

# Clinical Study of Lower-Lung Field Tuberculosis

J. Ayatollahi

## Abstract

**Background:** Lower lung field tuberculosis is atypical presentation of pulmonary tuberculosis which often causes confusion in diagnosis. HIV/AIDS epidemic has considerably increased its incidence. This study was designed to identify the prevalence and different clinical conditions of lung tuberculosis in conjunction with its common clinical and radiological presentations and its treatment.

**Methods:** The patients diagnosed as having pulmonary tuberculosis with lesions below an arbitrary line across the hila of their chest X-rays, considered lower lung field tuberculosis, are included in this study. Laboratory testing was done on sputum for acid-fast bacillus. HIV testing, blood sugar and other relevant examinations were performed in each patient.

**Results:** Out of a total of 217 patients with pulmonary tuberculosis, 19.8% had lower lung field tuberculosis. The majority of the patients (41.8%) were over 60-yrs of age. It was more common in female (21.8%) than in male patients (17.7%). Unilateral disease was more common (52%) and the right side involvement was more frequently affected (60%). Consolidation (47%) and cavitations (26%) were the main radiological findings.

**Conclusion:** Lower lung field tuberculosis is fairly common in central part of Iran. Its clinical presentation is similar to that of classical upper lung field tuberculosis.

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**Keywords** • Tuberculosis • pulmonary • diabetes • lower-lung field

## Introduction

**P**ulmonary tuberculosis is a leading killer infectious disease of adults in developing countries. It is estimated that *Mycobacterium tuberculosis* infects some 50 to 100 million people worldwide, of whom ten to twenty million people develop overt disease and about three millions die each year.<sup>1</sup> Though pulmonary tuberculosis commonly affects the upper lung fields, lower lung field tuberculosis (LLFT) is not common. This often causes great confusion in the diagnosis.<sup>2</sup> AIDS epidemic has considerably increased the incidence of middle and lower lung field tuberculosis which is frequently associated with negative sputum smear due to lower bacillary load.<sup>2,3</sup> Moreover, the signs and symptoms LLFT are also similar to other non-tuberculosis lung diseases, therefore, in such situations an accurate diagnosis is impossible.

Infectious and Tropical Diseases  
Research Center,  
Shahid Sadoughi Hospital,  
Yazd University of Medical Sciences,  
Yazd, Iran.

**Correspondence:**  
Jamshid Ayatollahi MD,  
Infectious and Tropical Diseases  
Research Center,  
Shahid Sadoughi Hospital,  
Yazd University of Medical Sciences,  
Yazd, Iran.  
**Tel:** +98 351 8224001  
**Fax:** +98 351 8224100  
**E-mail:** jamshidayatollahi@yahoo.com

Since early diagnosis and treatment play an important role in the prevention of tuberculosis, a proper understanding of clinical, radiological, and bacteriological presentations, as well as treatment outcome of this disease entity is of crucial importance. In view of the foregoing considerations, the present clinical study was conducted to determine the incidence of lower lung field tuberculosis in different clinical conditions, common clinical and radiological presentations, acid-fast bacillus (AFB) status of sputum and the outcome of short course chemotherapy.

### Patients and Methods

This study was conducted in the Infectious and Tropical Diseases Research Center of Shahid Sadoughi University of Medical Sciences for a period of five yrs. A total of 217 patients (107 males and 110 females) were diagnosed as having pulmonary tuberculosis. Patients who had both pulmonary and extra-pulmonary tuberculosis were also considered as cases of pulmonary tuberculosis,<sup>4</sup> and included in the study.

Diagnosis of pulmonary tuberculosis was made by detailed clinical history, chest X-ray, examination of sputum for AFB by Ziehl-Neelsen method and its culture on Lowenstein-Jensen media. Patients whose sputum was negative for AFB by direct smear on three consecutive days and also by culture were diagnosed as cases of sputum negative pulmonary tuberculosis. They were also confirmed on the basis of suggestive radiological findings and clinico-radiological non-responsiveness to a 2-3 weeks course of antibiotics.<sup>4</sup>

An arbitrary horizontal line across the hila in a posteroanterior (PA) chest film was taken as the dividing line between upper and lower lung fields.<sup>5,6</sup> Para hilar regions were considered in lower lung fields. Lower lung field included middle lobe and the lingula in addition to the lower lobes.<sup>5,7</sup> A total of 43 patients had lower lung field tuberculosis.

Patients excluded from the study comprised those aged less than 15-yrs, cases of either ipsilateral or contralateral involvement of both upper and lower lung fields, pleural effusion and thickening unless associated with parenchymal lesions in the involved area.<sup>8</sup> Diagnosis of diabetes was made by their fasting and postprandial blood sugar levels. Strict control of blood sugar level was maintained during anti-tubercular treatment. Having obtained informed consent, HIV testing was done in each patient with pulmonary tuberculosis according to Center for Disease Control guidelines.<sup>9</sup> All patients underwent a short course chemotherapy according to WHO guidelines.<sup>1</sup>

### Results

Of 217 patients with pulmonary tuberculosis, 43 (19.8%) had lower lung field tuberculosis (Table 1), which was significantly more common in females (21.8%) than in males (17.8%). Mean age of male patients having lower lung field tuberculosis was higher (51-yrs-old) than females (47-yrs-old) and in both groups, the highest incidence (41.9%) was observed in those aged over 60 years. As shown in Table 2, regarding to ages of 31 to 45 yrs-old, significantly higher incidence ( $P < 0.05$ ) was found in females (33.3%) than in male patients (21.1%). In diabetic patients (28%), incidence was significantly higher than in non-diabetic patients (18.7%).

**Table 1:** Incidences of lower lung field tuberculosis (LLFT) in different genders.

Sex	# of patients	LLFT n (%)
Male	107	19 (17.8)
Female	110	24 (21.8)
Total	217	43 (19.8)

**Table 2:** The incidence of LLFT in different age groups.

Age (yrs)	15-30	31-45	46-59	>60	
Male	19	2	4	3	10
Female	24	3	8	5	8
Total	43	5	12	8	18

Most common clinical features in upper or lower pulmonary tuberculosis were cough, with or without expectoration presented in 119 (91.7%), followed by fever in 167 (76.9%) patients with general toxic symptoms in 160 (73.7%), and hemoptysis in 21 (9.7%) patients. In diabetic patients, clinical presentation in upper and lower lung field tuberculosis did not significantly differ from non-diabetic individuals.

Main radiological presentations in lower lung field tuberculosis were consolidation in 39 (90.7%), followed by cavity in 20 (46.5%) patients. Single and multiple cavities, without measuring their sizes, were present in 22 (51.2%), and 21 (48.8%) patients respectively. Consolidation was more common (100%) in diabetic than in non-diabetic patients (88.9%). Right lung was more frequently affected in 23 (53.5%) patients. Left lung was involved in 20 (46.5%) and bilateral involvement in five (11.6%) patients.

Sputum was positive for AFB in 39 (90.7%) patients which were significantly higher than those with classical upper lung field disease (87.8%). The treatment was complete in 42 (97.7%) and unsuccessful in the remaining 2.3% patients.

### Discussion

LLFT was first reported by Kidd in 1886.<sup>10</sup> Literature shows a great variation (0.6% and 6.4%) in

reported frequency of LLFT,<sup>6,11</sup> compared to its higher incidence (19.8%) observed in this study. Also, the studies from TB sanatoria reported a lower percentage than general hospitals.<sup>5-7,12,13</sup>

Our observation and others show that LLFT was predominant in female patients.<sup>6,7,14</sup> This may be explained by the fact that women have costal type of respiration resulting in poor aeration of the lower lobe hence having a higher chance of tuberculosis.<sup>11,15</sup>

In our study, the incidence rate of infection was 41.9% in patients with ages over 60-yrs, followed by 27.9% in patients with ages of 31-45 yrs-old. This was similar to the reports of investigators.<sup>6,14,15</sup> It was found that the incidence of LLFT was significantly higher in women (33.3%) than in men (21.0%), similar to what was reported by Vidyasagar et al.<sup>8</sup> Therefore, this entity should be looked for in women having lower lung field lesions. Most patients presented with predominant symptoms of cough, fever, weakness, and hemoptysis. This finding is in conformity with other studies.<sup>7,11,15</sup>

The observation that right lung was predominantly involved in 53.5% of patients was also in accord with other studies.<sup>5,7,11</sup> Reasons for higher prediction of infection in the right lung are not well understood, though, more common right sided infection might be due to anatomical variations.

Moreover, the higher incidences of right-sided hilar lymphadenopathy have been reported in people living in Asia.<sup>16,17</sup> These lymph nodes may rupture into the bronchi and induce lower zone infection.<sup>18</sup> The reported incidence of positive sputum was higher in LLFT compared to all cases of pulmonary tuberculosis.<sup>18</sup>

Slightly higher positive sputum was found in LLFT than in classical upper lung field tuberculosis. Less efficient expectoration leading to a higher bacillary load may be due to the accumulation of mucous in LLFT.<sup>18</sup> All the patients were treated according to WHO guidelines,<sup>1</sup> with a success rate of more than 97.7, which is similar to the classical upper lung field tuberculosis.

## Conclusion

Sputum examined for acid-fast bacillus seems an easiest way for diagnosing lower lung field tuberculosis. Tuberculosis is rather a common type of lung disease that needs attention in diabetic patients, and patients having lower lung field lesions.

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