

## Original Research

# To Evaluate The Role Of Fiberoptic Bronchoscopy In Sputum Negative For Pulmonary Tuberculosis

<sup>1</sup>Dr. Vijay Kumar, <sup>2</sup>Dr. Anshul Jain

<sup>1</sup>Assistant Professor, Department of Tuberculosis and Respiratory Diseases, RKDF Medical College and Research Centre, Bhopal, India

<sup>2</sup>DNB General Medicine (PD Hinduja National Hospital and Medical Research Centre, Mumbai), Senior Medical Officer, Gandhi Medical College, Bhopal, India

## Corresponding Author

Dr. Anshul Jain

DNB General Medicine (PD Hinduja National Hospital and Medical Research Centre, Mumbai), Senior Medical Officer, Gandhi Medical College, Bhopal, India

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## ABSTRACT

**Introduction:** Tuberculosis (TB) is a noteworthy medical issue far and wide, with a rough frequency of 9.4 million (8.9– 9.9 million) and with around 1.7 million TB-related passing deaths in 2009. determination of active PTB is over and over again late on the grounds that less than half of these patients have a positive sputum smear and isolation of Mycobacterium tuberculosis (MTB) takes quite a while. **Aim of the study:** Comparative study to detect the role of fiberoptic Bronchoscopy in sputum negative for pulmonary tuberculosis. **Material and Methods:** This study will be conducted as a prospective cohort study, Patient seeking medical attention at Sri aurobindo medical college and Post Graduate institute, Hospital, during the period of study from August 2016 to May 2018. Descriptive statistics was used to show the characteristics of the collected sample. T-Test was used for quantitative measurement and for qualitative measurement Chi-square test applied. **Results:** Total 121 cases among 46 female and 75 males with no previous history of tuberculosis (fresh cases) ranging from 16 to 90 year of age and 24 to 73 kg of weight (mean of 46.19) were included, Maximum cases belonged to the age group of 46-55 yr of age (26) followed by 56-65 yr and more than 65 of age. **Conclusion:** This study enhance that FOB can give superb material to finding of associated cases with when smears of expectorated sputum don't uncover mycobacteria. Henceforth there is have to figure guidelines which are now undertaken in consideration where the respiratory doctor can make a complete conclusion without expanding the quantity of pointless treatment in new sputum negative tuberculosis patients.

**Keywords:** fiberoptic, Bronchoscopy, sputum, pulmonary tuberculosis

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## INTRODUCTION

Tuberculosis (TB) is a noteworthy medical issue far and wide, with a rough frequency of 9.4 million (8.9– 9.9 million) and with around 1.7 million TB-related passing deaths in 2009 [1,2]. The worldwide technique to control TB is speedy diagnosis, notification, and fruitful treatment of patients with active, transmissible malady. Early determination of active pulmonary tuberculosis (PTB) is basic for TB control. Unfortunately, determination of active PTB is over and over again late on the grounds that less than half of these patients have a positive sputum smear (29– 39% of every 2009 in Korea) [1,3] and isolation of Mycobacterium tuberculosis (MTB) takes quite a while. AFB smears of respiratory samples (no not exactly no less than two samples) are fundamental for the incite investigation of PTB, anyway AFB smears have poor sensitivity (30– 70%)

notwithstanding high specificity (98– 99%). Mycobacterial cultures are more delicate than AFB smears (80– 85%), yet culture comes about normally require 3– 8 weeks [4]. The conclusion of TB and the choice to begin treatment against sputum spread negative TB is generally subject to clinical highlights, yet 20% of PTB patients are totally asymptomatic though 42– 86% of PTB patients might be symptomatic. Sputum smear negative PTB patients are particularly prone to demonstrate no or mellow respiratory symptoms and systemics manifestation [5] Fiberoptic bronchoscopy can give selective respiratory specimens to diagnosis particularly from particular destinations which were associated by radiological testing for suggested PTB when sputum expectoration has over and over again failed on the grounds that sputum is missing [6,7,8]. FOB is additionally more valuable in the finding of

endobronchial TB, which can be viewed as normal in HRCT, and FOB might be predominant in the differential analysis of tuberculosis with other regularly experienced maladies, for example, pneumonia or lung cancer[9].Regardless of the way that it is more aggressive and generally costly, FOB is viewed as valuable for the determination of sputum smear negative PTB as a result of these focal points and advantages. Delayed consequences of bronchial washing samples with AFB smears or MTB polymerase chain reaction (PCR) and tissue samples from bronchoscopic or transbronchial biopsies are often came within one week, hence empowering quick conclusion before the accessibility of affirmation from sputum culture of sputum smear negative PTB patients. The point of this examination was to assess the diagnostic and analytic estimation of FOB in the conclusion of active PTB in patients suspected with PTB yet giving a negative sputum smear in a TB trouble nation.

## MATERIAL AND METHODS

This study will be conducted as a prospective cohort study, Patient seeking medical attention at Sri Aurobindo medical college and Post Graduate institute, Hospital during the period of study from august 2016 to may 2018 on 121patients.

Inclusion Criteria for the study subjects age 16 years and above both male and female as strong suspect of pulmonary tuberculosis, patients diagnosed with PTB according to clinical and radiological findings who showed no clinical improvement with empirical antibiotics but did show clinico-radiological improvement with anti-tuberculosis medication. All patients giving the written consent for participation in the study by Fibre Optic Bronchoscopy. Cases presented as fresh case but sputum negative for PTB or not able to produce sputum. Those having Sputum AFB smear-positive patients with inconclusive diagnoses due to loss of follow-up. Patient hemodynamically unstable and not fit for FOB and patient not agree for FOB and not giving written consent for participation in study by FOB was excluded from study.

## Equipment

The bronchoscope is a bit of hardware that can be coordinated and moved around the curves in the larynx, trachea, and bronchi. These pictures are transmitted through the bronchoscope either to the eyepiece or a video screen. An open divert in the scope enables different instruments to be gone through it to take tissue samples (biopsies) or to expel fluid.

## Pre-procedure Protocol

- All the patient with strong suspect of pulmonary tuberculosis will be subjected to detailed history and through clinical examination and following investigation will be done.

- CBC
- ESR
- CHEST XRAY
- SPUTUM FOR AFB UNDER DOTS
- FIBER OPTIC BRONCHOSCOPY

## Procedure planned

- After obtaining informed written consent then shift the patient to minor operation theatre, all patients received local anaesthesia following slandered protocol under strict vitals monitoring like B.P, pulse, spo2, R.R, bronchoscopy was done with all aseptic precautions and relevant sample will take for following investigations.
- BAL and Bronchial brushing for Cytology, CBNAAT, AFB, Gram, and c/s. CBNAAT, Histo-pathological examination.

## Data analysis

- Descriptive statistics was used to show the characteristics of the collected sample.
- T-Test was used for quantitative measurement and for qualitative measurement Chi-square test applied.
- P value (probability value) <0.05 was considered significant.

## RESULTS

Total 121 cases among 46 female and 75 males with no previous history of tuberculosis (fresh cases) ranging from 16 to 90 year of age and 24 to 73 kg of weight (mean of 46.19) were included, Maximum cases belonged to the age group of 46-55 yr of age (26) followed by 56-65 yr and more than 65 of age. Descriptive statistics was used to show the characteristics of the collected sample. T-Test was used for quantitative measurement and for qualitative measurement Chi-square test applied. P value (probability value) <0.05 was considered significant. Table 2 shows that CBC outcome as lymphocytic predominance is 1/10 malignant, 27/70 not tuberculosis, 17/40 tuberculosis and as not lymphocytic predominance is 9/10 malignant, 43/70 not tuberculosis, 23/40 tuberculosis. CBC outcome with a Pearson Chi-Square Value = 3.669, 2 degree of freedom, and 'p' value = 0.160 suggesting the findings are statistically significant. ESR shows not raised in 3/11 malignant, 13/70 not tubercular, 5/40 tubercular and ESR raised in 8/10 malignant, 57/70 not tubercular, 35/40 tubercular cases. ESR outcome with a Pearson Chi-Square = 0.983, 2 degree of freedom, 'p' value = 0.612 suggesting the findings are statistically not significant in our study. Chest x-ray finding as cavitory lesion in 7/11 malignant, 25/70 not tubercular, 32/40 tubercular and non-cavitory lesion in 4/10 malignant, 45/70 not tubercular, 8/40 tubercular. Chest x-ray outcome with a Pearson Chi-Square value = 19.545, 2 degree of freedom, 'p' value = 0.001 suggesting the findings are statistically highly significant in our study.

Table 3 shows total 96 histopathological examination of bronchial biopsy findings with reference to final diagnosis are suggesting statistically very highly significant with a Pearson Chi-Square = 101.0, 10 degree of freedom, 'p' value = 0.001. Outcomes in CBNAAT in BAL and Bronchial brushing as 34/40 MTB detected tuberculosis diagnosed cases and 6/40 MTB not detected in tuberculosis diagnosed cases. CBNAAT in BAL and Bronchial brushing with a Pearson Chi-Square = 88.94, 2 degree of freedom, 'p' value = 0.001 suggesting findings are statistically highly significant in our study. AFB in BAL and Bronchial Brushing positive (detected) 9/40 in T.B. diagnosed cases and negative (ND) 29/40 in T.B. diagnose cases. AFB in BAL and Bronchial Brushing

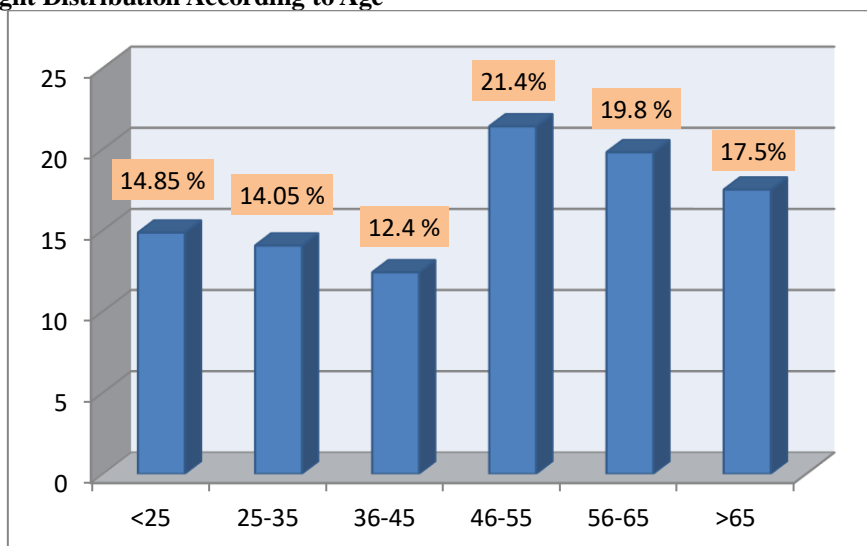
with a Pearson Chi-Square = 24.50, 4 degree of freedom, 'p' value = 0.001 suggesting findings are statistically highly significant in our study. Gram +ve in 10/40, mixed growth in 26/40, no growth in 4/40 and no gram -ve in T.B. diagnose cases. Gram and C/S in BAL and Bronchial Brushing with a Pearson Chi-Square = 15.04, 6 degree of freedom, 'p' value = 0.020 suggesting findings are statistically significant in our study.

Graph 1: 121 cases screened with no previous history of tuberculosis ranging from 16 to 90 year of age (mean of 48.80) and 24 to 73 kg of weight (mean of 46.19) were included, Maximum cases belonged to the age group of 46-55 yr of age (26) followed by 56-65 yr and more than 65 of age.

**Table 1- Shows the Descriptive Statistics**

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	121	16	90	48.80	18.644
Weight	121	24	73	46.19	9.595

**Graph 1: Weight Distribution According to Age**



**Table 2- Shows the patients with CBC, ESR and Chest Xray Diagnosis**

	FINAL RESULT			Total
	MALIGNANT	NOT TUBERCULOSIS	TUBERCULOSIS	
CBC				
LYMPHOCYTIC PREDOMINANT	1	27	17	45
NOT LYMPHOCYTIC PREDOMINANT	10	43	23	76
ESR				
1. NOT RAISED	3	13	5	21
2. RAISED	8	57	35	100
Chest X ray				
CAVITARY LESION	7	25	32	64
NON CAVITARY LESION	4	45	8	57

**Table 3: Shows the histological examination, CBNAAT, AFB & Gram and c/s in bronchial biopsy**

	FINAL RESULT			Total
	MALIGNANT	NOT TUBERCULOSIS	TUBERCULOSIS	
<b>HISTOLOGICAL EXAMINATION IN BRONCHIAL BIOPSY</b>				
INTERSTITIAL PNEUMONITIS	0	1	0	1
MALIGNANT	10	0	0	10
NON-MALIGNANT	1	52	30	83
TUBERCULAR BRONCHITIS	0	0	2	2
<b>CBNAAT</b>				
DETECTED	2	0	34	36
ND	9	70	6	85
<b>AFB</b>				
DETECTED	0	0	9	9
ND	11	70	29	110
NOT AVAILABLE	0	0	2	2
<b>GRAM and C/S</b>				
GRAM - ONLY	0	5	0	5
GRAM + ONLY	2	5	10	17
MIXED	4	43	26	73
NO GROWTH	5	17	4	26

## DISCUSSION

The study titled "To evaluate the role of fiberoptic Bronchoscopy in sputum negative for pulmonary tuberculosis" was conducted at Sri aurobindo medical college and Post Graduate institute, Hospital during the period of study from august 2016 to may 2018.

Wallace et al. (1981) conducted a study to combining stained smear positivity of bronchial washings and histopathology, the finding was built up in 43.4% in our investigation while it was 48 and 50% in the studies led [10]. In this study, we had chosen 121 patients with sputum smear negative on two events, out of which 62% males and 38% females. This was equivalent to the investigation done by Purohit et al. 27 where in the sample measure 70% male and 30% females. Accordingly, the information created in our investigation is tantamount to this study.

Kulpati D S et al. [11] conducted a study Out of 121 the patients in our investigation 92% patients cough, 83% patients cough with expectoration, 60% patients had fever, 30% patients had hemoptysis and 20% patients gave chest discomfort.

Chan H S et al. [12] investigation 42 cases out of 121 (35%) were active smokers, while 40 cases (33%) them stopped smoking for over one year and 24 instances of them(20%) had never smoked.

Kwan Hoi Yee et al. [13] conducted a significant study Amongst the 121 cases, when assessed for history of contact with an instance of pulmonary tuberculosis, 85 cases (70%) were certain. This high rate could be because of high commonness of tuberculosis in India. Malek Mohammad M et al. [14] showed that Bronchoscopic examination uncovered no pathology in 40 (33%) of these patients. Out of 81 patients where bronchoscopy uncovered some pathology, 37 cases (30%) had discharge from the

bronchus, 25 cases (20%) had unfortunate mucosa/granuloma, 8 cases (10%) had outer compression and 8 (10%) have bleeding from bronchus while abnormal growth appreciable just in 5 cases(4%). In our investigation, bronchial lung biopsies were taken from territories of doubt and where attainable in 96 cases, 12 cases (12.5%) showed tuberculosis. A.K. Jaiswal et al [15] announced bronchoscopic guided biopsy for finding of sputum negative tuberculosis to be 10%(2 out of 20 cases) in their examination During our investigation we could diagnose 53 cases out of 121 cases(43.8%) by consolidating all the bronchoscopic supported systems and utilizing BAL and Brushing tests alongside Bronchial biopsy samples. Out of these 53 cases ,42 cases diagnose as tuberculosis, BAL and Brushing tests was the best technique where conclusion was secured in 40 cases (40/42) with an sensitivity of 95.2% taken after by Bronchial biopsy 2 cases (2/42) with an sensitivity of 4.76% for tuberculosis which was comparable to the examination done by de Gracia et al [16], A.A Bachh et al [17] and Chawla et al [18] where sensitivity of 88%, 48.33% and 62% separately. Limitation of the study might be the study was conducted as fresh cases only which didn't had previous history of pulmonary or extra pulmonary tuberculosis and not taken previously Anti- tubercular treatment. Only sputum negative cases included in this study which are sputum smear negative for two occasion or not able to produce sputum. In this study, BAL and Brushing samples and bronchial biopsy not sent for culture which result was delayed as early diagnosis and prompt treatment was targeted for early patients benefits. The study design not included post bronchoscopy sputum sample parameter for

diagnosis. Patient for first 24 hrs only for post procedure airway complications. BAL samples and Bronchial Brushing sample as single parameter and not discriminate between them because both sample process as same and both procedure done in all patients.

### CONCLUSION

Fiberoptic bronchoscope, mucus extractor, 50ml and 20 ml syringe, bronchial brushing catheter, bronchial biopsy catheters, Resuscitation equipment, Sphygmomanometer, ECG and vital monitor, Pulsometer, Equipment's for laryngoscopy & intubation. Standard Anesthesia protocol was followed for all patients. Bronchoscopy was done under all aseptic precautions and took relevant sample for investigation. The financial requirements restrict the vast majority of the underprivileged area of society to attempt this procedure. Henceforth there is have to figure guidelines which are now undertaken in consideration where the respiratory doctor can make a complete conclusion without expanding the quantity of pointless treatment in new sputum negative tuberculosis patients.

### REFERENCE

1. World Health Organization (WHO): Global tuberculosis control. 2011
2. Nair N, Wares F, Sahu S: Tuberculosis in the WHO South-East Asia Region. Bull World Health Organ. 2010, 88: 164-10.2471/BLT.09.073874.
3. Korean National Tuberculosis Association (KNTA): Trend of case notification rate per 100,000 by year, 2004–2010.
4. Foulds J, O'Brien R: New tools for the diagnosis of tuberculosis: the perspective of developing countries. Int J Tuberc Lung Dis. 1998, 2: 778-783
5. Tozkoparan E, Deniz O, Ciftci F, Bozkanat E, Bicak M, Mutlu H, Ors F, Bilgic H, Demirci N: The roles of HRCT and clinical parameters in assessing activity of suspected smearnegative pulmonary tuberculosis. Arch Med Respir. 2005, 36: 166-170. 10.1016/j.arcm.2004.12.010
6. Kanaya AM, Glidden DV, Chambers HF: Identifying pulmonary tuberculosis in patients with negative sputum smear results. Chest. 2001, 120: 349-355. 10.1378/chest.120.2.349.
7. Richeldi L: An Update on the Diagnosis of Tuberculosis Infection. Am J Respir Crit Care Med. 2006, 174: 736-742. 10.1164/rccm.200509-1516PP.
8. Charoenratanakul S, Dejsomritrutai W, Chairasert A: Diagnostic role of fiberoptic bronchoscopy in suspected smear negative pulmonary tuberculosis. Respir Med. 1995, 89: 621-623. 10.1016/0954-6111(95)90231-7.
9. Willcox PA, Benatar SR, Potgieter PD: Use of the flexible fiberoptic bronchoscope in diagnosis of sputum-negative pulmonary tuberculosis. Thorax. 1982, 37: 598-601. 10.1136/thx.37.8.598.
10. Wallace JM, Deutsch AL, Harrell JH, Moser KM. Bronchoscopy and transbronchial biopsy in evaluation of patients with suspected active tuberculosis. Am J Med. 1981; 70: 1189–94.
11. Purohit S.D, Sisodia R.S. et al. Fiberoptic bronchoscopy In Diagnosis of Smear Negative Pulmonary tuberculosis. Lung india 1983;1(4): 143-46.
12. Kshatriya RM, Khara NV, Paliwal R, Patel S. Role of flexible fiber-optic bronchoscopy in the diagnosis of pulmonary diseases in rural-based tertiary hospital. IJMSPH. 2016; 5: 873-76.
13. Chan H.S., Sun A.J. et al. Bronchoscopic aspiration and bronchoalveolar lavage in the diagnosis of sputum smear-negative pulmonary tuberculosis. Lung 1990;168(4): 215-20.
14. Malekmohammad M., Marjani M. et al. Diagnostic yield of post-bronchoscopy sputum smear in pulmonary tuberculosis. Scand J Infect Dis 2012; 44(5): 369-373.
15. Jaiswal A.K., Kulpati D.D. et al. Role of bronchoscopy in early diagnosis of suspected smear negative cases of pulmonary tuberculosis. Ind. J. Tub 1989; 36: 233.
16. Gracia J.de Curull V. et al. Diagnostic value of bronchoalveolar lavage in suspected pulmonary tuberculosis. Chest 1988; 93(2): 329-332.
17. Bachh A.A. Gupta R. et al. Diagnosing sputum smear negative pulmonary tuberculosis: does fiberoptic bronchoscopy play a significant role?. Lung India 2010; 27: 58-62.
18. Chawla R. Pant K. et al. Fiberoptic bronchoscopy in smear negative pulmonary tuberculosis. Eur Respir J 1988; 1: 804-806