Case Series

Endobronchial growth: Tumor or tuberculosis

Zuber Ahmad[1], Imrana Masood[1], Ummul Baneen[1], Saima Ejaz[1], Suhailur Rehman[2]

[1]Department of TB and Respiratory Diseases, JNMCH, AMU, Uttar Pradesh, India, [2]Department of Pathology, JNMCH, AMU, Uttar Pradesh, India

Abstract

Endobronchial tuberculosis (EBTB) is characterized by tuberculosis infection of the tracheobronchial tree. It has variable presentation but tumorous growth-like presentation in bronchus is very rare. The clinical and radiological features are non-specific, which creates a diagnostic dilemma. Bronchoscopy and biopsy of the lesion are mandatory to confirm the diagnosis. In this case series, we are presenting three unique cases of endobronchial growth diagnosed as EBTB after biopsy and evaluation of bronchoalveolar lavage (BAL) with cartridge-based nucleic acid amplification test (CBNAAT) and other ancillary investigations for tuberculosis. Four patients presented to the outpatient department with non-specific symptoms of fever, cough, hoarseness of voice, and hemoptysis. They were evaluated with chest radiograph (CXR), contrast-enhanced computed tomography (CECT) thorax, and bronchoscopy. Bronchoscopy revealed growth in the bronchus in all three cases. A biopsy was taken and BAL was performed. All cases turned out to be EBTB in histopathological examination and BAL CBNAAT. They were treated with anti-tubercular drugs and all responded well to treatment. Endobronchial tuberculosis presenting as tumorous growth in the tracheobronchial tree is rare. There should be a high index of suspicion while dealing with patients with non-specific clinical and radiological features of tuberculosis. EBTB can be misdiagnosed as malignancy in most cases. Therefore, it should be kept as a differential diagnosis while encountering a mass lesion in the trachea or bronchus during bronchoscopy.

Keywords: Bronchoscopy, endobronchial, mass, tuberculosis

Introduction

Endobronchial tuberculosis (EBTB) is a common entity with a variable presentation.[1] However, tumor-like presentation of endobronchial tuberculosis is a very rare finding.[2] By definition, endobronchial tuberculosis is characterized by tuberculosis infection of the tracheobronchial tree with histopathological and microbiological evidence.[3] Among the various manifestations of TB, endobronchial tuberculosis (EBTB) stands out as a distinctive and clinically significant presentation. Given the resurgence of TB in many regions and the potential for severe complications, primary care providers, and family physicians must have a comprehensive understanding of this condition. The exact pathogenesis of EBTB is still vague. The most accepted theory is the direct implantation of the tubercle bacilli from adjacent pulmonary parenchyma into the tracheobronchial tree. Other causes are direct airway infiltration by adjacent tuberculosis mediastinal lymph nodes, hematogenous spread, lymphatic spread, and infected sputum.[4] The usual clinical symptoms are non-specific such as cough, fever, chest pain, hemoptysis, wheezing, hoarseness of voice, and generalized weakness.[5] Diagnosis of EBTB is often delayed due to non-specific clinical and radiological findings. The mass-like presentation of EBTB can be mistaken as carcinoma, carcinoid, or adenoid. The confirmation of the diagnosis of EBTB is achieved by bronchoscopy, biopsy, and culture. Here, in this case series, we are reporting four such cases of endobronchial mass that were diagnosed as EBTB after bronchoscopic biopsy and histopathological examination. As frontline caregivers,

Address for correspondence: Dr. Saima Ejaz, Department of TB and Respiratory Diseases, JNMCH, AMU - 202 001, Uttar Pradesh, India.
E-mail: saimaejaz2011@gmail.com

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general and primary care providers play a pivotal role in the timely diagnosis and treatment of TB-related conditions, including EBTB, which can mimic other respiratory disorders. With the right knowledge and awareness, these physicians can contribute significantly to reducing the burden of EBTB and improving patient outcomes. This study not only highlights the clinical aspects of EBTB but also provides insights into the multidisciplinary approach required for comprehensive patient care.

Case Presentation

Case 1

A 32-year-old female patient presented to an outpatient clinic with complaints of intermittent low-grade fever, cough with yellowish expectorations, and chest pain for 1 month associated with a few episodes of hemoptysis. She had a history of pulmonary tuberculosis 10 years ago, for which she received anti-tubercular treatment (ATT) for 6 months and was cured. On auscultation, there was reduced breath sound in the left infraclavicular region. For the above complaints, she was evaluated with a chest radiograph (CXR), which was suggestive of heterogeneous opacity in the left mid-lung zone [Figure 1a]. Contrast-enhanced computed tomography (CECT) thorax was performed, in which there was a finding of heterogeneously enhancing soft tissue density in the left upper lobe of size 3 × 3.9 × 5 cm with ipsilateral upper lobe collapse with enlarged paraaortic and mediastinal lymph nodes, suggesting neoplastic etiology with centrilobular necrosis [Figure 1b].

Because of the left upper lobe collapse, a bronchoscopy was performed. There was hyperemic, fragile growth observed in the left upper lobe [Figure 1c]. Biopsy was taken from the lesion and transbronchial needle aspiration (TBNA) was taken from the left secondary carina. Broncho alveolar lavage (BAL) was also performed from left basal segments. Histopathological examination (HPE) was suggestive of chronic granulomatous lesion favoring tuberculosis. Cartridge-based nucleic acid amplification test (CBNAAT) from BAL was positive for *Mycobacterium tuberculosis* with rifampicin sensitivity. Therefore, a diagnosis of endobronchial tuberculosis was reached and the patient was started on ATT.

Case 2

A 25-year-old immunocompetent female patient with no comorbid conditions presented to the outpatient department with complaints of low-grade intermittent fever associated with dry cough, hoarseness of voice, weight loss, and decreased appetite for the past 2 months. General physical examination was grossly normal except for right-sided cervical lymphadenopathy. On auscultation, there were normal bilateral vesicular breath sounds with no added sounds. The patient was further evaluated with a chest radiograph (CXR) and CECT thorax and upper abdomen [Figure 2a and b]. CXR shows paratracheal and mediastinal opacity suggesting lymphadenopathy. CECT thorax was suggestive of multiple enlarged mediastinal and right hilar lymph nodes with granulomatous lesions in splenic parenchyma. As the diagnosis was inconclusive on the above findings, a bronchoscopy was performed to achieve a confirmatory diagnosis in bronchoscopy, there was endobronchial growth in the right main bronchus in the anterior segment [Figure 2c]. A biopsy was taken from the lesion and sent for histopathological examination (HPE). On HPE, there was a finding suggestive of chronic granulomatous lesion confirming tuberculosis [Figure 3a-c]. Thereafter, the diagnosis of endobronchial tuberculosis was confirmed and the patient started on ATT. The patient responded to treatment and is doing well after 3 months of treatment.

Case 3

A 35-year-old male patient presented to the outpatient clinic with chief complaints of hoarseness of voice, dry cough, and chest pain for 2 months. General physical examination was grossly normal. On auscultation, there were reduced breath sounds in the right infraclavicular region. Chest radiograph suggestive of right upper lobe collapse [Figure 4a]. CECT thorax was performed, which was suggestive of right upper lobe collapse with enlarged mediastinal lymph nodes [Figure 4b]. Due to the collapse of the right upper lobe, bronchoscopy was advised. In bronchoscopy, sessile growth was observed in the right upper lobe in the apical segment [Figure 4c]. A biopsy was taken from the lesion and sent for histopathological examination. BAL was taken from the right middle lobe. CBNAAT from BAL was positive for *M. tuberculosis* with rifampicin sensitivity. The patient was subsequently started on ATT. He responded to the treatment and is symptom-free after 6 months of follow-up.

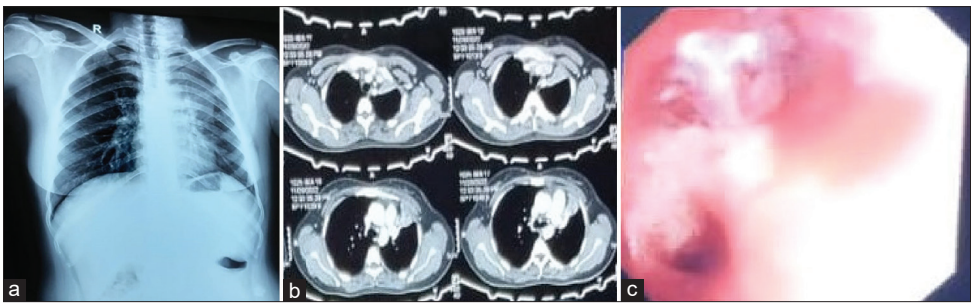

Figure 1: (a) Chest X-ray showing heterogenous opacity in the left mid lung zone, (b) CECT thorax shows heterogeneously enhancing soft tissue density in the left upper lobe of size 3 × 3.9 × 5 cm with ipsilateral upper lobe collapse with enlarged para-aortic and mediastinal lymph nodes, (c) bronchoscopic image showing growth in the left upper lobe bronchus

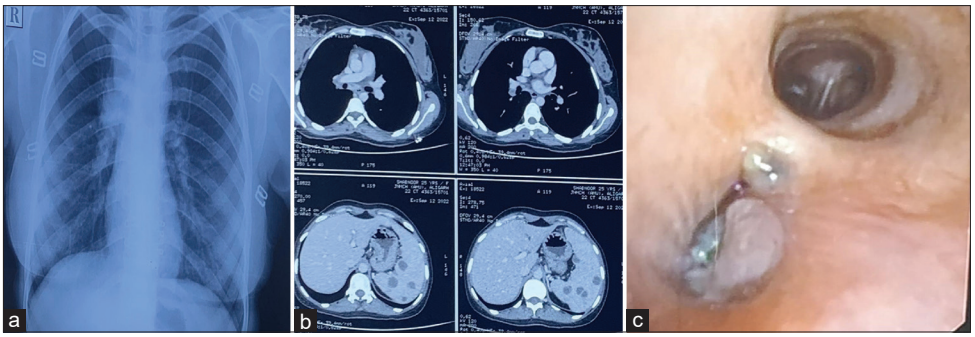

Figure 2: (a) Chest X-ray suggestive of right paratracheal and mediastinal opacity, (b) CECT thorax and abdomen shows multiple enlarged mediastinal and right hilar lymph nodes with granulomatous lesions in the splenic parenchyma, (c) bronchoscopic image showing growth in the right main bronchus

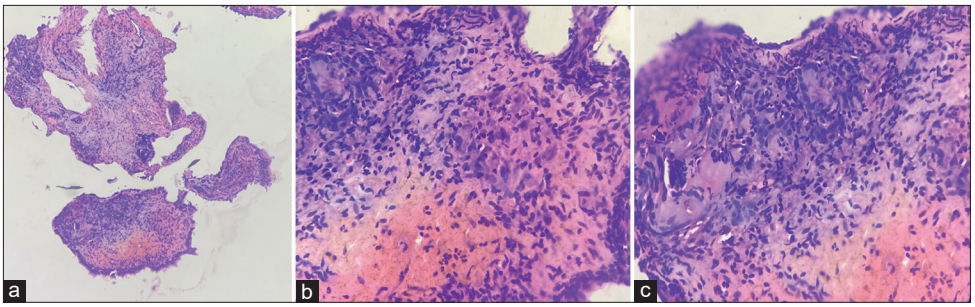

Figure 3: Histopathological examination findings in case 2. (a) Section showing pseudostratified ciliated columnar epithelial lined tissue with epithelioid cell cluster (H and E ×40), (b and c) section showing well-formed epithelioid cell granuloma with Langhans giant cell (H and E ×400)

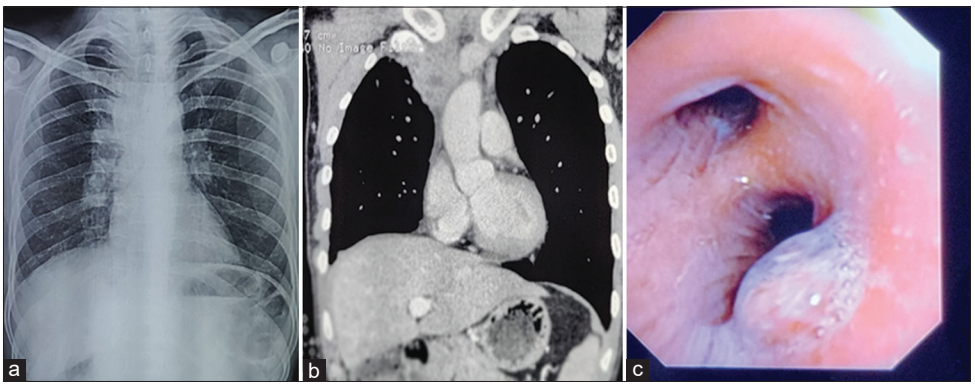

Figure 4: (a) Chest X-ray suggestive of the right upper lobe collapse, (b) CECT thorax suggestive of right upper lobe collapse with enlarged mediastinal lymph nodes, (c) bronchoscopic image showing polypoidal growth in the right upper lobe bronchus

Case 4

A 19-year-old female patient presented to the outpatient clinic with chief complaints of dry cough and decreased appetite for 2 months. General physical examination was grossly normal. On auscultation, bilateral breath sounds were equal with no added sounds. Right paratracheal opacity was present in the chest radiograph [Figure 5a]. CECT thorax was performed, which was suggestive of multiple enlarged conglomerating and necrotic mediastinal and jugular lymph nodes with sub-segmental collapse of posterobasal and medial basal segments of the right lower lobe [Figure 5b]. Due to right-sided mediastinal lymphadenopathy, a bronchoscopy was planned. In bronchoscopy, the trachea was compressed and a widening of the main carina and nodular growths were observed in the left main bronchus along with a widening of the right secondary carina and a narrowing of the right intermediate bronchus [Figure 5c]. Transbronchial needle aspiration (TBNA) and biopsy were taken from that lesion and sent for histopathological and CBNAAT examination. BAL was also sent for CBNAAT. CBANAAT from BAL and TBNA came out to be positive for *M. tuberculosis* with rifampicin sensitivity. The patient was subsequently started on ATT. She responded well to the treatment and was symptom-free during her follow-up.

Discussion

Endobronchial tuberculosis (EBTB) is a tuberculous infection of the tracheobronchial tree. It is fairly common with an incidence of 6–55% in patients with active pulmonary tuberculosis.[6] It is

considered to be a disease of young age with a peak incidence in the third decade of life with a female preponderance.[2] The discussion of endobronchial tuberculosis in the context of general and primary care providers as well as family physicians is crucial, as these healthcare professionals often encounter patients with respiratory symptoms and may be the first to suspect or diagnose this rare but challenging manifestation of tuberculosis. Highlighting the subtle yet characteristic clinical clues associated with EBTB can aid in early diagnosis and prevent delays in treatment and one should explore the red flags that should prompt further investigation. In the present case series too, three of the four patients were females. All patients were less than 35 years old [Table 1].

EBTB primarily affects the trachea, main bronchi, and upper bronchi. In our case series, the lesions were found in the bronchus in all three cases. Chung and Lee[2] divided EBTB into seven categories based on gross pathological appearance in bronchoscopy. These are non-specific bronchitis, actively caseating, granular, edematous, hyperemic, ulcerative, tumorous, and fibrostenotic. Actively caseating type is the most common, whereas others are rare. EBTB with tumorous growth can mimic bronchial adenoma, carcinoid, or malignancy.[7] Due to the rarity of tumor variants of EBTB along with non-specific clinical presentations and radiological features, the diagnosis is often delayed and challenging. The chest radiograph may be normal unless the mass is causing airway obstruction. Computed tomography (CT) of the chest particularly HRCT offers great help in evaluating patients of EBTB. It can demonstrate bronchial wall irregularities, lymphadenopathy related to bronchial lesions, or segmental lung collapse.[8] Visually, the appearance of EBTB lesions might resemble sarcoidosis, cancer, or granulomatous illness, sending clinicians down different diagnostic routes and causing a delayed or wrong diagnosis.[9] In our series, there was the finding of segmental collapse of the left upper lobe with the possibility of underlying mass in the first case and enlarged mediastinal and right hilar lymph nodes in the second case. However, the diagnosis is always confirmed by bronchoscopy and biopsy of the lesion as well as microbiological evidence.[10] In the present case series, bronchoscopy was performed in all four patients. The biopsy was taken from the tracheal/bronchial lesion. Histopathology and CBNAAT were suggestive of chronic granulomatous lesions favoring tuberculosis in all cases.

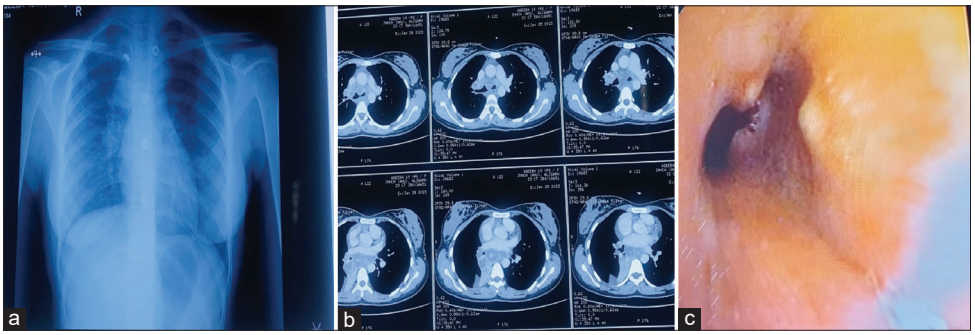

Figure 5: (a) Chest X-ray suggestive of right paratracheal opacity, (b) CECT thorax was suggestive of multiple enlarged conglomerating and necrotic mediastinal and jugular lymph nodes with sub-segmental collapse of posterobasal and medial basal segments of the right lower lobe, (c) bronchoscopic image showing nodular growth in the left main bronchus

Table 1: Demographic, clinical, radiological, and pathological profiles of four cases

Parameters	Case 1	Case 2	Case 3	Case 4
Age (years)	32	25	35	19
Sex	Female	Female	Male	Female
Clinical features	Fever, cough with expectoration, chest pain, and hemoptysis.	Fever, dry cough, hoarseness of voice.	Dry cough, hoarseness of voice, and chest pain.	Dry cough and loss of appetite.
Radiological findings	CXR-diffuse haziness in the left mid-lung zone. CECT-heterogeneously enhancing soft tissue density in the left upper lobe with ipsilateral upper lobe collapse with enlarged paraaortic and mediastinal lymph nodes, suggesting neoplastic etiology with centrilobular necrosis.	CXR-grossly normal. CECT-multiple enlarged mediastinal and right hilar lymph nodes with lesions in the splenic parenchyma.	CXR-grossly normal. CECT-right upper lobe collapse with enlarged mediastinal lymph nodes	CXR-right paratracheal opacity. CECT thorax-multiple enlarged conglomerating and heterogeneously enhancing necrotic mediastinal lymph nodes with sub-segmental collapse of posterobasal and medial basal segments of the right lower lobe with features of volume loss.
Bronchoscopy	Growth in left the upper bronchus	Growth in the right main bronchus	Growth in the right upper bronchus	Three nodular growths in the left main bronchus.
BAL CBNAAT	MTb-positive, rifampicin sensitive	Negative for tuberculosis	MTb-positive, rifampicin sensitive	MTb-positive, rifampicin sensitive
Histopathological findings	Chronic granulomatous lesion	Chronic granulomatous lesion favoring tuberculosis	Chronic granulomatous lesion favoring tuberculosis	

The treatment of EBTB is similar to that of pulmonary tuberculosis. The role of steroids is still controversial with some studies favoring its use and citing benefits in preventing bronchial stenosis.[11] We managed all three cases with anti-tubercular drugs. They are responding to treatment and showing improvement in general well-being. To sum up, the discussion section of this research paper serves as a valuable resource for general and primary care providers, as well as family physicians, by addressing the challenges and complexities of diagnosing and managing endobronchial tuberculosis. By equipping these healthcare professionals with a comprehensive understanding of EBTB, we aim to enhance patient care, reduce diagnostic delays, and ultimately contribute to better outcomes for individuals affected by this challenging condition.

Conclusion

Endobronchial tuberculosis presenting as tumorous growth in the tracheobronchial tree is a rare finding. There should be a high index of suspicion while dealing with patients with non-specific clinical and radiological features of tuberculosis. EBTB can be misdiagnosed as malignancy. Therefore, it should be kept as a differential diagnosis while encountering a mass lesion in the trachea or bronchus during bronchoscopy. The diagnosis is confirmed with histopathological and microbiological examination. Early diagnosis and treatment are mandatory for the proper management of such cases and the prevention of subsequent complications.

Abbreviations

- ATT = anti-tubercular treatment
- BAL = broncho alveolar lavage
- CBNAAT = cartridge-based nucleic acid amplification test
- CECT = contrast-enhanced computed tomography
- CXR = chest X-ray
- HPE = histopathological examination
- TBNA = transbronchial needle aspiration.

Declaration of patient consent

The authors declare that they have obtained consent from patients. Patients have given their consent for their images and other clinical information to be reported in the journal. Patients understand that their names will not be published and due efforts will be made to conceal their identity but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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