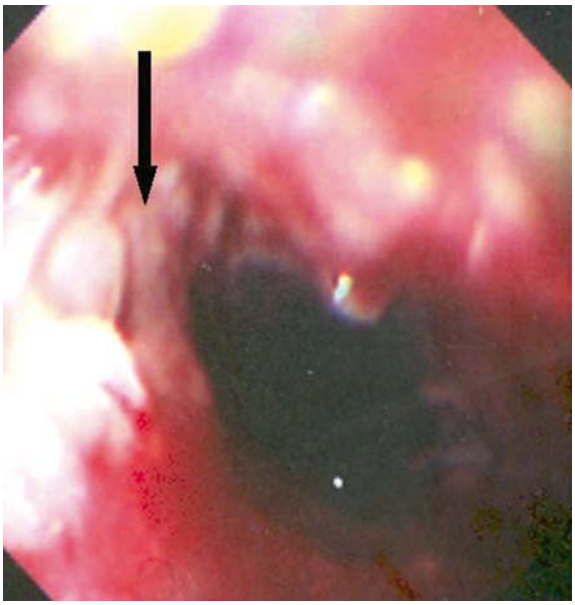

Fig. 3 Bronchoscopic photograph shows ulcerative and granular appearances (arrow) of other parts of the bronchial tree.

was 2.39L (79% predicted), and the FEV1/FVC was 76%. The flow-volume loop did not show any pattern of airflow obstruction or upper airway obstruction. A metacholine challenge test was negative.

In view of the absence of airflow obstruction, persistence of symptoms and the presence of a bulky left hilum, it was decided to carry out a bronchoscopy. The appearances (Figs. 2 & 3) were those of extensive infiltration of the mucosa, which was seen from the glottis down the whole of the trachea, the left main bronchus, and the medial wall of the right main bronchus. The bronchoscopic appearances were indistinguishable from those of a malignant process. The mucosa was hypertrophic, irregular, erythematous, granular and haemorrhagic in varying degrees. There was narrowing of the lumen of variable extent throughout the bronchial tree. Biopsies revealed fragments of eosinophilic necrotic tissue associated with inflammatory cellular infiltration and without any obvious granulomas. Special stains showed large numbers of acid-fast bacilli and no malignant cells. The cultures were positive for *Mycobacterium tuberculosis*.

This patient was a clerk and did not give any history of contact with tuberculosis, nor did she have any other risk factors for the disease. HIV serology was negative. The Mantoux test was positive, with 40mm induration at 72 hours. The *Mycobacterium tuberculosis* cultured was sensitive to all 4 drugs tested, namely: streptomycin, rifampicin, isoniazid and ethambutol. Treatment with anti-tuberculous drugs for six months led to resolution of her symptoms. A follow-up bronchoscopy showed complete clearing of EBTB. However, there was residual stenosis of the left main bronchus and left upper lobe bronchus (Figs. 4a-b).

DISCUSSION

EBTB was common in the pre-tuberculosis chemotherapy era[1-2]. Lesions in the tracheobronchial tree were seen on rigid bronchoscopy in 15% of patients, and in 40% of all cases seen at autopsy[1]. Many of these patients had obvious pulmonary tuberculosis, especially with cavitary disease, and the diagnosis of tuberculosis was easily suspected from their chest radiographs. What is less-well known and may catch the unwary is that EBTB may exist without significant parenchymal abnormalities, and 10% to 20% of patients may have normal chest radiographs.

EBTB can also be mistaken for malignancy[3]. In our patient, the bronchoscopic appearances were similar to those of a tumour. In other cases, EBTB can lead to collapse of a lobe simulating a carcinoma; the error is compounded when the bronchoscopic

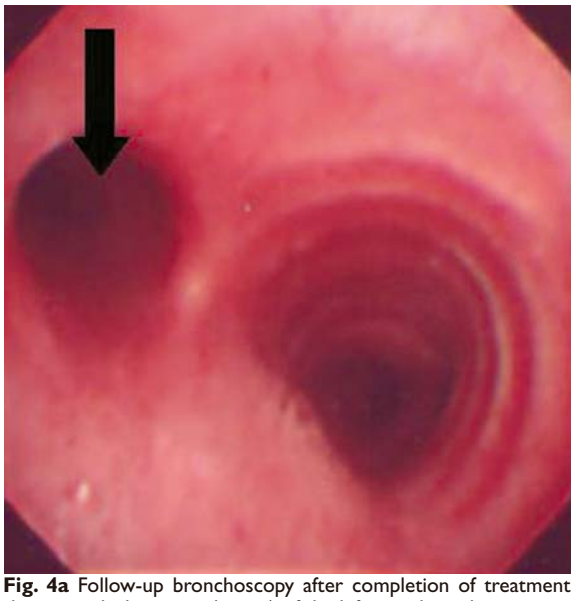

Fig. 4a Follow-up bronchoscopy after completion of treatment shows residual stenosis (arrow) of the left main bronchus.

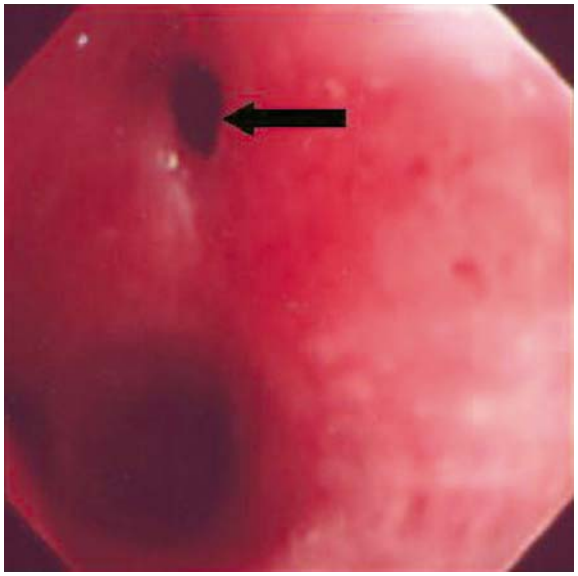

Fig. 4b Follow-up bronchoscopy shows marked stenosis (arrow) of the left upper lobe bronchus.

appearance seems to suggest a tumour as the cause of the collapse. Bronchoscopic appearances of EBTB have been classified into: actively caseating (most common; 43%), oedematous-hyperaemic (14%), fibrostenotic (10.5%), tumorous (10.5%), granular (11.4%), ulcerative (2.4%), and non-specific bronchitic (7.9%)[4]. Our patient showed appearances which were tumorous and ulcerative, granular and oedematous-hyperaemic in different areas.

EBTB has also been known to simulate asthma on presentation[5], as it did in our patient. Subsequently, during treatment, the wheeze and dyspnoea may persist or worsen because a hypersensitivity reaction during tuberculosis treatment to the released tuberculosis antigens may give rise to asthmatic symptoms. During this stage, steroids may be useful. Possible mechanisms for EBTB include direct implantation into the bronchus from adjacent parenchymal lesion, direct airway infiltration from adjacent tuberculous mediastinal lymph node, erosion and protrusion of an intrathoracic tuberculous lymph node into the bronchus (in children), haematogeneous spread, and extension to the peribronchial region by lymphatic drainage. Bronchostenosis is a known complication of EBTB[6,7]. There is no convincing evidence that steroids reduce the incidence of this complication[8]. Endostenosis has been previously managed by repeated dilation, the use of stents, or even resection[9,10].

This case report is a reminder that EBTB is a diagnosis that must be considered in the right clinical context, and cannot be ruled out, even though the chest radiograph is normal. The condition may also simulate other conditions, such as malignancy or bronchial asthma. Bronchoscopic examination and adequate sampling for acid-fast bacilli smear and culture for *Mycobacterium tuberculosis*, as well as histology samples, in all instances would enable the diagnosis to be made. In spite of adequate treatment, bronchostenosis remains a serious complication.

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