

## Original Research Article

# Role of flexible fiberoptic bronchoscopy in diagnosis of indefinite pulmonary infiltrates

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### ABSTRACT

**Background:** Respiratory diseases commonly present and are mostly diagnosed by routine clinical assessment and noninvasive investigations. Bronchoscopy a novel diagnostic tool used in diagnosis of various infectious, inflammatory and neoplastic pulmonary diseases by retrieving samples from bronchial, alveolar and interstitial compartments of patients with lung infiltrates. We prospectively assessed diagnostic utility of bronchoscopy in patients who had respiratory symptoms, radiographic infiltrates and sputum smear is negative for acid-fast bacilli (AFB). Despite, recent technical innovations in bronchoscopy, routine FOB is practiced with high yield and cost effectiveness.

**Methods:** A prospective study was performed in which bronchoscopy was performed in 40 patients between August 2018 and January 2019, who had respiratory symptoms, radiographic findings not consistent with any specific diagnostic entity and had sputum smear negative for AFB.

**Results:** Out of total 40 patients, most 30 (75%) patients were from rural areas, more than half 24 (60%) of the patients were males. Out of total 21 (52%) of patients were current smokers. Most common presenting symptoms were cough 22 (55%) and hemoptysis 8 (20%) followed by fever 6 (15%) and weight loss 4 (10%). Tuberculosis was confirmed in 18 (45%) patients. Non tubercular diseases were diagnosed in 22 (55%). Interstitial lung disease (ILD) was diagnosed in 5 (12.5%), lung cancer in 5%, bronchiectasis in 7.5%, pneumonia in 12.5%, lung abscess in 2.5% and non-specific infection in 15%.

**Conclusions:** Diagnostic utility of flexible bronchoscopy is ever growing and has certainly taken a turn from being a luxury to near necessity today. Its association with trivial complications makes it a safe procedure. Hence bronchoscopy should be considered in the evaluation of patients with respiratory symptoms, indefinite radiographic infiltrates and negative sputum AFB test.

**Keywords:** Acid-fast bacilli, Interstitial lung disease, Fiberoptic bronchoscopy, Tuberculosis

### INTRODUCTION

Fiberoptic bronchoscopy (FOB) is an important diagnostic tool for diagnosis of respiratory ailments. It is a universally accepted procedure for diagnosis of various pulmonary disorders as it helps in careful inspection of

bronchial tree for endobronchial lesion, foreign body and also helps in recovery of deep respiratory secretions, which is useful in diagnosis of uncommon infections, neoplasm and other non infectious causes. FOB not only helps in assessing the disease area but also provides better bacteriological and histological yield thus helping to reach a definite diagnosis.<sup>1</sup>

Today chest physicians deal with patients whose chest roentgenograms (CXR) reveal infiltrates and sputum smears are negative for acid-fast bacilli (AFB) regardless of immune status. In developing countries like ours one must exclude pulmonary tuberculosis (PTB) in such patients though differential includes non-mycobacterial infections, inflammatory and neoplastic etiology too.

For diagnosis of pulmonary tuberculosis RNTCP/WHO recommends an initial approach of detection of AFB in respiratory specimen but there are a few patients where sputum is non-productive here this method has a low sensitivity. Although easy to perform sputum microscopy and culture can be non-conclusive in a significant subset of tubercular patients with sensitivities ranging from 25 to 45%.<sup>2</sup> Nearly half of PTB cases are sputum smear negative for AFB and thus samples other respiratory specimens have an important role in patients not only having occult tuberculosis but also in other conditions that mimic tuberculosis. This study was performed to assess whether fiberoptic bronchoscopy (FOB) can provide any additional diagnostic yield in patients who have respiratory symptoms but are sputum negative for AFB and have indefinite radiographic infiltrates.

## METHODS

This descriptive study (prospective) was performed on patients that presented between August 2018 to January 2019, total 40 patients were included of age 18 years and above with respiratory symptoms and radiographic findings not consistent with any specific diagnostic entity. All patients had at least two sputum reports negative for AFB. Written informed consent was obtained from all eligible participants. Exclusion criteria included previous history of PTB, severe COPD, pregnancy and respiratory or cardiac failure. Complete history and physical examination, complete blood count, coagulation profile, HIV serology and CT chest (when needed) obtained in all patients included in study. Bronchial aspirate was obtained in all patients by wedging the bronchoscope into radiologically most involved pulmonary segment.

As per bronchoscopic findings the tissue material was collected through various procedures i.e. bronchial brushing, bronchial washing/aspirate, Tran's bronchial biopsy (TBB). The specimens were sent for microbiological and histo-pathological examinations. Data collected was compiled into MS Excel spreadsheet. Categorical variables were summarised as number and percentages. Continuous variables were summarised as mean and standard deviation. All statistical analysis was done using EPI Info version 7.2.1.0 statistical software.

## RESULTS

Present study included 40 patients most of the patients 30(75%) were from rural areas of which maximum (60%) were males, mean age was of 45 years (Table 1). 52%

participants were current smokers. Most common presenting symptoms (Table 2) were cough (55%) and hemoptysis (20%) followed by dyspnea (15%), fever (13%) and weight loss (10%).

Final diagnostic profile of patients (Table 3) was tuberculosis was confirmed in 18(45%) patients. Other nontubercular etiologies were diagnosed in 22(55%) and included interstitial lung disease (ILD), lung cancer, bronchiectasis, non-specific pulmonary infection (NSPI) and lung abscess.

In tuberculosis group 5 patients had endobronchial abnormality like endobronchial nodularity, mucosal irregularity and increased secretions in the radiologically affected lung. These patients had tuberculosis confirmed by microscopic examination and culture (in few) or bronchial aspirates in 14 (88%) cases and by bronchial biopsy or TBLB in 2 (12%) patients demonstrating caseating granulomas consistent with tuberculosis. In five patients (12.5%) a diagnosis of ILD was made on the basis of transbronchial lung biopsy (TBLB) and radiological findings in patients.

**Table 1: Demographic features of patients (N=40).**

Features	Number	Percentage (%)
Males	24	60
Females	16	40
Age (Mean)	45	-
Rural	30	75
Urban	10	25

**Table 2: Clinical profile of patients.**

Symptoms	Percentage (%)
Cough	55
Hemoptysis	20
Dyspnea	15
Fever	13
Weight Loss	10

Community acquired pneumonia (CAP) and lung abscess were found in 5 (12.5%) and 1 (2.5%) subjects respectively. There were 6 (15%) patients who did not fit in to any known and specific diagnosis and were labelled as nonspecific pulmonary infection (NSPI) as bronchoscopy and BAL fluid analysis did not reveal any specific etiology and patients improved with broad spectrum antibiotic therapy as there was clinico-radiological improvement. Bronchoscopy was well tolerated by most of the patients with no major complications in study.

Maximum 60% of patients were males, most patients came from rural areas with a mean age of 45. Out of total 40 patients maximum 45% of patients were of tubercular etiology, followed by NSPI 15%, pneumonia and ILD 12.5% each respectively (Table 3).

**Table 3: Final diagnostic profile of patients.**

Disease	Number (N-40)	Percentage (%)
Tuberculosis	18	45
NSPI	6	15
Pneumonia	5	12.5
ILD	5	12.5
Bronchiectasis	3	7.5
Lung Cancer	2	5
Lung Abscess	1	2.5
Total	40	100

## DISCUSSION

With advent of flexible FOB and other accessory instruments that can be inserted through the working channel has extended bronchoscopic exploration to lung periphery. This allows acquisition of biopsy specimen, selective mucosal brushing, and bronchoalveolar washings. Bronchoscopy is currently the primary means for diagnosis lung malignancies. and is a proven pillar in today's evidence based respiratory medicine. BAL based studies have been found to be useful for assessing the lower respiratory tract inflammation and studying the pathogenesis of various lung diseases. Pulmonary tuberculosis is a communicable disease with proven adverse health effects throughout the world.

Nearly 50% of PTB cases are sputum smear negative for AFB and the transmission rate of smear negative TB may be as high as 22%.<sup>3</sup> In endemic countries like India with high prevalence of tuberculosis and a high index of clinical suspicion, anti-tuberculosis therapy is often initiated without further investigations. Ideally any patient with suspected PTB on clinical and radiological grounds requires further investigations to confirm the diagnosis. A study that compared the yield between spontaneous sputum, induced sputum and bronchoscopy in patients with suspected PTB concluded that bronchoscopy had a higher diagnostic yield.<sup>4</sup> In contrast to this two other studies in patients with negative sputum for AFB did not find any additional yield by performing bronchoscopy.<sup>5,6</sup> In terms of higher microscopy and higher culture positivity, various studies have proved a higher diagnostic yield of bronchoscopy over sputum examination.<sup>7-9</sup>

In present study we report diagnostic yield of bronchoscopy in 40 patients who had respiratory symptoms, indeterminate radiographic infiltrates and AFB negative sputum specimens. Our results suggest that bronchoscopy is a useful and largely safe tool in the workup of such patients. Bronchoscopic procedures in the present study (Table 3) confirmed the diagnosis of PTB in 45% patients by BAL and biopsy.

Various different results have been reported regarding the yield of bronchoscopy in diagnosis of PTB which is suggestive of differences in studies having clinical and

radiological picture compatible with TB but a negative sputum smear for AFB usually receive ATT at peripheral hospitals and some private hospitals.<sup>7-10</sup> One may argue in favor of this strategy as it is useful in most cases with the advantage of avoiding an invasive bronchoscopic procedure because smear negative TB is a common problem in clinical practice.

However, our study has exposed a serious limitation of this strategy by diagnosing non-tubercular conditions (Table 3) particularly ILD, lung cancer, NSPI, for which ATT will not only mean toxicity of unnecessary treatment but at the same time patient may be losing the crucial design and the patient population being studied. In the present study like an earlier article by Mohan we have proven clearly the diagnostic utility of bronchoscopy in culture confirmation of TB after negative results on induced-sputum samples.<sup>11</sup>

From our results it is very clear that bronchoscopy and its related procedures including BAL, bronchial biopsy and TBLB have a definite diagnostic role. It not only helps us in precise culture-based diagnosis of mycobacterial pulmonary infection but also in other diseases like pneumonia, lung cancer, interstitial lung diseases, bronchiectasis, lung abscess. In India where prevalence of tuberculosis is high, patients time to final diagnosis of actual disease even if other than TB should be reduced by timely posting the patient with indeterminate pulmonary infiltrates for FOB and subsequently perform needed procedures through it to timely make a correct diagnosis and thereby start patient on disease specific management. Therefore, bronchoscopy and its related procedures should be offered to the patient and the procedure is largely safe.

## CONCLUSION

Routine flexible bronchoscopy techniques have a high diagnostic yield in current clinical practice in common lung conditions. Procedure is definitely more useful in diagnosis when combined with a sound clinical judgment and appropriate supportive investigations. Based on the results author concluded that, bronchoscopy should be considered in evaluation of patients with respiratory symptoms, indeterminate radiographic infiltrates and negative sputum AFB.

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