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Case Report

Ulcerative Form of Endobronchial Tuberculosis: A Rare Case

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Abstract

Endobronchial tuberculosis (EBTB) occurs when tracheobronchial tree is infected with mycobacterium. It is a diagnostic and therapeutic challenge due to its varied presentation. Nonspecific respiratory symptoms and a normal chest radiograph in most of the cases may be cited as the cause for the diagnostic delay. High resolution computed tomography (HRCT) is a more sensitive tool which demonstrates "tree-in-bud" appearance, a characteristic feature of tracheobronchial involvement. Endobronchial biopsy is the most reliable diagnostic test with a relatively high positivity rate. This case report describes the ulcerative form of EBTB which forms only 2.7% of all cases of EBTB.

Keywords: *Endobronchial Tuberculosis; Tree in Bud; Bronchostenosis*

Introduction

It is reported that about 10 - 40% of all patients with active pulmonary tuberculosis have endobronchial involvement [1]. More than half the cases of EBTB occur in patients aged less than 35 years old [1]. Despite widely available diagnostic testing, EBTB is a major cause of morbidity because of its complications such as bronchostenosis and atelectasis. Early diagnosis of this entity can be effectively done by bronchoscopy and computed tomography of the chest. The most frequently reported bronchoscopic findings are mucosal edema, erosion, ulceration, hypertrophy, luminal narrowing and bronchial stenosis [2]. We report a case of ulcerative type of EBTB which is rare when compared to other types and highlights its bronchoscopic findings.

Case Report

A 65 year old male smoker presented to the emergency department with complaints of fever and productive cough for 2 weeks. Patient had multiple episodes of haemoptysis amounting to 100 - 200 ml since the last 2 days. He complained of loss of appetite. On examination patient is febrile, ill looking and pale. Vitals were stable. Respiratory system showed decreased intensity of breath sound in the left infra-clavicular area with coarse crepitations. X-ray Chest PA view showed non-homogenous opacities in the left upper zone (Figure 1A). HRCT Thorax showed multiple nodular opacities and tree in bud lesions in the left upper lobe (Figure 1B).

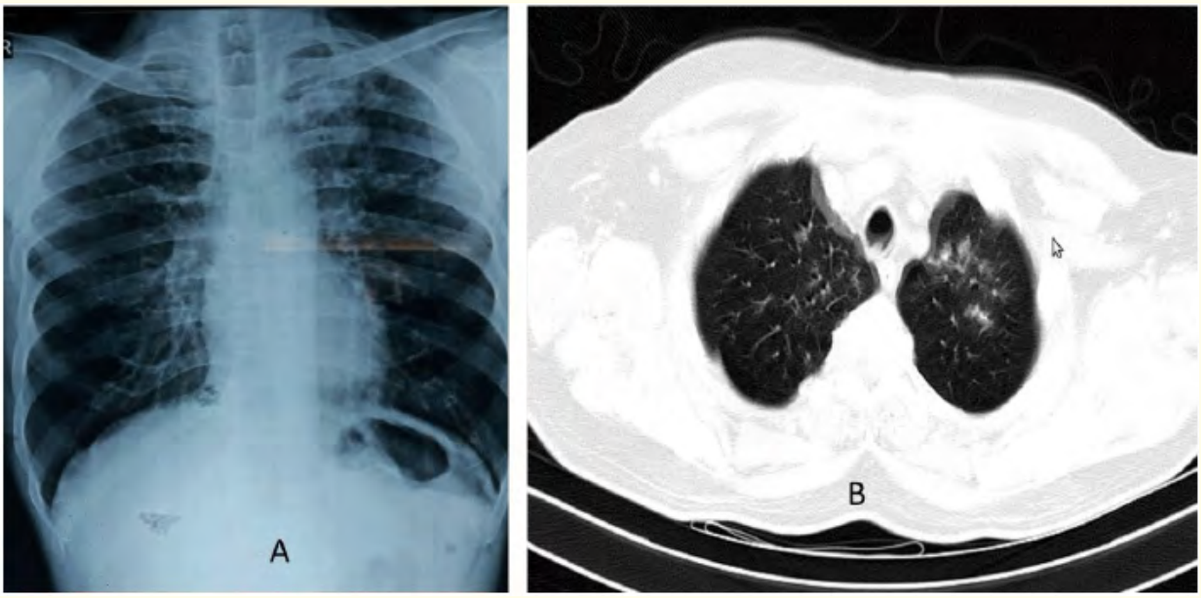

Figure 1*: 1A: X-Ray chest PA showing non-homogenous infiltrate in the left upper zone. 1B: HRCT Thorax showing nodular lesions, tree in bud lesions in left upper lobe.*

Routine blood investigations were within normal limits except for a raised erythrocyte sedimentation rate of 80 mm/Ist Hour and haemoglobin value of 10 gm/L. Sputum examination for Acid Fast Bacilli (AFB)was negative in two consecutive samples. Sputum routine culture showed growth of Klebsiella pneumoniae. He was started on broad spectrum antibiotics and other supportive measures. Because of haemoptysis he was subjected to fibreoptic bronchoscopy for further evaluation of tracheobronchial tree. Vocal cords and trachea were normal. In the left main bronchus at its division and in the left upper lobe bronchus there were multiple mucosal ulcers (Figure 2A and 2B), base of which was filled with cheesy necrotic material. Bronchial washing was taken for routine culture and sensitivity, AFB smear and Cartridge Based Nucleic Acid Amplification Test (CBNAAT). Biopsy was attempted from the ulcer which induced fresh bleeding. Gram staining and culture were negative. Bronchial washing on AFB staining showed acid fast bacilli. Rifampicin sensitive mycobacterium tuberculosis (MTB) was detected on CBNAAT. He was put on Category-1 anti-tuberculous treatment (ATT) as per revised national tuberculosis control program (RNTCP) guidelines. Follow up at the end of intensive phase showed clinical improvement and final assessment is scheduled at the end of chemotherapy.

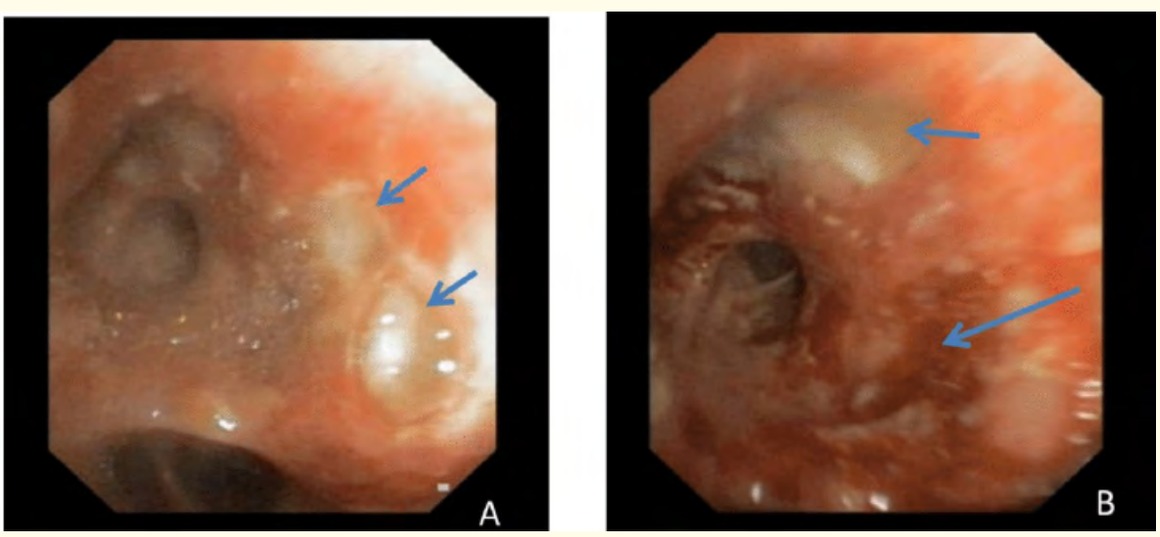

Figure 2A and 2B*: 1A: Shows left main bronchus at its division demonstrating multiple ulcers with necrotic material.*

Discussion

Tuberculosis (TB) is declared as a global emergency by WHO. There were an estimated 10.4 million new TB cases and 1.6 million TB deaths worldwide in 2016 [3]. Deaths from TB can be significantly controlled by early diagnosis and treatment. Endobronchial tuberculosis (EBTB) is a special form of TB and is considered when tuberculous infection affects tracheobronchial tree which is diagnosed by bacterial and/or histopathological proof [4]. According to various studies, EBTB was reported in 10 - 40% of patients having sputum positive pulmonary tuberculosis [1]. EBTB is reported more among young women [1]. This is due to the fact that women do not cough out sputum frequently leading to implantation of organisms in the airway. EBTB is mostly seen in second or third decade. However, there is a second peak reported in old age [5].

The suggested possible pathogenesis of EBTB are extension of infection from an adjacent parenchymal focus, deposition of organisms from an infected sputum, haematogenous spread, erosion of an infected lymph node, and lymphatic spreads [6]. The right upper lobe bronchus and right main bronchus most frequently involved [1]. Pathology includes caseous necrosis of mucosal surface with formation of granuloma. Healing of this lesion leads to fibrosis and bronchial stenosis.

Clinical Presentation of EBTB is highly variable and is depended on the site of disease, stage of disease and extent of involvement. Anorexia, weight loss, and night sweats may not be prominent [7]. Fever which is low grade initially becomes marked as the disease progresses [7]. The respiratory symptom in EBTB is cough with scanty sputum production, but bronchorrhea also has been reported [8]. Hemoptysis if occurs is usually mild. Wheeze and stridor may suggest presence of bronchostenosis. Clinical examination reveals only nonspecific findings such as reduced breath sounds, crackles and rhonchi. It is very difficult to diagnose the disease based on clinical features alone and thereby frequently missed.

The initial diagnostic investigations in endobronchial tuberculosis are sputum microscopy for acid fast bacilli and chest radiograph. Sputum positivity for acid fast bacilli ranges between 16 and 53% in various studies [9,10]. Oskaya S., *et al*. reported sputum negativity in all his cases including 23 biopsy proven cases [11]. Nuclear amplification tests like polymerase chain reaction (PCR) or other methods for amplifying DNA and RNA are better options in suspected cases [12].

Bronchoscopy and computed tomography of Chest are essential for the accurate diagnosis of bronchial involvement. Finding in Chest X-ray are nonspecific and include patchy parenchymal shadows involving both upper and lower lung fields. If there is bronchostenosis, segmental or lobar collapse, and obstructive pneumonia may be seen.

Early endobronchial spread of disease is better delineated by high resolution computed tomography (HRCT) than a conventional chest CT. Different studies had reported a diagnostic sensitivity of 95% to 97% in endobronchial tuberculosis using HRCT [13,14]. The earliest HRCT finding in EBTB is centrilobular nodules measuring 2 - 4 mm in diameter [13]. As the disease progresses "tree-in-bud" lesions are seen which are branching linear structures arising from a stalk. Other findings include nodules with poorly defined margins, lobular consolidation and bronchial wall thickening [14].

Bronchoscopy is mandatory for evaluating the involvement of tracheobronchial tree in EBTB. EBTB is usually classified into seven subtypes based on the bronchoscopic findings. They are: (i) actively caseating-swollen hyperemic bronchial mucosa covered with whitish cheese-like material, (ii) edematous-hyperemic-extensive mucosal swelling with surrounding hyperemia, (iii) fibrostenotic-marked narrowing of the bronchial lumen with fibrosis, (iv) tumorous-endobronchial mass with surface covered by caseous material and nearly totally occluding the bronchial lumen, (v) granular-appearance like scattered grains of boiled rice, (vi) ulcerative-ulcerated bronchial mucosa, and (vii) nonspecific bronchitis-only mild mucosal swelling and/or hyperemia [15]. The most common form is the actively caseating type comprising 43.0% and the least common form is the ulcerative type comprising 2.7% of all EBTB respectively [2]. In our case, multiple deep ulcers are seen in left main bronchus and left upper lobe bronchus. The ulcers are filled with cheesy necrotic material, aspiration of which precipitated bleeding from the ulcers.

Mucosal biopsy from the affected area is needed for histopathological confirmation of the disease. This is positive in 30% to 84% of patients with EBTB [16]. Bronchoscopic biopsy showed a higher positivity rate compared to fine needle aspiration (84% versus 16%) as reported by Altin., *et al* [16]. Bronchial lavage fluid can be subjected to molecular diagnostic methods such as PCR and CBNAAT. In our case bronchial lavage fluid was positive for acid fact bacilli and MTB was detected on molecular testing.

The most common complications encountered in EBTB are bronchial stenosis and stricture. These may occur in 60 to 95% of cases despite adequate anti-tuberculous therapy. Another common complication is bronchiectasis which frequently develops secondary to parenchymal destruction and fibrosis (traction bronchiectasis). When there is central bronchostenosis, the distal bronchi dilates leading to bronchiectasis. Bronchiectasis usually involves the upper lobes and is usually asymptomatic. Hemoptysis is the most threatening symptom in such cases [9].

Conclusions

Endobronchial tuberculosis is frequently associated with active tuberculosis. However diagnosis is always delayed due to nonspecific clinical and radiological findings. Bronchoscopy and HRCT help in early diagnosis. Early aggressive treatment is required to prevent serious complications and change the course of the disease favorably. Complications such as bronchostenosis can develop in spite of adequate chemotherapy. Close follow-up and intervention therapy may be required when there is bronchostenosis.

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