



Evaluation of The Role of Bronchial Washings in The Diagnosis of Sputum Smear Negative Pulmonary Tuberculosis

KEYWORDS

Sputum smear negative Pulmonary tuberculosis, Fiberoptic Bronchoscopy, Bronchial washing.

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ABSTRACT *In a tertiary-care hospital, 315 chest symptomatics with x-ray findings suggestive of pulmonary tuberculosis were subjected to flexible fiberoptic bronchoscopy (FOB). Bronchial washings obtained, were examined by microscopy and culture. Mycobacterium species were detected only in 13 specimens (4.15%). The results suggests that there is a need for further research on usefulness of bronchoscopy in TB diagnosis in resource-limited settings.*

Introduction

Tuberculosis is one of the greatest killers of all times. India accounts for one-fifth of the global incidence of tuberculosis and stands 17th among 22 high burden countries. In 2013, an estimated 9 million people developed TB and 1.5 million died from the disease, including 3,60,000 deaths among HIV positive people. ¹ If not treated every source case infects 10-15 other individuals each year.²

The main diagnostic tools available for diagnosis of pulmonary tuberculosis are microscopy, culture and molecular methods. In tuberculosis bacteriology, an often overlooked problem is that of obtaining satisfactory specimens. Accuracy of the laboratory reports is directly dependent on the quality of specimen submitted.

In order to improve the sensitivity of microscopy and culture, better sampling techniques are to be adopted. Sputum induction using saline aerosols can be done for patients who cannot bring out good quality sputum. In this procedure the cough produced may be difficult to control and also hypertonic saline may trigger severe bronchospasm on patients with severe asthma or on patients actively wheezing.³

In most of the tuberculosis centers, even after meticulous search, the bacteriological positive yield from sputum is low and large proportion remain negative in spite of clinical profile and radiological lesions being consistent with diagnosis of pulmonary tuberculosis. Early diagnosis of pulmonary tuberculosis prevents progression of disease, morbidity, spread of disease and permanent damage by fibrosis. Culture of sputum for acid fast bacilli (AFB) takes long time and a reliable serological test is not yet available. In such a situation, bronchoscopy has been tried for rapid diagnosis of tuberculosis in smear negative cases.

The usefulness of bronchoscopy in diagnosis of pulmonary tuberculosis (PT) has been demonstrated by many workers after 1980's. The advantages of bronchoscopy are that the physician can see abnormalities, like inflammation or bleeding that don't show up well on X-rays. Also, fluid can be removed directly from the lungs, thus minimizing contamination with oral secretions.

In this study, we have explored the use of Bronchial washings in the diagnosis of sputum smear negative pulmonary tuberculosis.

Materials and methods

Study subjects:

- All patients, aged more than 15 years, with chronic cough for more than 3 weeks, who were negative for Acid fast bacilli (AFB) on sputum smear stained by Ziehl-Neelsen technique.
- Patients suspected to have pulmonary tuberculosis (TB) on clinical grounds; raised ESR and X-ray chest showing pulmonary infiltrates, with or without cough.

Standard patient preparations for bronchoscopy were done and bronchial washings obtained were sent for microscopy and culture for tubercle bacilli in sterile containers.

The samples received were subjected to digestion, decontamination and concentration process by Petroff's method and inoculated onto Lowenstein Jensen media based on standard culture methods for Mycobacterium tuberculosis.

Results

The study was conducted in the Department of Microbiology, Government Medical College, Ernakulam. 315 patients with suspected pulmonary tuberculosis were enrolled for the study.

Of the 315 bronchial washings processed, Mycobacterium species were detected only in 13 specimens (4.15%). From BAL smear alone, 5 were found positive for AFB. 7 patients turned positive in BAL culture for AFB. Only one among the total 13 positives was positive for both smear and culture. The remaining 302 were found negative for AFB in BAL.

Discussion

Patients with a negative sputum smear present a dilemma (to treat or not to treat for tuberculosis) to chest physicians. It has been reported that 74% of such patients progress to active tuberculosis within five years, if left untreated. ⁴ For confirming the diagnosis in sputum smear negative pulmonary tuberculosis cases, fiberoptic bronchoscopy specimens (washings, brushes and biopsies) and post-bronchoscopy sputum examination have been used. Fiberoptic bronchoscopy allows bronchial secretions and washings to be collected from the most likely site of infection under direct vision.

Routinely submitting all bronchoscopic specimens for

smear and culture examination for bacteria including Mycobacteria has been practiced in several centers world over. However, the value of this practice has been poorly defined.

In this study, the positivity rate from bronchial wash smear and/or culture was 4.15%, which is comparable with the study conducted by Wallace et al (1981) ⁵ and less when compared to the study conducted by Sharma et al (2014) which yielded a positivity of 8.82%. ⁶ In a study conducted by Jayachandra et al, examination of bronchoscopic specimens like bronchial aspirate and brush smear and post-bronchoscopy sputum together had a positive yield of 48%. ⁷

Sputum smear negative pulmonary tuberculosis is a paucibacillary condition and the dilution of epithelial lining fluid by the instilled saline might be responsible for the low yield from bronchial washings. In addition, the local anesthetic used for bronchoscopy might have also suppressed the growth of *M. tuberculosis*. It has been shown that when two millilitres of xylocaine was used, the bronchial aspirate could contain up to 1% lignocaine ⁸ and that most strains of *M. tuberculosis* are inhibited by a concentration of 0.5 percent. ⁹

Hence, there is a need for further research on the feasibility and cost-effectiveness of bronchoscopy for TB diagnosis in resource-limited settings before it can be recommended as a useful tool.

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