

Role of Fiberoptic Bronchoscopy in Sputum Smear Negative Pulmonary Tuberculosis

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Abstract

Introduction: The microscopic examination of sputum for acid-fast bacilli is the method of choice in patients of pulmonary tuberculosis. The sputum for acid-fast bacilli can be negative in cases of paucibacillary disease as well as immune suppression. Therefore, Fiberoptic Bronchoscopy (FOB) helps in providing confirmative diagnosis in such patients.

Aim: To assess the role of FOB in diagnosis of smear negative pulmonary tuberculosis.

Materials and methods: This study was conducted on 279 patients who all had 3 sputum smear samples negative for acid-fast bacilli by Ziehl-Neelsen stain but the clinical and radiological findings were suggestive of pulmonary tuberculosis. All these patients were subjected to Post FOB sputum and BAL.

Results: Out of a total 279 specimens examined, 63 (22.58%) were positive for acid-fast bacilli.

Conclusion: Fiberoptic bronchoscopy is a reliable and useful procedure to establish the diagnosis of Pulmonary Tuberculosis when sputum smear is negative for acid-fast bacilli.

keywords: Acid-fast bacilli, Bronchoalveolar Lavage, Pulmonary Tuberculosis, Ziehl-Neelsen stain

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I. Introduction

Tuberculosis is a major health problem worldwide with variable clinical presentations. Pulmonary Tuberculosis is the commonest form and needs prompt diagnosis and treatment. Though cosmopolitan in distribution, it has traditionally been a disease of the developing world. India reports the highest number of patients in the world and accounts for almost a quarter of annual global burden of the disease. The prevalence of Tuberculosis in our country was around 25 lakhs in 2015[1,2,4-8]. In the year 2006, nearly 1.4 million patients were registered for treatment of Tuberculosis, out of which 28.7% were sputum smear negative. Sputum smear microscopy to detect acid-fast bacilli is a rapid, inexpensive and highly specific tool to identify persons with active pulmonary tuberculosis.[9] However many patients fail to produce sputum and even amongst those who produce it, may remain smear negative despite having clinical and radiological findings suggestive of pulmonary tuberculosis. Most of the TB centers report Mycobacterium bacilli in only 16 to 50% cases. Therefore, new methods are being tested for early detection of Tuberculosis. The Interferon Gamma Release Assay (IGRA) test is preferred nowadays over Mantoux Tuberculin Skin test (TST). A positive IGRA and TST tests suggest that patient is infected with tuberculosis (latent tuberculosis). To diagnose Tuberculosis, an additional confirmatory test is required. The Quantiferon-TB Gold in Tube Test (QFT-GIT) has been tried in many large health care institutions but with a high false positive rate. It is a known fact that timely detection and treatment of pulmonary tuberculosis arrests the spread, progression and death from the disease. The absence of a reliable serological test and the long waiting time of culture methods have prompted many physicians to attempt bronchoscopy in smear negative cases of pulmonary tuberculosis. The Fiber-Optic Bronchoscopy (FOB) is an outdoor procedure and patient is discharged after a few hours of observation. Some of the known side effects associated with FOB include bleeding, infection, myocardial infarction, pneumothorax, hemorrhage, infection and cardiac arrhythmia and lung collapse if airway is injured during the procedure. Keeping the encouraging results of the FOB in mind, the present study was conducted and aimed to assess the role of FOB in diagnosis of smear negative pulmonary tuberculosis.

II. Materials And Methods

This **retrospective study** approved by institutional ethics committee was conducted in the Department of Pulmonary Medicine, Government Medical College, Patiala over a period from January 2010 to December 2011. The study involved 279 patients who had clinical and radiological findings suggestive of pulmonary tuberculosis. All patients had 3 sputum smear samples negative for acid-fast bacilli by Ziehl-Neelsen stain. Prior to the procedure an informed consent was obtained from all the patients. Patients with contraindications to bronchoscopy such as coagulation disorders, thrombocytopenia, uremia, single lung and severe pulmonary hypertension were excluded. The procedure was carried out effectively with the patient nil per orally for 4 to 6 hours. Nebulisation was done with 2% xylocaine via nebulizer. Bronchoscopy was carried out under local anesthesia via olympus bronchoscope. After inspection of bronchial tree, Bronchoalveolar lavage (BAL) was done with 20 ml of normal saline at the end of bronchoscopy in the region suspected for lesion based on chest radiography. After the procedure, patient was observed for development of pneumothorax, haemorrhage, infection and cardiac arrhythmias for 24-48 hours. The sputum sample after bronchoscopy (Post FOB sputum) and next day early morning sputum sample was collected and sent for analysis. Proper disinfection of the bronchoscope in between use was mandatory.

III. Results

Fiberoptic Bronchoscopy was performed in 279 sputum smear negative patients, 168 men (60.2%) and 111 women (39.8%); the mean age was 49 years with range of 18 to 80 years. Total yield of bronchoscopy in diagnosis of sputum smear pulmonary tuberculosis was 22.58% (63/279).

IV. Discussion

In patients of pulmonary tuberculosis, microscopic examination of sputum for acid-fast bacilli is the method of choice. But sometimes sputum smear is negative for acid-fast bacilli or patient is unable to produce sputum even when the diagnosis of pulmonary tuberculosis is likely both clinically as well as radiologically. As early detection and treatment is the goal to arrest tuberculosis, FOB and BAL are increasingly being employed for the same.[2,3,10] Many researchers have also suggested the early use of these modalities in pulmonary tuberculosis(11,12)In our study, we had selected 279 patients with sputum smear negative on three occasions, out of which 168 were males and 111 were females. The FOB successfully diagnosed 22.58 % (63/279) cases of sputum smear pulmonary tuberculosis. Yuksekol et al conducted a study on sputum smear-negative patients and observed positive results in both BAL smears (23%) and culture for *M. tuberculosis* (50%). The findings of ZN positive BAL smears are in accordance with our findings. They concluded that FOB is useful and mandatory in the selected patients.[13]Kamal et al reported FOB and BAL as valuable methods to detect pulmonary tuberculosis and other lung pathologies.[14] Some researchers also observed that if post bronchoscopy sputum culture and transbronchial biopsy are performed in addition to BAL examination, there is a rise in the sensitivity and specificity.[15,16] Tamura et al established the usefulness of FOB in pre bronchoscopy negative sputum specimen that were Acid Fast Bacilli and PCR. These researchers also supported the role of FOB for quick and definite diagnosis of PTB. The FOB is associated with a low complication rate and the chances of post bronchoscopic hospitalization are also less. No such complications were observed in our study.

V. Conclusion

The study concluded that Fiberoptic bronchoscopy is a reliable and useful procedure to establish the diagnosis of pulmonary tuberculosis when sputum smear is negative for acid-fast bacilli and therefore, treatment in such cases can be started confidently.

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