Case Report

MIDDLE LOBE SYNDROME DUE TO TUBERCULOUS ETIOLOGY: A SERIES OF 12 CASES

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Summary
The term right middle lobe syndrome (RMLS) is often used in clinical practice though it has no consistent definition. Inflammatory lesion, malignant tumors followed by bronchiectasis are considered as the most common etiological factors for RMLS. Here we describe 12 cases of RMLS due to tuberculous etiology diagnosed over a period of 6.5 years at our Institute. They were diagnosed using conventional methods and responded to anti-tubercular treatment with favourable outcome. The cases are being presented here to highlight the fact that tuberculosis, though not frequently reported in published literature, is an important etiological factor and must be considered for differential diagnosis when RMLS is evaluated particularly in regions where the prevalence of tuberculosis is high as it responds to anti-tubercular chemotherapy remarkably.

Key words: Middle lobe syndrome, fibreoptic bronchoscopy, polymerase chain reaction test, anti-tubercular treatment

INTRODUCTION
The term ‘middle lobe syndrome’ was coined by Graham & co-workers1 who reported 12 cases of middle lobe atelectasis of non-tuberculous origin secondary to bronchial compression by enlarged lymphnodes. The patients in their series presented with haemoptysis, chronic cough and recurrent pulmonary infections and were treated by lobectomy. The definition of middle lobe syndrome was subsequently modified to include all types of right middle lobe atelectasis, even when the bronchial compression was not present. The present consensus considers right middle lobe syndrome (RMLS) to represent a notable radiological finding (just like solitary pulmonary nodule) without implying an exact etiopathogenic factor that should prompt a complete diagnostic workup to ascertain the underlying cause2.

CASE REPORT
The present study was carried out at the Department of Tuberculosis & Respiratory Medicine in our Institute over a period from August 1997 to February 2004. All patients were selected for the presence of right middle lobe syndrome (RMLS) over chest roentgenogram. Chest roentgenogram postero-anterior view revealed ill-defined opacity abutting the right cardiac border leading to loss of cardiac silhouette (silhouette sign) and the lateral view further helped in localization: opacity with triangular shape suggestive of lateral segment and that with rectangular shape indicative of medial segment. CT thorax was undertaken in each and every case that confirmed the diagnosis and helped to understand the type and extent of lesion and patency of airways.

The diagnosis of tuberculous etiology was based on (1) compatible clinical history of chronic cough with sputum production for more than 3 weeks not responding to antibiotic therapy and constitutional features including a low grade fever, loss of appetite and weight loss, (2) a positive tuberculin test using 1 TU of PPD RT 23, (3) detection of acid fast bacilli or Mycobacterium tuberculosis in specimen (sputum or bronchial aspirate) by direct smear or culture/ polymerase chain reaction, respectively, (4) fine needle aspiration cytology revealing chronic inflammatory cells, mainly epithelioid cells, lymphocytes and Langhans’ type
Table 1: Characteristics of Patients with Right Middle Lobe Syndrome Due To Tuberculosis

<table>
<thead>
<tr>
<th>CASE NO.</th>
<th>AGE &amp; SEX</th>
<th>SYMPTOMS CO-EXISTING ILLNESS</th>
<th>CT THORAX STATUS</th>
<th>MANTOUX TEST</th>
<th>SPUTUM FEATURES</th>
<th>FOB: BRONCHIAL SECRETIONS</th>
<th>FNAC</th>
<th>REGIMEN</th>
<th>OUTCOME/FOLLOW UP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58(M)</td>
<td>C,S,PC,F</td>
<td>ES</td>
<td>12 mm</td>
<td>Non-specific</td>
<td>Granulomatous lesion</td>
<td>Granulomatous lesion</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>2</td>
<td>46(M)</td>
<td>C,S,F,DE</td>
<td>COPD, DM</td>
<td>14 mm</td>
<td>Non-specific</td>
<td>Isolation of acid-fast bacilli</td>
<td>--</td>
<td>2HRZE/7HR</td>
<td>Resolution, Fibrosis</td>
</tr>
<tr>
<td>3</td>
<td>23(F)</td>
<td>C,S,HP,PC</td>
<td>NS</td>
<td>18 mm</td>
<td>Non-specific</td>
<td>Granulomatous lesion</td>
<td>Granulomatous lesion</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>4</td>
<td>48(M)</td>
<td>C,S,PC,DC</td>
<td>COPD, HT</td>
<td>16 mm</td>
<td>Non-specific</td>
<td>Granulomatous lesion</td>
<td>Granulomatous lesion</td>
<td>2HRZE/7HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>5</td>
<td>35(F)</td>
<td>C,S,HP,PC,F</td>
<td>--</td>
<td>14 mm</td>
<td>Non-specific</td>
<td>Granulomatous lesion</td>
<td>Granulomatous lesion</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>6</td>
<td>28(F)</td>
<td>C,S,PC,F</td>
<td>Asthma</td>
<td>20 mm</td>
<td>Non-specific</td>
<td>Isolation of M. tub by PCR</td>
<td>--</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>7</td>
<td>34(M)</td>
<td>C,S,PC</td>
<td>--</td>
<td>18 mm</td>
<td>Non-specific</td>
<td>Isolation of M. tub by PCR</td>
<td>--</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>8</td>
<td>62(M)</td>
<td>C,S,PC,DE</td>
<td>COPD, CAD, HT, DM</td>
<td>12 mm</td>
<td>Non-specific</td>
<td>Isolation of M. tub by PCR</td>
<td>--</td>
<td>2HRZE/7HR</td>
<td>Resolution, Fibrosis</td>
</tr>
<tr>
<td>9</td>
<td>38(F)</td>
<td>C,S,F</td>
<td>--</td>
<td>14 mm</td>
<td>Non-specific</td>
<td>Granulomatous lesion</td>
<td>Granulomatous lesion</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>10</td>
<td>42(M)</td>
<td>C,S,PC,F</td>
<td>COPD, DM</td>
<td>14 mm</td>
<td>Non-specific</td>
<td>Isolation of acid-fast bacilli</td>
<td>--</td>
<td>2HRZE/7HR</td>
<td>Resolution, Fibrosis</td>
</tr>
<tr>
<td>11</td>
<td>24(M)</td>
<td>C,S,HP,F</td>
<td>--</td>
<td>20 mm</td>
<td>Non-specific</td>
<td>Isolation of acid-fast bacilli</td>
<td>--</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
<tr>
<td>12</td>
<td>31(M)</td>
<td>C,S,PC,F</td>
<td>ES</td>
<td>16 mm</td>
<td>Non-specific</td>
<td>Isolation of acid-fast bacilli</td>
<td>--</td>
<td>2HRZE/4HR</td>
<td>Complete Resolution</td>
</tr>
</tbody>
</table>

C = Cough, S = Sputum, H = Haemoptysis, PC = Pain Chest, F = Fever, DE = Dyspnoea on exertion
DM = Diabetes mellitus; HT = Hypertension; CAD = Coronary artery disease
S = Smoker, ES = Ex-smoker, NS = Non-smoker
mm = Millimetre
PCR = Polymerase chain reaction
giant cells against a caseous necrotic background, and (5) a favourable response to the therapeutic trial of antitubercular drugs. A total of twelve cases of middle lobe syndrome with confirmed tuberculosis were included in the study and their individual characteristics were as shown in Table 1.

**Patients’ profile:** Out of 12 patients, 8 were males (66.7%). Their age was between 23 and 62 years (mean 29.74 ± 12.24). All four females were non-smokers. Out of 8 males, 4 were smokers, 2 were ex-smokers and 2 were non-smokers.

**Clinical presentation:** All patients presented with cough and sputum production. Other symptoms including fever, pain chest, haemoptysis, decreased appetite, weight loss and generalized weakness were as described in Table 1. Presence of co-existing illnesses was also investigated in each patient and results are shown in Table 1.

**Investigations:** All patients had a positive tuberculin test 48 hours after the intradermal injection of 1 TU of PPD RT-23. The tubercular etiology was confirmed on following reports: Acid-fast bacilli were isolated from sputum specimen in 3 patients. Fibreoptic bronchoscopy was carried out in nine patients who were smear negative for acid-fast bacilli; bronchial aspirate revealed acid-fast bacilli in 3 patients and in two patients bronchial aspirate was positive for polymerase chain reaction test for *M. tuberculosis*. Histopathological examination of fine needle aspiration cytology specimen confirmed granulomatous lesions in 4 patients.

**Treatment:** All patients were given short
course anti-tubercular treatment; 8 patients were given for six months (2HRZE/4HR), whereas ATT was extended to nine months in four patients (3 patients had coexisting diabetes mellitus and one patient was on oral corticosteroid for COPD). All patients had good clinical improvement without requiring any surgical intervention. Eight patients had complete radiological resolution whereas four had resolution with fibrosis.

**DISCUSSION**

Middle lobe syndrome is defined as recurrent or chronic collapse of the middle lobe of the right lung. It occurs in all age groups and is divided into an *obstructive type*, with a demonstrable airway occlusion, and a *non-obstructive type*, with a patent right middle lobe bronchus apparent on bronchoscopy. In a community based study, out of the 30,588 persons who underwent annual minichest roentgenography, 0.17% had middle lobe syndrome, diagnosed from chest X-ray films. The incidence was significantly higher in persons over 50 years old than in persons under 50 years old (0.26% vs. 0.02%), and was higher in females than in males (0.20% vs. 0.11%).

Radiology remains the mainstay in screening of RMLS. The published medical literature describes the triangular shape of the lateral segment and the rectangular shape of the medial segment when seen over lateral view. The cicatrisation atelectasis of middle lobe is the characteristic CT finding in patients with bronchopulmonary tuberculosis.

The medical literature review shows benign inflammatory disease being the most common etiological factor. The earlier view that bronchial compression/obstruction was the pathophysiological abnormality leading to development of the syndrome has been rejected as the sole reason by more recent authors. The focus has now turned to the relative isolation of the middle lobe, especially when a complete minor fissure is present. This isolation prevents the aerating effects of collateral ventilation of the upper lobe from reaching the middle lobe and thus impairs the clearing of secretions from the middle lobe bronchus. The reported etiologies of RMLS include inflammation (47%), malignant tumors (22%), bronchiectasis (15%), tuberculosis (9%), benign tumors (2%), aspiration (2%) and the
RMLS is also frequent in children. Infectious causes were dominant in these series. Middle lobe syndrome has also been described in siblings, occurring in two sisters.

The treatment essentially depends on the underlying cause. Few authors consider surgery to be the main method of treatment of the middle-lobe syndrome or syndrome of the lingular segments. If there is reasonable evidence that the middle lobe syndrome has a benign etiology, a prudent attempt of medical management is warranted.

REFERENCES