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Pulmonary Medicine

ROLE OF FIBEROPTIC BRONCHOSCOPY IN CONFIRMATION OF DIAGNOSIS IN VARIOUS LUNG CONDITIONS

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ABSTRACT

BACKGROUND: Fiberoptic bronchoscopy is a useful diagnostic tool in management of pulmonary diseases.

OBJECTIVE: Role of Fiberoptic bronchoscopy in confirmation of diagnosis in various lung diseases which are undiagnosed clinico-patho-radiologically.

MATERIALS & METHODS: An institutional based observational study was undertaken with 66 patients to evaluate the role of Fiberoptic bronchoscopy in confirmation of diagnosis in various lung condition. Fiberoptic bronchoscopy was performed in patients who had persistent opacities on chest radiography and who remain undiagnosed clinico-patho-radiologically. All the patients were subjected to fiberoptic bronchoscopy.

RESULTS: Total 66 patients included in the study and were subjected to fiberoptic bronchoscopy. Majority of the patients (25.7%) were from the age group of 51-60 years. Out of 66 patients 47 were male and 19 were females. Total Malignancy detected patients were 19 and in 22 patients Bacterial pneumonia was diagnosed. Foreign body and Fungal Pneumonia were found in 2 patients each. Bronchoscopy remained undiagnosed in 6 patients.

CONCLUSION: FOB is a safe procedure which provides high diagnostic yield at relatively low risk and is also useful in finding specific etiology of various lung conditions not diagnosed on routine investigations.

KEYWORDS : Fiberoptic bronchoscopy, respiratory diseases.

INTRODUCTION:

Fiberoptic bronchoscopy (FOB) is an important entity in the armamentarium of procedures listed in diagnosis of respiratory problems. It is a universally accepted procedure both in the diagnosis and therapy of various pulmonary disorders. This procedure allows careful inspection of the bronchial tree for endobronchial lesion and foreign body and also helps in recovery of deep respiratory secretions, brushing and biopsy, 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[1]. Although tissue biopsy is gold standard for diagnosing neoplastic and paraneoplastic diseases, bronchoscopic technologies are the safest and most accurate tools to evaluate both central and distal airway mucosa [2]. Bronchoscopy is an invaluable diagnostic tool for many lung disorders and a safe procedure with low (0.1–2.5%) morbidity and very low (<0.05%) mortality [3].

Nowadays, endobronchial tuberculosis is a rare occurrence. Cases with sputum smear negative for acid fast bacilli, diagnosis was possible only with Fiberoptic bronchoscopy and bronchial biopsy [4]. In cases of community acquired pneumonia there are no unique radiographic features but Fiberoptic bronchoscopy leads to early diagnosis in such cases which has no resolution after appropriate antibiotics, it can be also useful in diagnosis of atypical pneumonia such as legionnaires' disease [5]. Flexible bronchoscopy can be used safely for wider indications in children [6]. The majority of complications, as expected, occur in patients with high levels of comorbid disease undergoing more extensive therapeutic interventions. Bronchoscopy requires skilled operators and continues to evolve technologically to the advantage of both the physician and the patient [7].

MATERIALS & METHODS:

The present hospital based cross sectional observation study was done in Dr. Panjabrao Deshmukh Memorial Medical College, Amravati, a tertiary care teaching hospital. The study was carried on total 66 patients, to evaluate the role of Fiberoptic bronchoscopy in confirmation of diagnosis in various lung conditions. Fiberoptic bronchoscopy was performed in patients who had persistent opacities on chest radiography and who remain undiagnosed clinico-patho-radiologically. The detailed clinical history, physical examination, and routine investigations and chest X-rays were carried out in all patients.

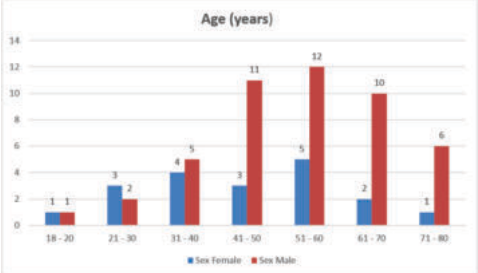
Fiberoptic bronchoscopy was used to examine bronchial tree and obtain- Bronchoalveolar lavage (BAL) fluid for AFB, CBNAAT, Culture sensitivity and gram stain, fungal culture and cytology and when required bronchial brushing and endobronchial biopsy.All subjects had at least 2 sputum smear examination which were negative for acid fast bacilli. The bronchoscopy was performed transnasally using fujinon bronchoscope by 2 bronchoscopists under local anaesthesia. All patients received lignocaine 10% spray to the nose and throat and lignocaine 2% solution to the vocal cords, trachea and bronchi. Between 40 to 120 mg of lignocaine was used for the anaesthesia of bronchial trees.

Premedication with pethidine 50 - 75mg and atropine 0.6mg intramuscularly was given to all the in-patients half an hour before the procedure but not to the out-patients. A thorough examination of bronchial tree was carried out and bronchial aspirate (BA) bronchoalveolar lavage (BAL) bronchial brushing, transbronchial lung biopsy (TBLB) were collected. The specimen obtained was placed on slides for Ziehl-Neelsen stain.

Bronchial biopsy was performed on abnormal looking mucosa and stained with Eosin-hematoxylin and Ziehl-Neelsen stains. After the procedure patients were observed for development of post procedure complications for 24-48hrs. Proper disinfection of bronchoscope in between use was done.

RESULTS:

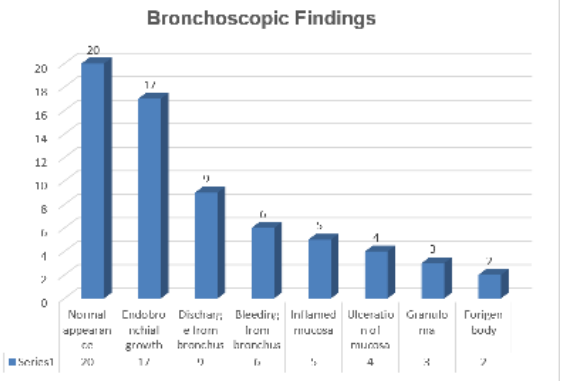
In present study there was male preponderance (71.2%) while female patients constituted 28.7% of the study group. Majority of the patients (25.7%) were from the age group of 51-60 years followed 21.2% from the age group of 41-50 years. (Bar Diag. No.1)



Patients were having multiple complains among which 58 (87.8%) and 38 (57.5%) patients presented with cough and fever respectively. The other symptoms were breathlessness 33 (50%), chest pain 25 (37.8%), haemoptysis 16 (24.2%) and weight loss 16 (24.2%).

Bronchoscopic findings showed no pathological lesion in 20 (30.30%) patients. Out of 46 patients where bronchoscopy revealed some pathology, 9 (13.6%) patients had discharge from bronchus, 3 (4.5%) patients had unhealthy mucosa / granuloma, 6 (9.09%) patients had bleeding from bronchus while endobronchial growth was visible in 17 (25.7%) patients which was more frequent among all findings, 4 (6,06%) patients had ulceration of mucosa, 5 (7.5%) had Inflamed mucosa, 2 (3%) had Foreign body. (Bar Diag. No.2)

Bar Diag. No.2: Distribution of study subjects according to bronchoscopic findings



The Final Diagnosis in study were Bacterial Pneumonia 22 (33.3%), Foreign body 2 (3.0%), Fungal Pneumonia 2 (3.0%), Malignancy 19 (28.7%), P. Tuberculosis 15 (22.7%), Undiagnosed 6 (9.0%).

Bronchial biopsies were done only in 27 out of 66 patients, where biopsy was feasible. Trans-Bronchial lung biopsy (TBLB) showed caseating epithelioid granuloma in 3 (11.11%) patients out of which all were positive in BAL CB NAAT. Squamous cell Carcinoma in 7 (25.25%) and 10 (37.03%) patients were positive for Adenocarcinoma and Nonspecific inflammation in 7 (25.25%) patients (Table No.1)

Table No.1: Distribution of study subjects according to cytopathology

Cytopathology	No.	%
Caseating Epithelioid granuloma	3	11.11%
Adenocarcinoma	10	37.03%
Squamous cell Carcinoma	7	25.92%
Non-specific inflammation	7	25.92%
Total	27	100%

CBNAAT of bronchoalveolar lavage fluid was done in all 66 patients. CBNAAT was positive in 15 (22.7%) patient out of which 10 are males and 5 are females. All 9 cases which were positive in BAL Fluid Direct smear were also positive in BAL CBNAAT. There was no significant association of CBNAAT of BAL Fluid and gender of patients (p=0.6607). (Table No.2)

Table No.2: Distribution of study subjects according to CBNAAT of Bronchoalveolar Lavage (BAL) Fluid

	Sex		
BAL CBNAAT	**Female**	**Male**	**Total**
Negative	14	37	51
Positive	5	10	15
TOTAL	19	47	66

(X2=0.1956, df=1, p=0. 0.6607)

BAL CBNAAT was the most effective method where diagnosis in Tuberculosis was accurate in 15 cases with sensitivity of 100.0% (15/15) followed by BAL fluid smear were diagnosis was accurate in 9 with a sensitivity of 60% (9/15). Using TBLB the diagnosis was 3 out of 15 positive patients with a sensitivity of 20% (3/15).

TBLB was the most effective method where diagnosis was accurate in 17 cases with sensitivity of 89.4% (17/19) followed by Bronchial Brushing where diagnosis was accurate in 11 cases with a sensitivity of 57.8% (11/19) and BAL cytology in 10 cases 52.6% (10/19) respectively.

Causative organisms in pneumonia include Strep. Pneumoniae 11 (28.2%), Strep. Pyogenes 3 (7.69%), Staph aureus 3 (7.69%), Klebsiella 5 (12.8%), M. Tuberculosis 15 (38.4%), A. Fumigatus 2 (5.1%).

History of smoking was present in 28 patients. 27 out of 47 male patients smoked while 1 out of 19 female patients were smokers. There is significant association of gender of patients with smoking history (p=0.001). Smoking history is present both Adenocarcinoma and Squamous cell carcinoma but more prevalent and present in all cases of Squamous cell carcinoma.

TBLB was the most effective method where diagnosis was accurate in 17 cases with sensitivity of 89.4% (17/19) followed by Bronchial Brushing where diagnosis was accurate in 11 cases with a sensitivity of 57.8% (11/19) and BAL cytology in 10 cases 52.6% (10/19) respectively. (Table No.3)

Table 3: Sensitivity of Various Bronchoscopic Methods in Malignancy

Diagnostic Technique	Positive (out of 19)	Sensitivity
BAL Cytology	10	52.63%
Brushings	11	57.89 %
TBLB	17	89.47 %

DISCUSSION:

An institutional based observational study was undertaken with 66 patients to evaluate the role of Fiberoptic bronchoscopy in patients who had persistent opacities on chest radiography and who remain undiagnosed clinico-patho-radiologically. We found that FOB was diagnostic in 90% (60 cases) of patients whereas in the study conducted by **Fein AM and et al** [8] the FOB was diagnostic in 12 out of 14 (86%) patients. The study population was less as compared to present study. In present study bacterial pneumonia was found in 22 (33.33%) patients and Streptococcus pneumoniae was grown in 11 (50%), Klebsiella in 5 (22.7 %) and Staphylococcus in 3 (13.6%) patients indicating that even commonest organisms clear very slowly and require aggressive work up to diagnose them. In all patients of bacterial pneumonia (22 cases), diagnosis was made on the BAL Culture report. **Jay and et al** [9] found that Streptococcus pneumoniae clears very slowly and takes about 8 to 10 weeks. In a study conducted by **Macfarlane et al** [5] only 59% of all patients with Streptococcus pneumoniae had a normal chest film eight weeks after diagnosis. **Johnson JL et al** [10] have reported various nonresolving pneumonia 11 % had bronchioloalveolar cell carcinoma or adenocarcinoma of the lung identified at bronchoscopy. A study by **Fein AM et al** [8] found adenocarcinoma and bronchoalveolar carcinoma in 11% of patients at bronchoscopy, which has a low yield as compared to our study. However, these might be due to a smaller number of patients. Averagely >30 pack-year smoking history was found in our study. In a retrospective review of patients over a six-year period, **Baughman et al.** [11] observed that bronchoscopy with BAL was useful in the diagnosis of pulmonary tuberculosis. In their study there were 30 patients whose pre-bronchoscopy expectorated sputum specimens were negative for AFB. Of these, bronchoscopy specimens were smear positive in 26 (87%). In our study 3 patients of Tuberculosis were diagnosed by TBLB which shows Granuloma / unhealthy mucosa. All 15 patients were BAL CBNAAT positive. **Prakash P et al.** [12] studied to assess the role of bronchoscopy in diagnosis of pulmonary tuberculosis among patients who have clinicoradiological suspicion but remain negative for AFB on sputum examination. They found of the 50 cases, 33(66%) were males and 17 (34%) were females. Fungal pneumonia is also one of the causes of non-resolving pneumonia. In our study, we found fungal pneumonia in 2 patients (3.03%). Both patients were diabetic. Both patients were also positive for serum Aspergillus IgM Antibody. The study conducted by **Kyprianou A et al.** [13] found fungal infection in 14% of the patients, which is quite high as compared to the present study.

CONCLUSION:

FOB is a safe procedure which provides high diagnostic yield at relatively low risk. FOB is useful in finding specific etiology of various lung conditions not diagnosed on routine investigations.

Bronchoscopy can be very useful tool in diagnosing causative organism in cases of community acquired pneumonia which do not respond to routine treatment or in cases of Immunocompromised host. Bronchoscopic intervention could be a safe and effective procedure for early diagnosis of lung malignancy specially when Endobronchial growth is suspected.

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