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Case Series

Internal Medicine Section

Role of Computed Tomography Chest and Bronchoscopy in the Diagnosis of Endobronchial Masses

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ABSTRACT

Endobronchial Masses (EBM) can present with Central Airway Obstruction (CAO). Causes of EBM can be benign or malignant in origin. Malignant endobronchial masses are more common than expected. However, they are underdiagnosed because of their non specific clinical and radiological presentations. The authors present a case series of seven cases of endobronchial growth. Three cases were of squamous cell carcinoma, one was bronchioloalveolar carcinoma, one was a typical carcinoid, and another one was Endobronchial Tuberculosis (EBTB). All were males, and five were above 50 years of age. Breathlessness, cough, wheeze, and haemoptysis were the common symptoms. In three patient diagnoses were delayed as Computed Tomography (CT) chest and bronchoscopy were not done during the initial evaluation. In one of the cases, empiric treatments for pulmonary tuberculosis delayed definite diagnoses of endobronchial growths. In another patient, empiric treatments for pleural tuberculosis delayed the diagnosis of carcinoma of the lung. In one patient empiric treatment with corticosteroids for asthma delayed the diagnosis of EBTB. However, in three patients early CT chest and bronchoscopy revealed the diagnoses of different types of carcinomas of the lung despite acute symptoms. One patient had carcinoma of the lung and EBTB. Early and optimal use of chest CT and bronchoscopy can clinch the diagnoses. Investigation should be done for both EBTB and malignancy in a case of endobronchial growth.

Keywords: Airway obstruction, Bronchioloalveolar carcinoma, Carcinoid, Pulmonary tuberculosis, Squamous cell carcinoma

INTRODUCTION

Endobronchial Masses (EBM) are occasionally seen in clinical practice. The differential diagnoses of an EBM include benign tumors, primary lung carcinoma, endobronchial metastasis of carcinoma from extrapulmonary organs, aspirated foreign body, asthma, and chronic obstructive pulmonary disease [1,2]. EBM can cause Central Airway Obstruction (CAO) [3]. The prevalence of CAO at the time of diagnosis was 13% [4]. Nearly 50% are diagnosed during acute hospital admission [4]. Endobronchial Tuberculosis (EBTB), which can cause CAO, is often underdiagnosed [3,5]. The incidence of EBTB ranges from 4.1- 20% in Tuberculosis (TB) patients [3]. Bronchogenic carcinoma can also occur as an EBM with CAO [6]. Patients with lung cancer have CAO in 20-30% of cases and the later is responsible for 40% of their deaths [4]. CAO can cause complications like postobstructive pneumonia, atelectasis, and dyspnea [5].

Squamous cell carcinoma is the most common primary lung carcinoma presenting as EBM [2]. The exact incidence is unknown [7]. Carcinoids account for 2% of all lung tumors [1]. Adenocarcinoma of the lung with a central location is rare [1,2]. Metastases from extrathoracic malignancies can present as EBM in 1.1% of cases [8].

Therefore, the accurate diagnosis of EBM is foremost for specific treatment [8]. Because of the non specific clinical presentation of EBM with CAO, early suspicion is the key to diagnosis. This case series discusses seven patients of EBM with diverse clinical, and radiological presentations and central airway obstruction.

CASE SERIES

Case 1

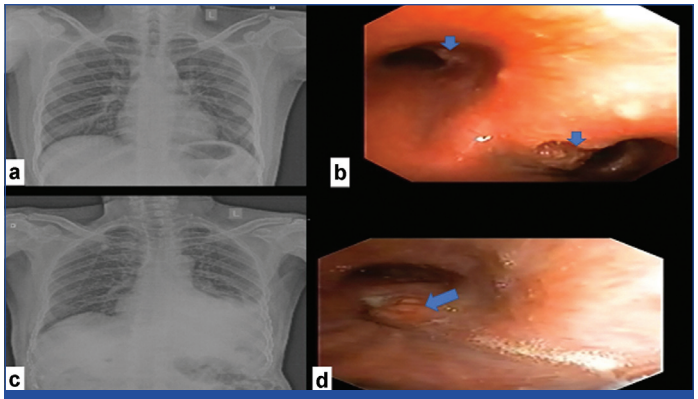
A 21-year-old male had a dry cough, wheeze, appetite loss, and weight loss for one month. He was treated as an asthmatic elsewhere with bronchodilators and inhaled corticosteroids. As his symptoms were not relieved, he visited Department of Respiratory Medicine of hospital for a second opinion. His physical examination and Chest Radiograph (CXR) were normal [Table/Fig-1a]. Computed Tomography (CT) chest disclosed multiple tree-in-bud opacities in the Left Upper Lobe (LUL) and mediastinal lymphadenopathy. Bronchoscopy revealed multiple nodules in both main bronchi [Table/Fig-1b]. Biopsy showed a chronic granulomatous infection. The molecular test for tuberculosis of bronchial wash was positive. He was started on category 1 Antituberculosis Treatment (ATT) as per the National Tuberculosis Elimination Programme. His symptoms resolved after 1 month. He completed the course of ATT. Empirical treatment for asthma delayed the diagnosis by more than a month.

Case 2

A 68-year-old male presented with breathlessness, and a productive cough for six months. At presentation, he was on empiric ATT for five months from elsewhere. As his symptoms were not relieved, he came for a second opinion. His physical examination was normal and his initial CXR showed left costophrenic angle blunting [Table/Fig-1c]. Pleural fluid was exudative. Chest CT showed Right Upper Lobe (RUL) fibro-calcifications with left moderate pleural effusion. Bronchoscopy revealed EBM obstructing LUL bronchus [Table/Fig-1d]. Biopsy disclosed infiltrating keratinised squamous cell carcinoma. He was referred to a medical oncologist, who started him on chemotherapy. But the patient died after one month. Empirical treatment of pleural effusion with antituberculosis drugs resulted in the progression of the disease in this patient.

Case 3

A 35-year-old male presented with breathlessness, productive cough, swelling of the face, neck, and right upper limb, wheezing, appetite loss, and weight loss for two months. He was receiving empiric ATT for 1 month from a local physician. Despite the treatment as there was no improvement in symptoms, he came to us. On physical examination, tubular bronchial breath sounds were present in the right suprascapular area. CXR showed RUL collapse with an adjacent cavity. On chest CT, noticed a soft tissue lesion with abrupt



[Table/Fig-1]: a and b) Images of case 1 with endobronchial tuberculosis.
a) Normal chest radiograph; b) Endobronchial nodules/masses.
c and d) Images of case 2 with infiltrating keratinised squamous cell carcinoma.
c) Left pleural effusion; d) Left upper lobe growth (Long arrow).

cut-off RUL bronchus and mediastinal lymph nodes compressing the superior vena cava. Bronchoscopy revealed EBM obstructing RUL bronchus. Biopsy showed squamous cell dysplasia. As the patient was not willing for further investigation, authors could not proceed. Initial empirical treatment with antituberculosis drugs delayed the diagnosis.

Case 4

A 70-year-old male presented with breathlessness, dry cough, and chest pain for 15 days. Stony dullness and absent breath sounds were present on the left side. The CXR showed left massive pleural effusion. Pleural fluid was exudative with Lactate Dehydrogenase (LDH) of 1995 IU. On chest CT, left lung collapse with abrupt cut off of Left Main Bronchus (LMB) was seen. Bronchoscopy disclosed EBM extending from the left secondary carina into the LUL bronchus with extraluminal compression of the left Lower Lobe Bronchus (LLB). Biopsy uncovered bronchioloalveolar carcinoma. After knowing the stage of the carcinoma and its prognosis, the patient refused further evaluation and treatment. Here subjecting the patient to an early CT chest with contrast gave the clue to the diagnosis.

Case 5

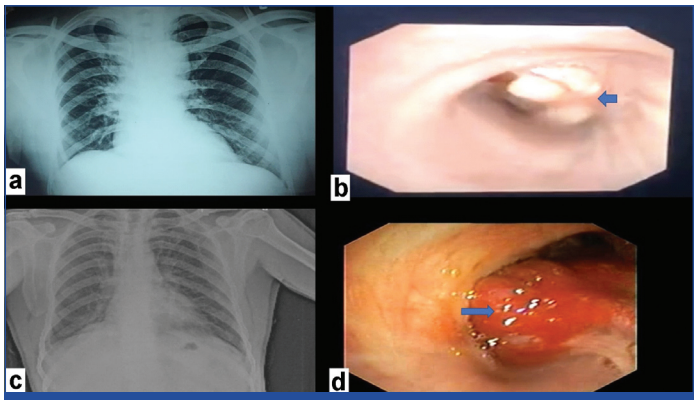
A 64-year-old male presented with breathlessness and hemoptysis for two weeks. Physical examination was normal. The CXR showed mediastinal widening [Table/Fig-2a]. On further evaluation with CT chest displayed an irregular growth extending from distal Right Main Bronchus (RMB) with abrupt cut-off RUL bronchus and centrilobular nodules in RUL. Bronchoscopy revealed a pedunculated EBM in RMB occluding 80% of the lumen [Table/Fig-2b]. Biopsy unveiled well-differentiated keratinized squamous cell carcinoma. The Patient was referred to a medical oncologist for further management. Early bronchoscopy in this patient, guided us to the diagnosis.

Case 6

A 53-year-old male presented with breathlessness, hemoptysis, and chest pain for seven days. Physical examination and CXR were normal [Table/Fig-2c]. CT chest was plannedbecause of haemoptysis. Chest CT showed a well-defined enhancing soft tissue density in RMB extending into the right intermediate bronchus. Bronchoscopy revealed EBM, which bled on touch, extending from the posterior wall of RMB into the right intermediate bronchus partially obstructing the lumen [Table/Fig-2d]. Biopsy disclosed typical carcinoid. The Patient was referred to a cancer hospital for further management. In the evaluation of haemoptysis, doing CT chest and bronchoscopy despite normal chest radiograph helped in clinching the diagnosis.

Case 7

A 54-year-old male presented with breathlessness, productive cough, wheeze, and chest pain for two months. He was on treatment for diabetes. Right suprascapular harsh breath sounds were noted on physical examination. CXR showed RUL consolidation. Chest CT displayed multiple thick-walled cavities in bilateral upper lobes with centrilobular nodules and mediastinal lymphadenopathy. Bronchoscopy revealed pale EBM partially occluding RMB. Biopsy uncovered well-differentiated keratinised squamous cell carcinoma. A molecular test for TB of bronchial wash was positive. This supports the simultaneous occurrence of EBTB and carcinoma of the lung.



[Table/Fig-2]: a and b) Images of case 5 with well differentiated keratinized squamous cell carcinoma.
a) Mediastinal widening; b) Pedunculated mass in right main bronchus (arrow).
c and d) Images of case 6 with typical carcinoid.
c) Normal chest radiograph; d) Growth from posterior wall of Right main bronchus that bleeds on touch (arrow).

DISCUSSION

As many malignant and non malignant EBM can cause CAO, it is essential to determine the etiology of an EBM. Predicting the diagnosis just based on clinical symptoms and their duration is not suggestible [9].

Clinical symptoms are non specific and depend on the location, size of EBM, and severity of CAO [9]. This is supported by our study as the duration of clinical symptoms of our study patients ranged from 1 week to 6 months. One patient had stage 4 bronchioloalveolar carcinoma despite the duration of symptoms being 15 days. Wheeze is one of the clinical features of EBM. Treating patients with wheezing as obstructive airway disease without further evaluation can delay the diagnosis. For instance, one of the above patients (case 1) was treated with inhaled and systemic corticosteroids for asthma. But on evaluation with CT chest and bronchoscopy, EBTB was confirmed by the molecular test.

Even though CXR is the first line of imaging for the evaluation of respiratory symptoms, it is non specific [3]. In a symptomatic patient, despite a normal chest X-ray, a CT chest may give clues to diagnosis. Especially, contrast-enhanced CT chest may give information about the location, extent of the lesion, the degree of CAO, and involvement of great vessels and lymphnodes [3]. The series supports this, as three of the patients had near-normal CXR. But CT chest gave important information about the diagnosis. The biopsy usually provides a definite diagnosis. Bronchoscopy is good at this. Sometimes lesions those are not obvious in CT chest can be identified by bronchoscopy. One of the patients (case 1) has multiple endobronchial nodules on bronchoscopy, which were not identified in the CT chest. Occasionally EBM may require repeat biopsies due to areas of necrosis and overlying fungal colonisation [10].

Empiric therapies are common in respiratory medicine practice. But this approach not only delays the detection of endobronchial masses but may also result in a poor prognosis. One of the patients (case 2) was treated for pleural tuberculosis. By the time the definite diagnosis was made, his clinical condition deteriorated and he died before starting chemotherapy.

In the era of evidence-based medicine, even in TB endemic countries like India, empirical treatment of pulmonary tuberculosis and obstructive airway diseases must be discouraged. As the median survival of patients with CAO was 3 to 8 months, a delay in diagnosis

may result in morbidity [4]. Two of the above patients were treated with empirical ATT elsewhere. On further evaluation, they confirmed squamous cell carcinoma. This stresses the importance of CT chest and bronchoscopy in the evaluation of respiratory symptoms.

Clinical history, physical examination, and chest radiograph are non specific. CT of the thorax and bronchoscopy are crucial for a conclusive diagnosis [3].

CONCLUSION(S)

Malignancy is a potential cause of EBM even in TB endemic countries. Avoid empirical therapies for asthma and TB, particularly in patients above 50 years. Consider chest CT and bronchoscopy wherever necessary irrespective of findings of CXR. The CT chest and bronchoscopy are complementary to each other. Evaluate for both carcinoma and EBTB, in the case of EBM, as coexistence is a possibility.

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