

A CLINICORADIOLOGICAL STUDY OF MIDDLE LOBE SYNDROME DUE TO TUBERCULOSIS

Saurabh Karmakar¹, Zia Hashim², Mohammad Aamir³, Kashif Raza⁴, Rajendra Prasad⁵, Surya Kant⁶, Alok Nath⁷, Zafar Neyaz⁸

¹Assistant Professor, Department of Pulmonary Medicine, Era's Lucknow Medical College & Hospital, Lucknow.

²Assistant Professor, Department of Pulmonary Medicine, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow.

³Assistant Professor, Department of Pulmonary Medicine, Era's Lucknow Medical College & Hospital, Lucknow.

⁴Junior Resident, Department of Pulmonary Medicine, Era's Lucknow Medical College & Hospital, Lucknow.

⁵Professor & HOD, Department of Pulmonary Medicine, Era's Lucknow Medical College & Hospital, Lucknow.

⁶Professor & HOD, Department of Pulmonary Medicine, King George's Medical University, Lucknow.

⁷Associate Professor, Department of Pulmonary Medicine, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow.

⁸Associate Professor, Department of Radiodiagnosis, Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow.

ABSTRACT

BACKGROUND

Although pulmonary tuberculosis is a common disease in India, tuberculosis of right middle lobe is infrequent. Tuberculosis of the right middle lobe leading to chronic collapse is a cause of Right Middle Lobe syndrome.

METHODS

The patients attended Pulmonary Medicine Outdoor at Era's Lucknow Medical College, Lucknow from April 2015 to March 2016. The purpose of this study is to describe the clinicoradiological features of patients of middle lobe syndrome due to tuberculosis. All patients presented with cough with or without expectoration, fever, chest pain, haemoptysis and constitutional symptoms like loss of appetite and weight. Chest X-ray PA view revealed ill-defined opacity abutting the right cardiac border. HRCT thorax was done in each case. The diagnosis of tuberculous aetiology was based on (1) History of chronic cough and fever, not responding to antibiotic therapy and constitutional symptoms, (2) A positive tuberculin test using 2 TU of PPD RT 23 and (3) Detection of acid fast bacilli by direct smear or Mycobacterium tuberculosis by polymerase chain reaction in bronchoalveolar lavage.

RESULTS

Out of 10 patients, 4 (40%) were males and 6 (60%) were females. The mean ages of the males were 55.8 years and females were 60.8 years and overall mean age was 59 years. Most of the patients were females and belonged to the middle age and old age group. ATT was started in all the patients.

CONCLUSIONS

Right middle lobe syndrome predominantly affects the older population and the female gender. Although tuberculosis is a common disease in India, Middle Lobe Syndrome is a very rare presentation of the disease. Due to non-specific symptoms and usually normal chest X-ray PA view in Right Middle Lobe Syndrome, we should keep a high index of suspicion to diagnose the condition.

KEYWORDS

Tuberculosis, Pulmonary, Right Middle Lobe Syndrome, Lung.

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INTRODUCTION: Right Middle Lobe syndrome (MLS) is defined as chronic collapse of the middle lobe of the right lung. Although rare, it is an important clinical entity. There is limited literature available regarding this condition. The epidemiology of this condition is not well described.

Chronic cough, haemoptysis and recurrent pulmonary infections are the usual clinical features. Usual treatment of

the condition is conservative medical management. Right Middle Lobe syndrome represents a notable radiological finding with varied aetiopathogenetic factors and should prompt a diagnostic workup to ascertain the cause.

MATERIALS AND METHODS: The observational study comprised of cases enrolled in the Department of Pulmonary Medicine at Era's Lucknow Medical College & Hospital between 1/04/2015 to 31/03/2016. All the patients who had Right Middle Lobe Syndrome were evaluated and enrolled. Every patient who had an ill-defined opacity, abutting the right cardiac border leading to loss of the cardiac border (Silhouette Sign) on his chest X-ray PA view was further evaluated.

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Corresponding Author:

Dr. Saurabh Karmakar,

Department of Pulmonary Medicine,

Era's Lucknow Medical College, Sarfarazganj, Hardoi Road,

Lucknow-226003.

E-mail: doc_next_door@yahoo.com

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High Resolution Computed Tomography thorax was done to visualise the opacity better and localise the lobe of involvement. HRCT thorax revealed right middle lobe collapse in form of a wedge shaped opacity extending laterally from the hilum to the chest wall. The collapsed middle lobe was bounded posteriorly by the Right Lower Lobe and anteriorly by the Right Upper Lobe. Each patient of Right MLS was then subjected to bronchoscopy to look for any possible endobronchial lesion and Bronchoalveolar lavage (BAL) was taken. BAL Fluid was stained for Acid Fast Bacilli by Ziehl-Neelsen staining and was also sent for cytological analysis and fungal smear and culture.

The diagnosis of tuberculous aetiology 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.
2. Tuberculin test using 1 TU of PPD leading to induration of more than 9 mm.
3. Detection of acid fast bacilli by Ziehl-Neelsen staining in Bronchoalveolar Lavage obtained by Fiberoptic Bronchoscopy.

The inclusion criteria were presence of Right Middle Lobe collapse along with all the above-mentioned criteria. A total of ten cases fulfilling the diagnostic criteria have been mentioned in Table 1.

RESULTS:

Case No.	Age (Yrs.)	Sex	Symptoms	Co - Morbidities	Smoking Status	CT Thorax
1	79	Male	C, DOE, H	Nil	ES	RML Bronchus Thickening with Atelectasis and Ground Glass Opacity
2	25	Male	C, F	Nil	NS	RML Collapse with Consolidation
3	60	Male	C, F, DOE	Nil	ES	RML Collapse with Consolidation and Bronchiectasis Patch in the Left Lingula with Nodular Opacities
4	59	Male	C, H, F	DM	ES	RML Collapse with Pseudo Aneurysm and Azygos Lobe
5	51	Female	C, H, F, DOE	Nil	NS	RML Collapse with Cavity and Nodular Opacities
6	81	Female	C, E, DOE, F	CAD	NS	RML Collapse with Narrowed RML Bronchus. Nodules in the Right Lung.
7	45	Female	C, H, F	Nil	NS	RML Bronchus Narrowed with RML Collapse with Tree in Bud Appearance.
8	71	Female	C, DOE	DM, CAD	NS	RML Collapse with Consolidation
9	50	Female	C, H, F	CAD	NS	RML Collapse with Consolidation, Right Lower Lobe Collapse Also Present
10	67	Female	C, DOE, F	Nil	NS	RML Collapse with Consolidation

Table 1: Characteristics of Patients

C = Cough, H = Haemoptysis, F = Fever, DOE = Dyspnoea on exertion, DM = Diabetes mellitus, CAD = Coronary Artery Disease, Ex = Ex-smoker, NS = Non-smoker.

Patient Characteristics: Out of 10 patients, 4(40%) were males and 6(60%) were females. The mean ages of the males were 55.8 years and females were 60.8 years and overall mean age was 59 years. 3 of the 4 males were ex-smokers while all the 6 females were non-smokers.

Clinical Presentation: The symptoms of all patients were recorded. Chronic cough was present in all the patients. Fever with evening rise in temperature was present in 6 (60%) of the patients. Haemoptysis was present in 5(50%) of the patients. 4(40%) patients had dyspnoea on exertion (Table 1). Comorbidities like coronary artery disease were

present in 3(30%) patients and diabetes mellitus in 2(20%) patients (Table 1).

Investigations: The patients were subjected to routine haematological investigation like complete blood counts (CBC), fasting and postprandial blood sugar, kidney function test (KFT) and liver function test (LFT). CBC, KFT and LFT of patients were within normal limits. All patients were administered 2 TU of PPD. PPD showed more than 9 mm induration in all patients. Sputum smear was negative for AFB in all patients. Fiberoptic bronchoscopy (FOB) with Bronchoalveolar Lavage (BAL) was done in all the patients.

BAL fluid was positive for Acid Fast Bacilli in all the ten patients.

Treatment: All patients were started on four drugs ATT (Rifampicin, Isoniazid, Ethambutol and Pyrazinamide). All patients improved on followup visits. These patients were assessed clinically and radiologically.

DISCUSSION: Middle Lobe Syndrome (MLS) is a rare but important clinical entity.¹

Effler and Ervin gave the term 'Middle Lobe Syndrome' to 12 patients of atelectasis and Non-tuberculous pneumonitis of right middle lobe, described by Graham et al in 1948.^{2,3} MLS is divided pathophysiologically into obstructive and nonobstructive types. Obstructive MLS is caused by endobronchial lesions or extrinsic compression of the right middle lobe bronchus. The most common cause of extrinsic compression is enlargement of peribronchial and hilar lymph nodes.⁴ Neoplasms may obstruct the airway as an endobronchial mass or by external compression. Mediastinal tumours, cardiomegaly due to congenital heart disease and aspirated foreign bodies are rare causes of obstructive MLS.⁵ Non-obstructive MLS is characterised by absence of any obstructive/compressive lesion in the middle lobe bronchus as evident on computed tomography (CT) or bronchoscopy.

The non-obstructive type is typically caused by inflammation, commonly as the result of infection. Benign inflammatory disease has been identified as the most common cause of MLS accounting for 62% of cases.⁶ Infectious causes are most commonly bacterial, but can be viral, mycobacterial, or fungal.⁷ It has been hypothesised that right middle lobe is relatively isolated lobe with lack of collateral ventilation from other lobes. Complete fissures surround the RML resulting in absence of collateral ventilation, leading to atelectasis, chronic inflammation and fibrosis. The prognosis of non-obstructive MLS is better than obstructive MLS.⁸ In Department of Pulmonary Medicine at Era's Lucknow Medical College over a year, chest X-ray PA view of every patient with chronic cough and constitutional symptoms was scrutinised for opacity abutting the right cardiac border. If chest X-ray was suggestive of opacity abutting the right cardiac border, then an HRCT thorax was done. Right middle lobe syndrome was diagnosed based on HRCT thorax appearance.

Ten patients had Right MLS based on HRCT features in our case series. Most of the patients were females and belonged to the old age group (Table 1). MLS is more common in females and the ratio of females to males' ranges from 1.5 to 3 in most studies.⁹, the ratio of females to males is 1.5 in our series. It has been hypothesised that females tend to regard coughing as unacceptable social behaviour and thus are at a greater risk of failing to clear secretions from the middle lobe and subsequently it becomes a nidus for chronic infection.¹⁰ The mean age of patients was 59 years in our study. Meteroğlu, in a retrospective analysis of Turkish patients of MLS, reported a mean age of 12 years. Pejhan et al in study of MLS patients from Iran found the

mean age to be of 32 years. Kwon et al in study of patients in South Korea reported a mean age of 47 years. Einarsson et al reported a case series of patients of MLS in Iceland, in which the mean age of patients was 55 years. Tuberculosis is leading to increasing disease burden among the elderly people.¹¹ Patients in our series had a mean age older than patients in the previous studies. Elderly people are more likely to develop atypical forms of disease that are often difficult to diagnose.¹¹

Also, elderly patients may not exhibit the classic features of tuberculosis like cough, haemoptysis, fever, night sweats and weight loss.¹² Chest X-ray PA view initially leads to suspicion of MLS. The PA view may also show obscuring of the right cardiac border (Silhouette sign), because the medial segment of the middle lobe is contiguous with the right atrium.¹³ Collapse of the middle lobe is often difficult to detect on PA view because the lobe is relatively thin and lies obliquely in the superoinferior plane. Air bronchograms on HRCT thorax suggests partial patency of the right middle lobe bronchus. Radiological abnormalities are more apparent in the lateral view: A wedge-shaped area of increased density with the apex is at the hilum and the base towards the pleura is seen.

Suspecting the presence of MLS is a prerequisite for further workup and management. Clinicians should have a lower threshold of performing HRCT thorax, when chest X-ray PA shows vague opacities abutting the right heart border and patient has persistent respiratory symptoms. HRCT is superior to chest X-ray in the diagnosis of MLS because it delineates the lobar anatomy and abnormalities. HRCT thorax shows atelectasis with or without bronchiectasis of the right middle lobe or the lingual lobe. Fiberoptic bronchoscopy (FOB) plays a key role in the diagnosis. We did a FOB in all the patients to examine the proximal RML bronchus, and to exclude any obstruction caused by granulation tissue, tumour or a foreign body. All the patients were sputum smear negative for AFB. Sputum for AFB smears is not sensitive enough to diagnose noncavitating tuberculosis in the elderly. FOB in all the patients enabled microbiological examination of secretions and toileting of the lobe. FOB is a helpful modality of investigation in elderly patients as they cannot expectorate adequate sputum.

Several diseases are known to cause MLS. In our case series, we have presented the findings in patients of Right Middle lobe syndrome due to tuberculosis. Although pulmonary tuberculosis is a very common disease in India, MLS is a rare presentation. Right middle lobe syndrome is a rare but important clinical condition. The insidious nature of disease and the radiological appearance of a near normal chest X-ray PA view led to delayed diagnosis. MLS is frequently misdiagnosed in clinical practice, and delay in the diagnosis leads to high economic burden due to over-prescription of non-effective drugs. Advanced technological modalities like high resolution computed tomography thorax and fiberoptic bronchoscopy are required for prompt and accurate diagnosis.

CONCLUSION: The burden of this disease is high in the elderly. Right Middle Lobe syndrome should be a diagnostic possibility in patients with chronic cough, constitutional symptoms and vague infiltrates in the chest X-ray PA view. Early recognition and investigation is the key to a successful outcome.

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