



Frequency of Pulmonary Tuberculosis in Smear Negative Patients with Suggestive Radiological Lesions in a Tertiary Care Centre

Authors

Dr Ronald Win B¹, Dr C Sudheendra Ghosh²

¹Additional Professor, Pulmonary Medicine, Govt Medical College, Trivandrum

²Professor & HOD of Pulmonary Medicine, Sree Gokulam Medical College & Research Foundation, Trivandrum, Formerly Professor & HOD of Pulmonary Medicine, Govt Medical College, Trivandrum

Corresponding Author

Dr Ronald Win B

Additional Professor, Pulmonary Medicine, Govt Medical College, Trivandrum

Abstract

Introduction: Tuberculosis is an infectious disease caused by mycobacterium tuberculosis, which may affect the lung, but it can also affect other part of the body. 50% of the patient will be smear positive and easy to diagnose and in smear negative cases the diagnosis is difficult. So understanding the proportion of pulmonary tuberculosis in smear negative cases within modern Cat 1 ATT will help in early diagnosis and treatment which reduce or prevent mortality and morbidity due to pulmonary tuberculosis.

Primary objective: To find out the proportion of pulmonary tuberculosis in smear negative patients with suggestive radiological shadows in a tertiary care centre.

Secondary objective: What are the characteristics of radiological shadows which indicate that it could be tuberculosis.

Study design: Prospective study

Study setting: Department of pulmonary Medicine, Govt. Medical College, Thiruvananthapuram

Methodology: A total of 398 patients with sputum AFB negative and x-ray chest shows radiological lesions were investigated and treated with antibiotic. Then further investigated and grouped into different diagnosis. The non diagnosed cases with radiological lesion were subjected for Cat 1 ATT and the response is observed and proportion of smear negative tuberculosis cases were assessed.

Conclusion: Patients above the age of 40 and male population were at risk of smear negative pulmonary tuberculosis. Comorbidities like diabetes COPD and risk factors like smoking were significant factors associated with pulmonary tuberculosis. Proportion of pulmonary tuberculosis in smear negative patients with suggestive radiological shadow in a tertiary care centre was 41%. characteristics of radiological shadows which indicate that it could be tuberculosis.

Keywords: Proportion, pulmonary tuberculosis, smear negative radiological lesions.

Introduction

Tuberculosis is an infectious disease caused by mycobacterium tuberculosis, which may affect the lung, but it can also affect other part of the body. It is the most common cause of death due to a

single infectious agent in adults and accounts for over a quarter of the avoidable death worldwide.¹ It is a leading cause of death among women of reproductive age, surpassing all cause of maternal mortality.² About one third of the global

population is infected with mycobacterium tuberculosis and every year there are 8 million new cases of tuberculosis and nearly 3 million death due to tuberculosis.^{3,4} In March 1993, WHO declared tuberculosis as a global emergency.⁵ Hippocrates describes tuberculosis as an almost always fatal disease of lung^{6,7}. Mycobacterium has been demonstrated microscopically in a mummy of a child of about 5 years of age.⁸ In March 24th of 1882 Robert Koch announced the discovery of tubercle bacilli and published a paper "Reports of the Imperial Health Office".⁹ In 1905 he was awarded a Nobel prize for his contribution in the field of tuberculosis research.¹⁰

About 50% of patient will be smear positive and others are negative. When it is smear negative the diagnosis is difficult. So understanding the proportion of pulmonary tuberculosis in smear negative cases and treatment with Cat 1 ATT will help in early diagnosis and treatment which reduce or prevent mortality and morbidity due to pulmonary tuberculosis.^{11,12}

Aim and Objectives

Primary Objective: To find out the proportion of pulmonary tuberculosis in smear negative patients with suggestive radiological shadows in a tertiary care centre.

Secondary objective: What are the characteristics of radiological shadows which indicate that it could be tuberculosis.

Materials and Methods

Study Design: Prospective study

Study period: June 2001 to September 2003

Study setting: Department of pulmonary Medicine, Govt. Medical College, Thiruvananthapuram

Study population: All patients presenting with fever, cough, hemoptysis, chest pain, loss of weight, loss of appetite and sputum smear AFT negative, with X-ray chest suggestive of pulmonary tuberculosis attending the department of pulmonary medicine, Govt. Medical College, Thiruvananthapuram.

Inclusion Criteria

All patients during the study period with symptoms suggestive of pulmonary tuberculosis in which the smear is negative for AFT and X-ray chest suggestive of pulmonary tuberculosis were included in the study after obtaining informed consent.

Exclusion Criteria

Sputum AFT positive cases with X-ray lesions suggestive of pulmonary tuberculosis, history of previous ATT, pleural effusion etc.

The severity of X-ray chest lesions were categorized based on the ATS Guidelines for radiological extent of disease, into minimal lesions, moderately advanced and far advanced.

Methods

This a prospective observational study conducted in the department of pulmonary medicine, Govt. Medical College, Thiruvananthapuram. All cases of smear negative and x-ray lesions suggestive of pulmonary tuberculosis cases were included in the study. All patients were subjected for detailed evaluation like blood and urine examination gram staining, sputum culture, sputum cytology, blood culture etc. All patients were started on broad spectrum antibiotic and observed. If there is clearance, it is diagnostic of community acquired pneumonia. If no response these patients were subjected for further investigations like Mantoux test, FNAC, CT/HRCT, US guided biopsy, CT guided biopsy, bronchoscopy etc. and other special investigations suitable of the clinical case. Based on the investigation, diagnosis was established (For eg. Pneumonia, malignancy, lung abscess, bronchiectasis etc.). All the other undiagnosed suspected smear negative pulmonary tuberculosis cases were subjected for category 1 ATT for 6 months and the outcome is assessed.

Observations and Results

The total number of patients with radiologic lesions suggestive of pulmonary tuberculosis included in this study were 398.

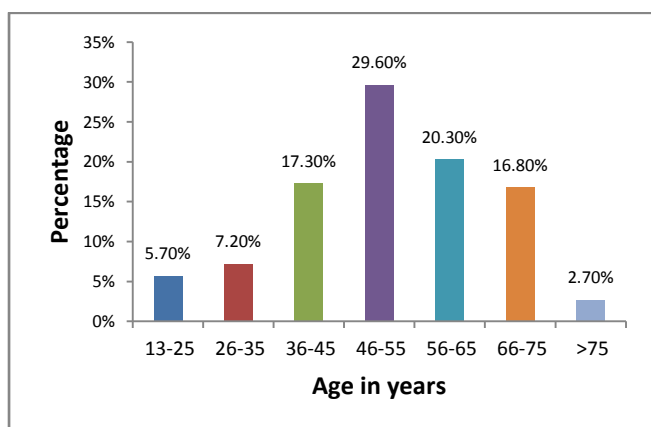
Sex distribution

Sex	Number	Percent
Male	306	76.8
Female	92	23.1
Total	398	100

Majority of patients belongs to male group.

Age distribution

Age in years	Number	Percent
13-25	23	5.7
26-35	29	7.2
36-45	69	17.3
46-55	118	29.6
56-65	81	20.3
66-75	67	16.8
>75	11	2.7
Total	398	100



Maximum patients were in the age group between 46 and 55 followed by the age group between 56 and 65. There are only 2.7% patients above the level of 75 years.

Outcome of total patients evaluated in the initial phase of the study

Diagnosis	Number	Percent
Diagnosed cases	211	53%
Undiagnosed cases	187	47%
Total	398	100%

Distribution of diagnosed cases

Diagnosis	Number	Percent
Pneumonia	79	19.85
Malignancy	74	18.59
Bronchiectasis	26	6.53
Lung abscess	12	3.02
ILD	5	1.26
Other diagnosis	15	3.77
Undiagnosed	187	46.98
Total	398	100

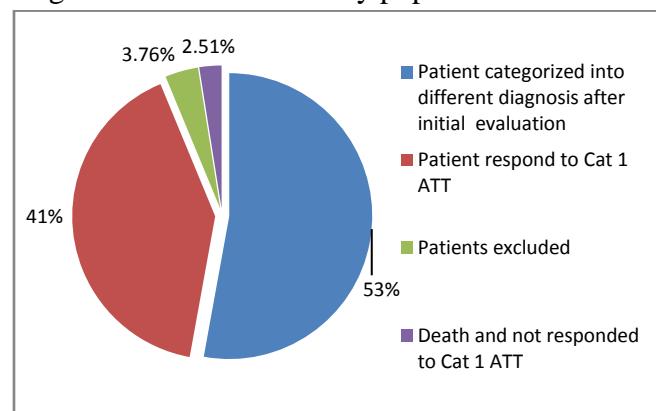
Distribution of outcome of patients started on Cat 1 ATT

Patient group	Number	Percent
Responded to chemotherapy	162	86.6
Death and not responded	10	5.3
Discontinued	8	4.2
Lost follow up	7	3.7
Total	187	100

Distribution of total outcome

Patient group	Number	Percent
Patient categorized into different diagnosis after initial evaluation	211	53
Patient respond to Cat 1 ATT	162	41
Patients excluded	15	3.76
Death and not responded to Cat 1 ATT	10	2.51
Total	398	100

Distribution of Tuberculosis and nontuberculosis diagnosed cases in the study population



211 (53%) of patients were categorized into various diagnosis after initial evaluation. 162 (41%) responded to category 1 ATT. 15 (3.76%) excluded, 10 (2.51%) were in the death and not responded to Cat 1 ATT group.

Discussion

In this prospective study 398 patients were investigated in detail for diagnosis. Sex distribution includes 306 (76.8%) males and 92 (23.1%) females. Patients were distributed into 7 age groups with minimum age of 13 years and a maximum age >75 years. After initial evaluation and diagnosis, 211 (53%) of patients were categorized into different diagnosis. This includes Pneumonia 79 (19.8%), Malignancy 74 (18.5%),

Bronchiectasis 26 (6.5%), Lung abscess 12 (3.0%), interstitial lung disease 5 (1.2%) and other diagnosis 15 (3.7%). Other diagnosis includes sarcoidosis, Wegener's, pneumoconiosis etc.

The undiagnosed 187 (47%) patients were started on Cat 1 ATT and continued for 6 months. Out of this, 162 (41%) patients responded to ATT and completely cured. 15 (3.7%) patients discontinued ATT and lost follow up. 8 patients died and 2 patients were remaining undiagnosed.

In the nontubercular diagnosis group pneumonia and malignancy were the two major groups of conditions followed by Bronchiectasis. Out of 74 malignancy cases 64 (86.48%) were males and 10 (13.5%) were females. Regarding the method of diagnosis of malignancy FNAC/Excision biopsy in 33 (44.6%) patients. CT guided biopsy in 19 (25.6%) patients, Bronchoscopy in 13 (17.5%) patients and cytology in 9 (12.16%) patients. Feinsilver SH et al reported that approximately 8% of bronchoscopies were done specially to evaluate patient with non resolving pneumonia. But in our study out of 398 cases 74 were malignancies and 13 (3.2%) patients were diagnosed via bronchoscopy.¹³

Out of 162 diagnosed cases of tuberculosis, 129 (79.6%) were males and 33 (20.4%) were females and majority of patients belonged to age group between 46 and 75 years. In our study 71% of patients belong to this age group. Low immune status associated smoking, diabetes mellitus and COPD may be the cause for this. The comorbidities include diabetes in 29 (17.9%) and COPD in 52 (32%) and risk factor like smoking in 113 (69.7%) patients.

Outcome of our study is almost similar to another study conducted on our department in 2008 and published in JAPI 2012 which shows that tuberculosis was the common cause of non resolving pneumonia (35.7%). Age was above 40 years, comorbidities like diabetes, COPD and risk factors like smoking and alcoholism were the commonest cause in this study¹⁴. Jaysa, Johnson WG et al in his study showed that common conditions associated with delayed resolutions are

advanced age COPD and alcoholism.¹⁵ Regarding the severity of radiological lesion in tuberculosis group includes minimum lesion in 33 (20.3%), moderately advanced in 78 (48.1%) and far advanced in 51 (31.4%) of patients.

In tuberculosis cases the zone of distribution of x-ray chest lesion was mainly in the upper zone but in diabetic patient it was mainly in the mid zone and lower zone. Regarding the clearance of radiological lesion 116 (72%) patients showed >50% clearance in 2 months followed by 149 (92%) >75% clearance in 4 months and 162 (100%) patients showed >90% clearance in 6 months.

In western literature, study conducted by Arancibia F, Ewigs et al in his study, Antimicrobial treatment failures in patients with community acquired pneumonia, causes and prognostic implications showed a high mortality in non resolving pneumonia.¹⁶ But in our study out of 398 patients only 7 patients died which was a low percentage.

So the proportion of pulmonary tuberculosis in smear negative radiological lesion suggestive pulmonary tuberculosis in the tertiary care centre was 41%.

Conclusion

Patients between the age group of 46 to 75 years and male population were at risk of smear negative pulmonary tuberculosis. Comorbidities like diabetes mellitus, COPD and risk factors like smoking were significant factors associated with pulmonary tuberculosis. Proportion of pulmonary tuberculosis in smear negative patients with suggestive radiological shadow in a tertiary care centre was 41%. Zone of distribution was mainly in the upper zone but in diabetic cases it was mainly on the mid zone and lower zone. The severity of lesion was mainly moderately advanced type but in diabetes it was far advanced.

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