

Pulmonary Tuberculosis Diagnosis Practices

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Abstract

Background: To study pulmonary tuberculosis (TB) diagnosis practices.

Methods: In this cross sectional study, 364 newly diagnosed pulmonary TB patients were included. Patients were categorized into four groups i.e. clinical, radiological, clinical and radiological and definitive pulmonary tuberculosis cases (clinical, radiological and sputum smear examination/mycobacterium TB culture).

Results: Of the 364 patients, 35.1% were diagnosed on clinical and radiological basis, 26.37% in definite way, 20.8% on radiological, and 17.58% on clinical evaluation. Sputum smear examination for Mycobacterium tuberculosis was sought in 85.6% patients, of these 31.9% were positive. In definite cases category, AFB smear were positive in 95.8% patients (p value <0.0000001) as compared to other three categories clinical 9.4%, radiological 0% and clinical and radiological 3.2%.

Conclusion: Diagnosis of pulmonary TB is most frequently based on clinical and radiological features rather than results of microbiological evaluation.

Key Words: Tuberculosis, Pulmonary, Diagnosis.

Introduction

Tuberculosis (TB) is a common disease in developing countries. ¹ About 2 billion persons are affected by TB that equals to one third of the World's population. ² Pakistan ranks 5th amongst the countries with highest burden of TB in the World. According to the World Health Organization (WHO), the incidence of TB in Pakistan is 181/100,000 population which corresponds with 272,000 new cases every year. ³

Prompt management of TB cases that includes guideline based diagnosis and treatment, is required to reverse rising global burden of TB.⁴ Early case detection is critical component of TB control. Modalities for TB diagnosis have improved a lot with availability of accurate and rapid tests. Sputum smear and mycobacterium culture remain the most widely used diagnostic tools for pulmonary TB.⁵

Deficiencies have been noted in Pakistani doctor's knowledge about diagnosis and treatment of TB. In Pakistani scenario among the government run health care facilities, teaching hospitals are considered as better provider of health care. Even in these hospitals doctor's knowledge regarding TB management has not been found up to mark.⁶ Diagnosis of pulmonary TB in Pakistani scenario can be based on one or more of clinical, radiological, and microbiological evaluations. Going through and reviewing practices concerning a particular problem is important method of improvement.

Patients and Methods

This cross sectional study was conducted at Department of Medicine, Holy Family Hospital/Rawalpindi Medical College, Rawalpindi. Samples size of 362 was calculated with 95% confidence level based on a Pakistani study in which only 38% of teaching hospital interns considered sputum smears for acid fast bacilli (AFB) as the best test for diagnosis of pulmonary TB.⁶

Adult patients of either gender receiving anti tuberculosis therapy (ATT) for pulmonary TB within one month of starting therapy were inducted consecutively after taking informed consent. Patients receiving ATT for non pulmonary TB, and who had been treated for TB earlier were excluded. Detailed review of clinical scenario and investigations were done in order to note how diagnosis of pulmonary TB was made in each patient.

Based on the way diagnosis of TB was made, patients were categorized in clinical (fever, cough, and sputum; symptom based diagnosis), radiological (pulmonary opacities/cavitations suggestive of TB on chest X ray), clinical plus radiological, and standard pulmonary TB diagnosis groups (clinical and or radiological suspicion of pulmonary TB supplemented by microbiological evaluation i.e. sputum smear for AFB positive on Zeihl Nelson staining or positive AFB culture). Chi² was used to calculate statistically significant association between diagnostic basis and results of sputum smear examination for AFB.

Results

Of the 364 study participants 199 (54.7%) were male and 165 (45.3%) females. Mean patient age was 36.29 ± 15.22 years. Sputum smear was sought in 310 (85.1%) patients. Of these 99 (31.9%) were positive for AFBs. Sputum culture for AFB was sought in 28 (7.7%) patients. It was positive in 4(14.2%) of these patients. Most frequently diagnosis of TB was based on clinical and radiological features(Table 1). In definite cases category AFB smear were positive in 95.8% patients (Table 2). AFB culture was sought in 8 of the definite cases group and was positive in 4 (50%).

Table 1: Diagnostic basis of Tuberculosis

	N	%
Clinical	64	17.58%
Radiological	76	20.8
Clinical and radiological	128	35.1%
Definite cases*	96	26.37%

*Clinical, radiological and sputum smear examination/mycobacterium TB culture

Table 2: Results of sputum smear examination for AFB

	AFB Positive	AFB Negative	p value
Clinical	6 (9.4%)	58 (90.6%)	<0.0000001
Radiological	0 (0%)	76 (100%)	
Clinical and radiological	4 (3.13%)	124 (96.87%)	
Definite cases	92 (95.8%)	4 (4.16%)	

Discussion

Present study revealed that diagnosis of pulmonary TB in our patients was most frequently based on clinical and radiological findings. A definite diagnosis , i.e., Clinical, radiological and sputum smear examination/mycobacterium TB culture , was made in 26.37%. In 95.8% of the patients diagnosed in standard way sputum AFB smear were positive, and sputum smear for AFB whenever performed in patients not diagnosed in standard way were negative in >90% instances.

In developing countries persistent symptoms like cough, fever, sputum, haemoptysis, and loss of weight are considered suggestive of pulmonary TB especially if these are persistent.⁷ As TB is a gradually progressive disease, many of the above mentioned symptoms may not be there unless pulmonary damage becomes extensive. Dependence on symptoms for

diagnosis of pulmonary TB may thus be deceptive.⁸ Infiltrates in upper zones, cavitation, and miliary mottling are considered important radiological features of pulmonary TB.^{7,9} Variable results have been noted in studies regarding radiological feature based pulmonary TB diagnosis. On one hand it has been shown that radiological features in patients with clinical symptoms of pulmonary TB are comparable with results of sputum smear examination and AFB culture sensitivity.^{10,11} On the other hand, it has also been noted that radiological features may not have high specificity compared to sputum smear examination.¹² In our patients, ATT was prescribed most frequently keeping in mind clinical and radiological features.

Examination of sputum smear for AFB is considered gold standard for diagnosis of pulmonary TB patients. It is however positive in 50-60% patients.^[13] Sensitivity of sputum smear examination done in standard way is 45-83% and specificity around 98%.⁸ Sputum smears were sought in 85.7% of study patients. Reasons for not seeking sputum smear in all patients include certainness about the diagnosis based on clinical, radiological, and other laboratory parameters, and lack of knowledge.^{6,9,14}

Statistically significant association was noted between sputum smear results and the way diagnosis of pulmonary TB was made. Interestingly sputum smear examinations were positive in majority of patients diagnosed in definite way, and negative in majority of patients diagnosed in other way whenever it was sought. The diagnosis of pulmonary TB in patients not diagnosed in standard way thus becomes questionable. ATT prescription in these patients can be associated with problems like ATT induced hepatitis leading to increased morbidity. In this context it is interesting to note that in patients diagnosed in non standard way, further attempts to microbiologically confirm diagnosis by concentrated sputum specimens and bronchoscopy for washings collection etc were not done.

Interestingly AFB cultures were positive in 50% (n=4) of the patients diagnosed by standard reference method. Ideally all of these should have been culture positive. Detection of dead AFBs by sputum examination seems responsible for the disparity. Diagnosis based on clinical acumen or radiological findings in our scenario is made with consideration that sputum microscopy can be inconclusive due to deficient laboratory facilities and lack of interest by over burdened laboratory staff in public sector hospitals. Not taking sputum samples in

standard way and lack of sputum liquefaction and concentration techniques which improves detection of AFB in sputum smear negative patients are also considered important in the same context.^{15,16} More costly and less easily available investigations like QuantiFERON-TB Gold, In-Tube (QFT-IT) test, PCR and bronchoscopy are advocated thus.¹⁷⁻¹⁹ Yield of sputum smear examination in our patients was 95.8%, making it the best diagnostic test for pulmonary TB in our scenario. Outcome evaluation in patients undergoing therapy for TB diagnosed in non standard way can better decide regarding efficacy of such approach.

Conclusion

1. Pulmonary TB diagnosis is frequently based on clinical and radiological features.
2. Minority (26.37%) are diagnosed in standard way based on microbiological evaluation i.e., AFB staining and AFB culture sensitivity.
3. In most (95.8%) of patients diagnosed in standard way microbiological evaluation is positive.

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