

**ROLE OF FIBEROPTIC BRONCHOSCOPY IN THE DIAGNOSIS OF VARIOUS RESPIRATORY CONDITIONS IN A TERTIARY CARE CENTRE**Lalit Singh<sup>1</sup>, Apoorv Sinha<sup>2</sup>, Aakanksha Chawla<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: AIM:** To evaluate the role of fiberoptic bronchoscopy in finding out the specific etiology of various respiratory conditions. **MATERIALS AND METHODS:** Fiberoptic bronchoscopy was performed in 70 adult patients who had persistent opacities on chest radiography in the form of collapse, consolidation, hilar mass and cavity with proper antibiotic course of 1 to 3 months. Bronchoscopic aspirates, brushing and biopsy (as and when required) were taken. Patients with known lung malignancy, sputum positive pulmonary TB, recent myocardial infarction, allergic diseases and blood dyscrasias were excluded. **RESULTS:** Fiberoptic bronchoscopy was diagnostic in 50 (71.4%) patients. Bacterial pneumonia was found in 18 (25.72%), malignancy in 15 (21.42%), pulmonary TB in 12 (17.14%), fungal pneumonia in 4 (5.7%) and foreign body in 1 (1.42%) patients respectively. In 20 (28.58%) patients no specific diagnosis was made. **CONCLUSION:** We conclude that fiberoptic bronchoscopy is an extremely useful tool in diagnosing specific etiology of various respiratory conditions.

**KEYWORDS:** Fiberoptic bronchoscopy, foreign body, fungal infection, malignancy, tuberculosis.

**INTRODUCTION:** Fiberoptic bronchoscopy (FOB) is an important entity in the armamentarium of procedures listed in the diagnosis of respiratory diseases. It is a universally accepted procedure both in the diagnosis and therapy of various pulmonary disorders. It allows careful inspection of the tracheobronchial tree for endobronchial lesion and foreign body and also helps in the recovery of deep respiratory secretions, brushing and biopsy, which is useful in the diagnosis of 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 to a definite diagnosis. The present study was undertaken to diagnose various respiratory conditions by FOB.

**MATERIALS AND METHODS:** The present prospective study was carried out on 70 patients from December 2012 to January 2015 at Sri Ram Murti Smarak Institute of Medical Sciences, Bareilly, and Uttar Pradesh. Detailed clinical history, physical examinations and investigations were carried out. Assessment of coagulation profile was done. ECG was done in patients above 35 years of age. All patients were subjected to sputum examination (Acid fast bacilli, Gram staining, culture/sensitivity, KOH staining, malignant cells), chest radiography and haematological examination. Selected patients were advised computerized tomography and ultrasonography of thorax. Patients with persistent opacity on chest radiography, in spite of appropriate antibiotic therapy for 1 to 3 months, and having persistent symptoms like breathlessness, Cough, haemoptysis and chest pain were subjected to fiberoptic bronchoscopy. Written informed consent from all study patients was taken. After premedication, bronchoscopy was performed with flexible FOB (Olympus adult type) through trans-nasal route under topical anesthesia (xylocaine). Some patients required sedation with injection

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midazolam. Oxygenation was monitored during and immediately after procedure with pulse oximetry and oxygen administered to maintain saturation >90 %.

Appropriate samples such as the bronchoscopic aspirate, brushing and biopsy (Whenever necessary) were obtained depending upon the lesion after thorough evaluation of the tracheobronchial tree. Protected specimen brush was not used because of its unavailability in our institute. Samples were subjected to cytology, histopathology and fungal staining. In suspected cases of bacterial pneumonia, initially, Gram stain was performed for identification of the organism which was later confirmed by culture. In all the patients, culture correlated with Gram staining. In clinically suspected cases of fungal pneumonia, sputum for KOH staining was done. Bronchial aspirate was subjected to KOH staining. Due to lack of facilities, fungal culture or identification of fungal species was not done. All the cases of fungal pneumonia were diagnosed on the basis of clinical, radiological presentation and identification of fungal hyphae on KOH staining of bronchial aspirate. Patients with known lung cancer, smear positive pulmonary TB, recent myocardial infarctions and blood dyscrasias were excluded.

**RESULTS:** The total number of patients enrolled in the study were 70, out of which 48 (68.57%) were males and 22 (31.43%) females. Patients between 20-80 years of age were included in the study. There were 6 (8.57%) patients in the age group of 20-30 years, 9 (12.86%) in 31-40 years, 15 (21.43%) in 41-50 years, 26 (37.14%) in 51-60 years, 12 (17.14%) in 61-70 years and 2 (2.86%) patients in 71-80 years age group respectively. Maximum patients belonged to 51-60 years age group i. e., 37.14%.

Out of 70 patients studied, FOB was diagnostic in 50 (71.4%) patients. Bacterial pneumonia was found in 18 (25.72%), malignancy in 15 (21.42%), tuberculosis in 12 (17.14%), fungal infection in 4 (5.72%) and foreign body in 1 (1.42%) patients respectively [Table 1]. In bacterial pneumonia, *Streptococcus pneumoniae* was the commonest organism found in 10 (55.55%) patients followed by *Staphylococcus* in 6 (33.33%) and *Klebsiella* in 2 (11.11%) patients [Table 2]. All patients diagnosed of fungal pneumonia had underlying diabetes mellitus. Radiological examination showed consolidation to be the commonest presentation found in 31 (44.29%), followed by collapse in 15 (21.43%), parahilar mass in 8 (11.43%), consolidation with effusion in 6 (8.57%), cavity in 6 (8.57%) and collapse with effusion in 4 (5.71%) patients respectively [Table 3]. Pneumothorax occurred in 1 (1.4%) patient whereas minor bleeding was observed in 2 (2.8%) cases. The overall complication rate was 4.2%.

Diagnosis	No. of patients (n=50)	Percentage (%)
Bacterial pneumonia	18	36 %
Malignancy	15	30 %
Pulmonary Tuberculosis	12	24 %
Fungal infection	4	8 %
Foreign body	1	2 %

**Table 1: Various Etiological Factors for Non Resolving Pneumonias**

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Organisms	Number (n=18)	Percentage (%)
Pneumococci	10	55.55 %
Staphylococci	6	33.33%
Klebsiella	2	11.11 %

**Table 2: Organisms Causing Bacterial Pneumonia**

Radiological presentation	Number (n=70)	Percentage (%)
Consolidation	31	44.29 %
Collapse	15	21.43 %
Parahilar mass	8	11.43 %
Consolidation with effusion	6	8.57 %
Cavity	6	8.57 %
Collapse with effusion	4	5.71 %

**Table 3: Radiological Presentation in Study Group**

**DISCUSSION:** Development of flexible FOB and various accessory instruments that can be inserted through the working channel has extended bronchoscopic exploration to the lung periphery. The instrument permits acquisition of tissue biopsy specimen, selective mucosal brushing, and bronchio-alveolar washings. The diagnostic yield of FOB is determined by the indication for its use and the skills of the endoscopist as well as the pathologist.<sup>1</sup> Bronchoscopy is currently the primary means for diagnosing pulmonary malignancies.<sup>2</sup>

In the present study, the commonest indication for FOB was persistent opacity on chest radiograph for upto 3 months' time unlike other similar studies by Jindal et al,<sup>3</sup> in which pre-bronchoscopic diagnosis of bronchogenic carcinoma was present in majority of cases and Garg B et al<sup>4</sup> in which suspicion for malignancy was the commonest indication for FOB. We found that FOB was diagnostic in 50 (71.4 %) out of 70 patients whereas in the study conducted by Fein AM et al,<sup>5</sup> FOB was diagnostic in 12 (86%) out of 14 patients. This high yield may be explained by their small study population as compared to the present study.

In our study, bacterial pneumonia was found in 18 (36%) patients and was the commonest etiology. Streptococcus pneumoniae was grown in 10 (55.55%), Staphylococcus in 6 (33.33%) and Klebsiella in 2 (11.11%) patients respectively indicating that even the commonest organisms clear very slowly and require aggressive work up for their diagnosis. Jay et al,<sup>6</sup> found that Streptococcus pneumoniae clears very slowly and takes around 8 to 10 weeks' time. Staphylococcal infection was also common in the present study.

An important concern for the clinician is the timing of evaluation of various lung conditions that do not resolve by appropriate antibiotics. An important cause is lung malignancy, which can manifest in several ways. In the present study, lung malignancy was found in 15 (30 %) patients. This result is similar to the studies performed by Abdul Aziz et al,<sup>7</sup> Hansen et al,<sup>8</sup> and Faber et al<sup>9</sup> who reported neoplasms in 28 %, 31 % and 31 % cases respectively. In contrast to this, Feinsilver SH et al,<sup>5</sup> and Johnson JL et al,<sup>10</sup> found lung carcinoma in 11% patients each on bronchoscopy. This low yield as compared to the present study may be because of the less number of patients enrolled in their studies.

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In this study, pulmonary tuberculosis was found in 12 (24 %) patients. In a retrospective review of patients over 6 years, Baughman et al,<sup>11</sup> observed that bronchoscopy with BAL was a useful tool in the diagnosis of pulmonary tuberculosis. In their study, out of 30 patients whose pre-bronchoscopy sputum specimens were negative for AFB, bronchoscopy specimen were smear positive in 26 (87%) patients. The result of this study is very high as compared to our study. Kenedy et al,<sup>12</sup> further observed that early diagnosis of sputum smear negative pulmonary tuberculosis was possible in 38% patients if bronchoscopy specimens like transbronchial biopsy and post bronchoscopy sputum, in addition to BAL, were studied. Panda et al,<sup>13</sup> reported that immediate diagnosis of pulmonary tuberculosis was possible in 35% of patients using transbronchial biopsy and bronchio-alveolar lavage. But in all these studies, only radiologically suspected cases of pulmonary tuberculosis were included and several bronchoscopic procedures were employed instead of a single procedure.

In the present study, fungal pneumonia was found in 4 patients (8 %). All these patients were diabetic and had multiple cavitory lesions on chest radiography. Lately, fungal infection has become more common in immunocompromised patients like HIV, diabetes mellitus and patients on immunosuppressive drugs and corticosteroids. Kyprianou A et al,<sup>14</sup> in their study found fungal infection in 14% of patients.

Foreign body in the bronchi should be considered when pulmonary infiltrates do not clear with treatment. Retained foreign bodies occur more often in patients with impaired cough and protective airway reflexes. Not all foreign bodies are radio-opaque and bronchoscopy should be considered in the appreciated setting even in a case of normal chest radiograph. In our study, we found foreign body in 1 (2 %) patient.

The complications, pneumothorax and minor bleeding were infrequent occurring in only 4.2 % cases. A similar complication rate was observed by Prasoon et al.<sup>15</sup>

**CONCLUSION:** We conclude that FOB is a useful tool in diagnosing specific etiology of various respiratory conditions not responding to routine treatment. However, if the cause is not evident, further diagnostic workup should be considered.

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