

Endobronchial tuberculosis: A case-based approach



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ABSTRACT

Endobronchial tuberculosis (TB) or tracheobronchial TB is defined as tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence. Here, in this article, we are reporting four surprising cases of endobronchial TB which came to our institution with clinical symptoms and signs suggestive of TB but chest X-rays were within normal limit and sputum microscopies were repeatedly negative. Bronchoscopy was performed which showed endobronchial lesions. Hence, early diagnosis and treatment were possible for these patients.

Key words: Endobronchial; Tuberculosis; Bronchoscopy; Sputum smear-negative

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INTRODUCTION

Endobronchial tuberculosis (EBTB) or tracheobronchial tuberculosis (TB) is a special form of TB and is defined as tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence.¹ Involvement of trachea and bronchi by TB was first described by Richard Morton, an English physician in 1698.² This form of TB is difficult to diagnose because the lesion is not evident in the chest radiograph frequently and thus delaying treatment. Further investigations such as computed tomography (CT) scan of chest and bronchoscopy are often needed to diagnose and evaluate bronchial lesions such as stenosis or obstruction.

CASE 1

A case of Tracheobronchial TB.

A 53-years-old male, smoker, 10 bidis per day for 25 years, diabetic since 7 years, presented with cough, fever, loss of appetite and shortness of breath for the past 3 months. There was history of Anti TB drugs (ATT) intake in past 10 years back for 6 months. On general examination, patient was febrile with no other positive findings and there were no significant peripheral palpable lymph nodes. Respiratory examination revealed crepitations in the left upper zone. Chest X-ray showed fibrosis of the left upper zone (Figure 1.1). High-resolution CT (HRCT) thorax showed herniation of the right lung with fibrosis of the left lung with pleural thickening (Figure 1.2). Sputum smear was repeatedly negative for acid-fast bacilli (AFB). Fiberoptic bronchoscopy showed hypertrophied and hyperemic mucous membrane with pit like ulcer in left bronchus with whitish nodules with granulation in trachea (Figure 1.3). Bronchoalveolar lavage and aspirate were sent for AFB which came positive. BAL

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was sent for CBNAAT which shows *Mycobacterium tuberculosis* (MTB) detected and Rifampicin resistance not detected. ATT was started according to weight of patient. Patient was symptomatically improved. FOB could not be repeated as patient was lost to follow-up.

CASE 2

EbTB in 18-years-old male presenting as hemoptysis.

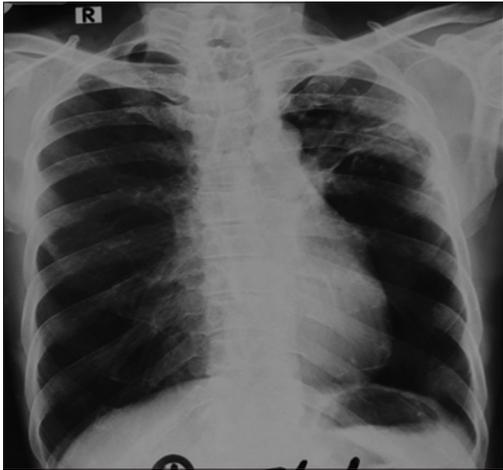


Figure 1.1: Fibrosis of the left upper zone

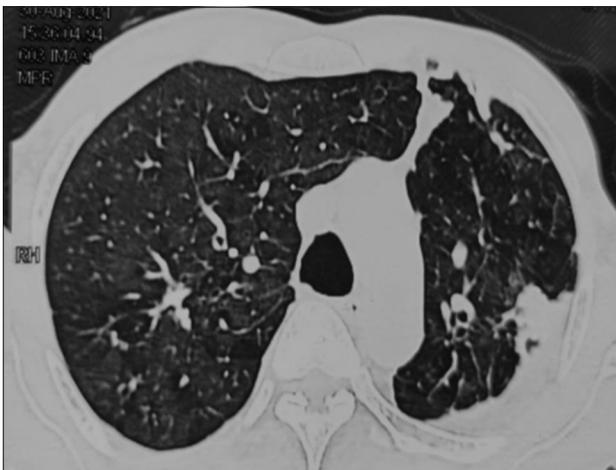


Figure 1.2: Herniation of the right lung with fibrosis of the left lung with pleural thickening

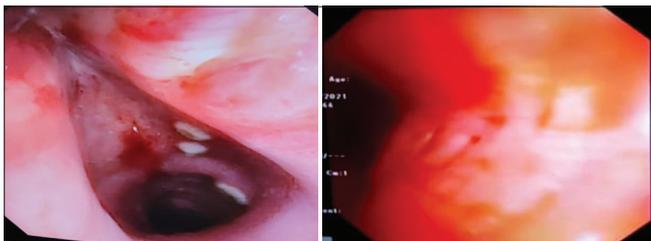


Figure 1.3: Hypertrophied and hyperemic mucous membrane with pit like ulcer in left bronchus with whitish nodules with granulation in trachea

A 18-years-old male, non-smoker, presented with high grade fever, dry cough, hemoptysis, loss of weight, and loss of appetite since past 1 month. There was no ATT history. On general examination, patient was febrile with no other positive findings. Chest X-ray was within normal limit (Figure 2.1). HRCT thorax showed tree in bud pattern with nodular opacities in the right lower lobe (Figure 2.2). Fiberoptic bronchoscopy showed hyperemic mucous membrane with multiple ulcerations in the right middle lobe and superior and anterior basal segment of the right lower lobe with stenotic areas (Figure 2.3). Bronchoalveolar lavage was sent for AFB and CBNAAT which shows AFB positive with MTB detection and rifampicin resistance not



Figure 2.1: Normal

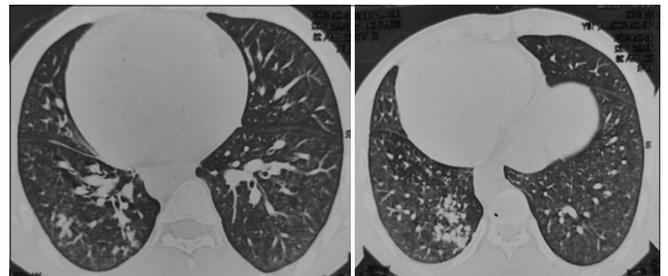


Figure 2.2: Tree in bud pattern with nodular opacities in the right lower lobe



Figure 2.3: Hyperemic mucous membrane with multiple ulcerations in the right middle lobe and superior and anterior basal segment of the right lower lobe with stenotic area

detected. ATT was started according to weight of patient. Patient was symptomatically improved.

CASE 3

EBTB in a 44-year-old female presenting as Hemoptysis.

This patient, non-smoker, presented with cough, and hemoptysis for the past 3 months. On general examination, there was no significant finding. Examination of the respiratory system revealed crepitations in the right infraclavicular area. Chest X-ray showed a homogenous shadow in the paratracheal area of the right upper zone (Figure 3.1). Contrast enhanced CT thorax showed triangular opacity with irregular caseation (Figure 3.2). Sputum smear was repeatedly negative for AFB. Fiberoptic bronchoscopy showed edematous and hyperemic secondary carina near right upper lobe bronchus which was filled with necrotic material and blood (Figure 3.3). Bronchial aspirate and brush biopsy was positive for AFB



Figure 3.1: Homogenous radio opaque shadow in the right paratracheal area

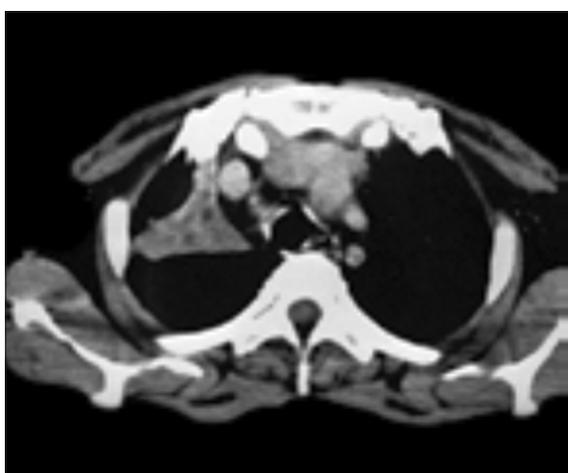


Figure 3.2: Triangular opacity with irregular caseation

and endobronchial biopsy from right upper lobe was consistent with histology of TB. She responded clinically and radiologically with antitubercular drugs.

CASE 4

EBTB in a 26-year-old female.

This patient, nonsmoker, known diabetic presented with cough, high fever, and chest pain for the past 15 days. On clinical examination, she was febrile. Examination of the respiratory system showed evidence of consolidation. Chest X-ray showed evidence of consolidation in the right upper zone (Figure 4.1). Her sputum was repeatedly negative for acid-fast bacillus. She was prescribed antibiotics for 10 days without any response (Figure 4.2) contrast enhance CT thorax showed mass lesion with central necrosis (Figure 4.3). Fiberoptic bronchoscopy showed edematous and hyperemic tertiary carina near posterior segment of the right upper lobe (Figure 4.4). Lumen of the same segment



Figure 3.3: Right upper lobe bronchus obstructed by caseous material and blood



Figure 4.1: Pneumonia of the right lung



Figure 4.2: No response after treatment

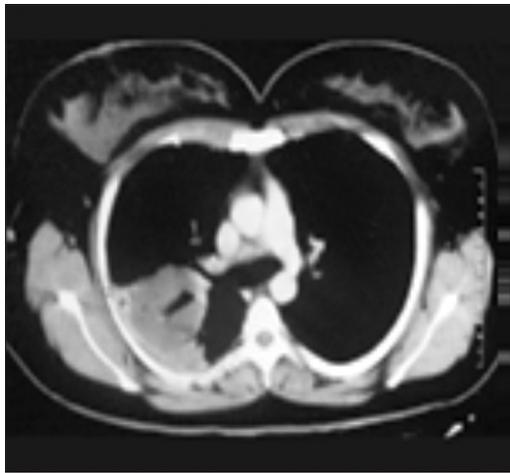


Figure 4.3: Mass lesion with central necrosis



Figure 4.4: Edematous and hyperemic tertiary carina near posterior segment of the right upper lobe

was also reduced. Bronchial aspirate from same segment was positive for acid-fast bacillus. Patient was given oral hypoglycemic drugs and antitubercular treatment to which she responded well clinically as well as radiologically.

DISCUSSION

EBTB is defined as a tuberculous infection of the tracheobronchial tree with microbial and histopathological evidence, with or without parenchymal involvement. It was shown that it is more common in young woman than male. Five potential mechanisms were believed to be responsible for the development of endobronchial infections caused by MTB: (1) Direct invasion from an adjacent parenchymal focus; (2) implantation of the organisms from infected sputum; (3) hematogenous spread; (4) erosion of a lymph node inside a bronchus; and (5) lymphatic drainage from the parenchyma toward the peribronchial region. Since bronchoscopy is not routinely performed to all patients with pulmonary TB, actual incidence of EBTB could not be evaluated. EBTB may mimic diseases such as bronchial asthma, pneumonia, and lung cancer. EBTB may affect any region of the tracheobronchial tree. If it affects the middle lobe, it causes collapse, since the entry of the middle lobe is narrow. This is known as middle lobe syndrome. In elderly patients, lobar and segmental bronchial invasion were more common whereas in younger patients involvement of trachea and main bronchi were seen generally and middle lobe syndrome was more common in elderly. Chung classified forms of EBTB into seven subtypes by bronchoscopic finding: Actively caseating, edematous-hyperemic, fibrostenotic, tumorous, granular, ulcerative, and non-specific bronchitic.³ Classical symptoms of EBTB are cough, difficultly expectorated high viscous sputum, wheezing, fever, chest pain, and hemoptysis. EBTB is a severe situation with high bacilli load and may cause complications with high morbidity such as bronchial stenosis; early diagnosis and treatment is, therefore, mandatory. EBTB contains rather high amounts of TB bacilli. Unlike parenchymal diseases, AFB positivity in EBTB is between 16 and 53.3% in most favorable conditions. Radiological findings of EBTB may vary; different findings such as patchy alveolar infiltrations, atelectasis, hilar widening, pleural effusion, mass, and cavitary lesions may be seen. Bronchoscopy should be performed in suspicious cases such as unexplained cough, wheezing, dyspnea, or hemoptysis. Persistent segmental or lobar collapse, lobar infiltrations, and obstructive pneumonia findings on chest X-ray examination are also indications for bronchoscopy.^{4,5} Sputum or bronchial lavage AFB is generally positive in active caseous type but edematous type is hard to diagnose, and sputum and bronchial lavage AFB is generally negative; therefore, TB culture and histopathological examinations should be performed. Corticosteroids have been used empirically in the treatment of TB in an attempt to prevent fibrosis. However, the value of using corticosteroids for EBTB is uncertain. Although literature reporting that steroid

addition did not help with improvement or clinical healing there is literature arguing that oral or inhaled steroids effect improvement and clinical healing positively in some types of EBTB. Corticosteroids are likely to be beneficial in earlier stages when hypersensitivity is the predominant mechanism, but are unlikely to be helpful in more advanced cases when extensive fibrosis is present. Close follow-up is advisable as stenosis may develop later despite antituberculosis chemotherapy with or without corticosteroids.

CONCLUSION

With above case based discussion, it can be concluded that endobronchial tb is difficult to diagnose as lesions are not evident on chest X-ray, so further investigations in the form of HRCT thorax and bronchoscopy should be performed and treatment should be started to prevent further delay.

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Authors Contribution:

RS- Conceived and designed the analysis; **RP-** Contributed analysis tools; **HR-** Collected the data and performed the analysis; **RK-** Performed the analysis; **AC-** Performed the analysis; **DRS-** Wrote the paper.

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