



Original Research Article

Role of Bronchoscopic Biopsy in Assessment of Bronchopulmonary Diseases at a Tertiary Care Center in UP

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Abstract

Background: *The flexible bronchoscope has proved to be a versatile instrument with many clinical implications. Since its introduction 52 years ago; it has completely changed the perspective of diagnosis and treatment of various conditions affecting lungs. A prospective study was carried out to know the efficacy of bronchoscopic biopsy in patients of pulmonary diseases and to assess the clinical, bronchoscopic and pathological correlation.*

Setting: *Department of Tuberculosis and Chest Diseases, S.N.Medical College, Agra*

Methodology: *Flexible fiberoptic bronchoscopy with bronchoscopic biopsy was performed under local anesthesia in patients of bronchopulmonary diseases and biopsy specimens were sent for histopathological examinations.*

Results: *Endobronchial abnormalities were visualized in nearly 47.7% case. Most common finding was exophytic growth seen in 57.1% of cases studied. Out of 44 cases, 36.36% were diagnosed as carcinomas and 43.18% as non neoplastic. Squamous cell carcinoma (50%) was most common neoplastic lesion followed by adenocarcinoma (37.5%) in neoplastic category.*

Conclusion: *Bronchial biopsy is simple and safe procedure which can be performed in out patients and provides significantly higher diagnostic yield in bronchopulmonary diseases with negligible minor complications.*

Keywords: *Tubercular pleural effusion, Fiberoptic bronchoscopy, Endobronchial Biopsy.*

Introduction

Introduction of fiberoptic bronchoscope by Ikeda in 1966 was a Landmark in the history of Pulmonary Medicine.¹ In most of the pulmonary

diseases the bronchoscopy is useful with the advantage of avoiding invasive diagnostic procedures with the flexible fiberoptic bronchoscope. To diagnose various pulmonary

diseases by using different accessories, bronchoscopy and related procedures such as bronchial brushing, bronchoscopic aspirations, bronchoalveolar lavage (BAL), trans bronchial fine needle aspiration (TBNA), Endobronchial lung biopsy (EBLB) and Trans-bronchial lung biopsy (TBLB) of peripheral mass may be an alternate way to reach the diagnosis as early as possible.^{2,3} Principal indications of bronchoscopy are in diagnosis of lung cancer⁴ and young patients with haemoptysis⁵. Present study included 46 patients of different age and sex in whom no conclusive diagnosis could be made on the basis of clinical history, physical examination, sputum examination and radiological investigation. Flexible fiberoptic bronchoscopy with bronchial biopsy was performed to make a final diagnosis.

Aims and Objectives

1. To know the diagnostic efficacy of bronchoscopy in patients of pulmonary disease by directly visualizing the endobronchial lesions.
2. To assess the clinicoradiological, bronchoscopic and pathological correlation.

Material and Methods

(A) Criteria for selection of cases: Diagnosed and clinically suspected AFB negative respiratory cases with SPO₂ above 90% belonging to 21-80 yrs of age of both sexes were selected from OPD and Indoor from the Department of Tuberculosis and Chest Disease, S.N. Medical College, Agra. Cases with associated cardiac disease and others having high risk of complications were excluded.

(B) Consent: Once a patient has been selected for flexible bronchoscopy, written and verbal consent was obtained from the patient or a designated decision maker prior to proceedings of Bronchoscopy.

(C) Instrument: Bronchoscopy was done by third year residents under the supervision of consultant using Olympus bronchoscope (Model No. BF-XT30) with following specifications. It has outer diameter 6.1mm, inner diameter 3.2 mm, working

length 550 mm, field of view 120° and depth of field 3-50 mm.

(D) Method: The procedure was carried out in bronchoscopy lab equipped to manage respiratory emergencies. All patients were kept fasting at least six hours prior to bronchoscopy. Premedication 30 minutes before the procedure with I/M Atropine usually not done except in few cases. To improve procedural cough, reduces lidocaine usage and increases patient procedural tolerance Midazolam. 0.1mg/kg. was administered I/V just before procedure.^{6,7} Then local anesthesia of upper respiratory tract done with application of 2% viscous lignocaine on nasal mucosa and spraying the oral cavity with 10% lignocaine to anaesthetize the tongue and nasopharynx. 'Spray-as-you-go' delivery technique was applied via the bronchoscopic working channel for laryngeal and tracheobronchial tree. Repeated application allowed 4% lidocaine delivery to the entire airway.⁶ Bronchoscopy done by trans nasal route, when the patient was in supine position with operator was standing at head end of the patient. Endobronchial or transbronchial biopsy was performed in all 44 cases depending on the endobronchial abnormalities. Three to four biopsies were taken using standard techniques. Bronchial biopsies were fixed in 10% formal saline and processed subsequently to department of pathology for histopathological examination. There was a close monitoring of physiological variables like blood pressure, heart rate and SpO₂ during entire procedure and 4 hours after the procedure by attendant staff. A Chest X-Ray was also done after the procedure to rule out pneumothorax. A prospective analysis of clinic-radiological profile, histopathological findings of biopsy specimen and complications was done for patients underwent bronchoscopy in present study.

Results

- In the present study, flexible fiberoptic bronchoscopy was done in 46 patients of undiagnosed bronchopulmonary diseases. Two patients (4.3%) could not tolerate the

bronchoscopy; rest 44 patents (95.6 %) tolerated well the entire procedure.

- Maximum patients were of the 51-60 year age group with a mean age of male and female 48.23% and 47.58% with \pm SD 14.34 and 13.79 respectively.
- Most (59.09%) cases had less than 6 months of illness. Mean duration of illness for male 2.76 years with $SD\pm 5.62$ and for female 1.60 years with $SD\pm 2.84$.
- Cough (90.9%), dyspnea (86.3%) and chest pain (70.5%) were most common symptoms followed by haemoptysis (20.4%). Fever was also present in few cases. 15.90% cases had hoarseness of voice amongst them most of the cases were male (6 out of 7) out of which 3 had squamous cell carcinoma and 1 had carcinoid tumor.
- Pallor was most common sign (88.6%) followed by fever and clubbing, edema of face and upper extremity. SVC obstruction in 3 cases (6.81%) and unilateral phrenic nerve paralysis in 1 case was present in our study. All the 3 cases having SVC obstruction proved to have squamous cell carcinoma (2 male, 1 female). One case which had phrenic nerve palsy also proved to have squamous cell carcinoma.
- Regarding, Age group, duration of illness and clinical features, statistically no significant difference observed between male and female.
- Smoking was most common risk factors found in 77.27% (30 male, 4 female) cases. It was statistically significant ($p < 0.05$). Only 6.25% male and 66.60% female were nonsmoker. Statistically significant difference was found between male and female non- smoker ($p < 0.05$).
- Regarding radiology, there were 17 confirmed cases of consolidation with strict male preponderance (16 male, 1 female). Mass lesions were observed in 16 cases, which included 7 central, 8 peripheral and 1 mediastinal mass. These mass lesions were more in male than in female (10 male, 6 female). Collapse was seen in 6 cases, cavity in 2 male and pleural effusions in two cases (1 male, 1 female). Statistically significant difference between male and female was observed in case of consolidation.
- Most of the patients showed involvement of right sided (22 cases) followed by left side (20 cases). Bilateral lung and mediastinal involvement was observed in 1 case each and upper zone was involved in 19(43.1%) cases.
- On bronchoscopy endobronchial abnormalities were visualized in total 21 cases (47.7%), 13 on right side and 8 on left side. Most common finding was growth/mass seen in 12 (57.1%) cases with male predominance. Out of 21 cases bronchial narrowing from outside compression was seen in 3 patients (14.2%). 9 (42.8%) patients had evidence of bronchial inflammation. These bronchoscopic findings given above were confirmed by histopathology which besides showing inflammatory cells, showed malignant cells in 16 cases, dysplastic cells in 3 cases, fibroblastic cells in 1 case.
- On histopathology, neoplastic lesions were diagnosed in 36.6% cases while 63.36% cases were observed as non neoplastic. (Table -1)(Graph-1)
- On histopathology, acute inflammatory cells seen in 11 (25%) cases and chronic inflammatory cells in 10 cases (22.45%). (Table -2)(Graph -2)
- Histopathologically different types of malignant cell were identified which includes Squamous cells in 8 (50%), Adeno in 6 (37.5%), small cell and carcinoid carcinoma each comprising 1 cases (6.25%) of the study group. (Table -3) (Graph-3)
- The incidence of malignancy was maximum 51-60 yrs of age (62.5%) followed by 41-50 yrs of age (12.5%).

- The cases which we have suspected of tubercular etiology on the basis of history and clinical examinations were confirmed histopathologically where we found fibroblasts and calcified/ necrosed granulomatous tissue in 3 cases (16.67%). This was consistent with the study conducted by Guleria et al (1997).
- Bronchoscopy and bronchial biopsy in the present study group presented negligible

complications. Haemoptysis was the most common complication found in 7 cases (15.9%) which was scanty for which no treatment was required. Other complications were breathlessness for short duration (3 patients) and chest pain (2 patients) which was relieved by analgesics. No complication was found in 33 cases (75.00%).

Table -1 Categorisation of Lung Lesion on Histopathology

| CATEGORY | NO OF CASES | PERCENTAGES |
|----------------|-------------|-------------|
| Non-Neoplastic | 28 | 63.63% |
| Neoplastic | 16 | 36.36% |
| Total | 44 | 100% |

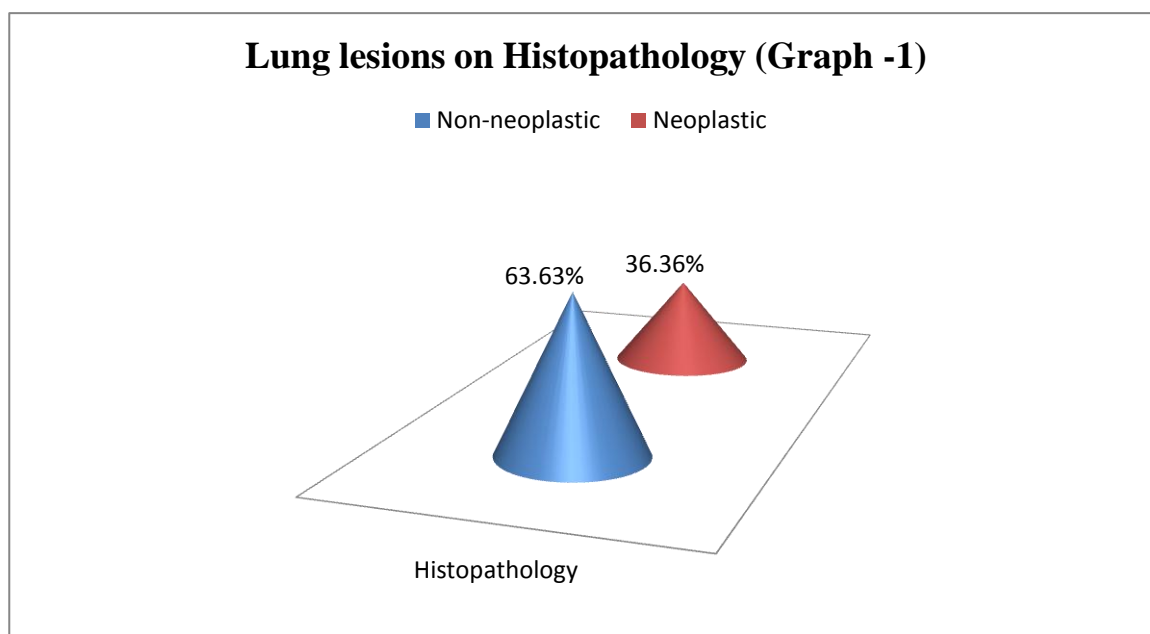


Table-2 Distribution based on histological diagnosis

| Histological findings | Male (n=32) | | Female (n=12) | | Total (n=44) | | Statistical correlation | |
|------------------------------------|-------------|-------|---------------|-------|--------------|-------|-------------------------|-------|
| | No | % | No | % | No | % | z | P |
| 1.Inflammatry cells | | | | | | | | |
| Acute infl. cell | 7 | 21.9% | 4 | 33.3% | 11 | 25.0% | 0.9 | >0.05 |
| Chronicinfl. cells | 8 | 25.0% | 2 | 41.7% | 10 | 22.7% | 0.6 | >0.05 |
| 2.Malignant cells | 11 | 34.4% | 5 | 41.7% | 16 | 36.4% | 0.4 | >0.05 |
| 3.Dysplastic cells | 3 | 9.4% | - | - | 3 | 6.8% | 1.7 | >0.05 |
| 4.Fibroblasts | 1 | 3.1% | - | - | 1 | 2.3% | 1.5 | >0.05 |
| 5.Calcified necrosed tissue | - | - | 2 | 16.7% | 2 | 4.5% | 1.0 | >0.05 |
| 6.Blood cells | - | - | 1 | 8.3% | 1 | 2.3% | 0.5 | >0.05 |

Histological Diagnosis (Graph-2)

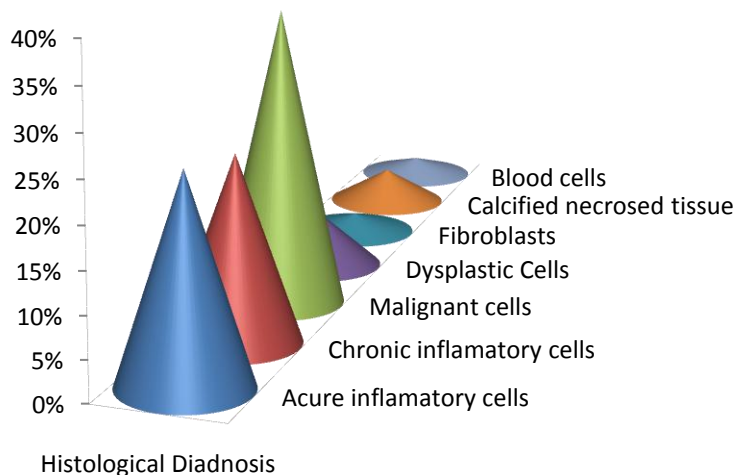


Table-3 Distribution of Cell types among malignancy

| Cell type | (n=16) | |
|--------------|-----------|------------|
| | No | % |
| Squamous | 8 | 50 |
| Adeno | 6 | 37.5 |
| Small | 1 | 6.25 |
| Carcinoid | 1 | 6.25 |
| Total | 16 | 100 |

Cell types among malignency (Graph-3)

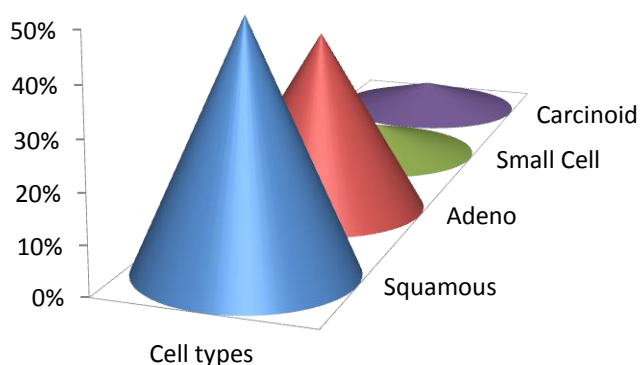


Table -4 Distribution of Cell types in different sex

| S.N. | Sex | Squamous | Adeno | Small | Carcinoid | Total | % |
|------|--------------|----------|----------|----------|-----------|-----------|------------|
| 1. | Male | 6 | 3 | 1 | 1 | 11 | 68.75 |
| 2. | Female | 1 | 4 | - | - | 5 | 31.25 |
| | total | 7 | 7 | 1 | 1 | 16 | 100 |

X²=4.0166

p>0.05

Discussion

FOB has important role in diagnosis, treatment and monitoring of respiratory diseases.

Endobronchial biopsy and trans bronchial biopsy under direct visualization are standard diagnostic techniques with flexible bronchoscope. Present study was done in 46 undiagnosed cases of bronchopulmonary disease. Fiberoptic bronchoscopy and biopsy was done to obtain sample for histopathological examination. Clinico-radiological and histopathological results were analyzed. History of smoking was present in 77.17% patients in our study. All the males (11 cases) which were proved to have malignancy having the history of smoking more than 20 bidi/cigarette/day for duration of more than 25 years. Amongst 5 females which were proved to have malignancy, history of smoking was found in 4 (80%) cases. There was one female in the study who had no risk factor and proved to have malignancy. Yorshi M. et al in his study also found that there were three fold smokers (75.7%) as compared to nonsmokers and findings of our study was also consistent with this study.⁸ Many authors also found that 85-90% of the pulmonary cancers can be attributed to smoking.^{9,10} In our study 38.6 % case presented as consolidation, 36.4 % as mass lesions, 13.6% as collapse, 4.5% as cavitory lesion and 4.5 % as pleural effusion as radiological features. Yorshi M. et al in his study found lung mass commonest radiological finding as it was present in 49.8 % case of his study. He also found hilar shadow (15.8%), apical opacity (13.1%), pleural effusion (12.1%), cavitory lesion (7.4%) and solitary nodule in 1.7% case of their study.⁸ Radiological features in our study are quite similar to above mentioned study. Almost 50% patients showed involvement of right side and 45.45% in left side which correlated well with the study conducted by Chechani et al (1996).¹¹ Patil S et al also noted abnormality on right side in 47.6 % case and 41.90% case on left side of lung in their study.¹² On bronchoscopy 47.7% case exhibit endobronchial abnormalities in form of growth/mass seen in 57.1% cases, 14.2% case

as bronchial narrowing from outside compression and (42.8%) patients had evidence of bronchial inflammation in our study. Patil S et al also categorized abnormalities as exophytic endobronchial lesions in 58.57% cases, sub mucosal abnormalities in 17.14 % cases and peribronchial lesions in 19-52 % case of his study and the result of our study very much consistent except no abnormality in around 4.7% cases only.¹² On histopathology inflammatory cells seen in 247.7% cases. Difference in inflammatory cell types on histopathology, from study conducted by Sharma et al (1988), Dhand et al (1988), Bhaughman et al (1991) on patients of clinical and radiological evidence of pneumonitis was due to selected cases of suspected malignancy which radiologically showed evidence of consolidation. In present study Squamous cell carcinoma (50%) was most common histological type among neoplastic category followed by Adenocarcinoma (37.5%). Upma et al in their study also showed squamous cell carcinoma (40.7%) as the most common neoplastic lesion followed by adenocarcinoma (25.9%) in neoplastic category.¹³ Though worldwide, adenocarcinoma has replaced squamous cell carcinomas being most prevalent lung cancer, still dominance of squamous cell carcinoma is reported in few geographical areas including present study population.¹⁴ The incidence of malignancy was maximum 51-60 yrs of age (62.5%) followed by 41-50 yrs of age (12.5%). Ahmad M et al also concluded that peak incidence of bronchogenic carcinoma occurs in 6th to 7th decades of life with age ranging from 50-79 yrs comparable to the findings of present study.¹⁵ On the basis of history and clinical observation, the cases were suspected of pneumonitis and or bronchitis were confirmed on bronchoscopic and histopathological examination. 9 cases proved to be of Pneumonitis (20.12%) and 9 (20.12%) cases of bronchitis. Overall yield for inflammatory conditions was 40.09%. In a study of Upma et al non-neoplastic category was comprised of 2 cases of tuberculosis, 1 case each of abscess and fungal infection and 5 cases were

showing non-specific inflammation and 4 cases were concluded as normal.¹³ In their study of Tuladhar et al. concluded that out of 15 non-neoplastic cases, 4 were of tuberculosis, 2 were abscess, 8 were of non-specific inflammation and 1 case concluded as normal. The findings were similar to that of present study.¹⁶ Choudhary M et al in a study, also reported that out of 35 cases, 60% were diagnosed as carcinomas, 40% as inflammatory or tubercular or with non-specific diagnosis.¹⁷ In present study the diagnostic yield was 36.36% (Table-1) for malignancies of lung. Post bronchoscopic complications were consistent with the study conducted by Cordasco et al.¹⁸

On the basis of current study it can be concluded that the use of bronchoscopy and bronchial biopsy is very useful and safe procedure in undiagnosed case of bronchopulmonary abnormalities especially in elderly smokers. Due to high yield it is considered as gold standard for diagnosing neoplastic etiologies. Use of FOB and biopsy should be encouraged in peripheral health institutions to make early diagnosis and definitive treatment of pulmonary diseases.

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