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Original Research Paper

# Role of Fibreoptic BRONCHOSCOPY in Etiological Diagnosis of Collapse of Lung

Medical Science

**KEYWORDS :** FOB, Collapse of Lung, atelectasis, bronchiectasis

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| **DR RAGHUMANDA SUNIL KUMAR** | MD, ASSOCIATE PROFESSOR, DEPT OF PULMONARY MEDICINE,GOVERNMENT HOSPITAL FOR CHEST AND COMMUNICABLE DISEASES, ANDHRA MEDICAL COLLEGE, VISAKHAPATNAM, A.P. |
| **DR CHAPPA RAMA NAGA BHUSHANA RAO** | MD , DTCD , ASSOCIATE PROFESSOR, DEPT OF PULMONARY MEDICINE,GOVERNMENT HOSPITAL FOR CHEST AND COMMUNICABLE DISEASES, ANDHRA MEDICAL COLLEGE |
| **DR GORANTLA SAMBASIVA RAO** | MD, PROFESSOR OF PULMONARY MEDICINE, DEPT OF PULMONARY MEDICINE, GOVERNMENT HOSPITAL FOR CHEST AND COMMUNICABLE DISEASES ,ANDHRA MEDICAL COLLEGE. |
| **DR DILEEP KUMAR BUSAPOGULA** | MD . DEPT OF PULMONARY MEDICINE, GOVERNMENT HOSPITAL FOR CHEST AND COMMUNICABLE DISEASES ,ANDHRA MEDICAL COLLEGE. |

## INTRODUCTION

Fiberoptic bronchoscopy (FOB) is an important entity in the armanmentarium of procdures listed in diagnosis of respiratory problems. It is a universally accepted procedure both in diagnosis and the therapy of various pulmonary disorders. This procedure allows careful inspection of the bronchial tree for endobronchial lesion and also helps in recovery of deep respiratory secretions brushing and biopsy, which is 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. The present study was undertaken to diagnose the etiological diagnosis of collapse of lung.Atelectasis, is defined as decrease in volume of lung or portion of the lung. Collapse is not a disease, but an important sign that results from disease or abnormalities in the ling. Therefore, it is necessary to use diagnostic tools such as fiberoptic bronchoscopy to get an accurate diagnosis of underlying cause in a patient presenting with collapse on chest radiograph or CT – Chest. The major causes of collapse of lung include Lung Cancer, Endobronchial TB, endobronchial matastasis, infection, bronchiectasis, foreign body, mucous plug etc.

**Aim:** To study the role of Fiberoptic bronchoscopy( FOB) in etiological diagnosis of collapse of lung.

**Objectives:**To study the demographic features in patient with collapse of lung, Diagnostic yield of FOB in diagnosis of collapse of lung, Bronchoscopic findings in patients with collapse of lung,Etiology causing collapse of lung.

The study was conducted on 30 patients with collapse of lung at GOVERNMENT HOSPITAL FOR CHEST AND COMMUNICABLE DISEASES,Andhra medical college, Visakhapatnam, AP, between March 2013 to September 2014.

**Inclusion criteria:**Collapse of lung or lobe on chest X-ray, Collapse of lung or lobe on CT-chest

**Exclusion criteria:** Known lung cancer , Recent Myocardial infarction, Blood disorders, Known case of Pulmonary Tuberculosis, Patients having poor general condition , Positive test result for HIV infection,Unwilling Patients

**Investigations:**Hemoglobin, TC, DC, Haematocrit , Platelet Count, BT, CT,Sputum gram stain &culture, AFB smear & culture,Mantoux test,HIVtest , HbsAg, ESR, Routine blood tests – RBS, LFTs, blood urea, serum creatinine, Chest X-ray PA& Lateral view,CT Scan- Chest,

## PROCEDURE:

The technique of FOB has been described for all patients. After an overmight fasting, prebronchoscopic medication was given with injection Atropine and injection Phenergan. Patients were also sprayed with 4% Xylocaline with an atomizer over the oropharynx befor the bronchoscopy. The branchoscopic procedure was done transnasally with the patient lying in supine position and under pulse oximetry and electrocardiographic monitoring. After passing the tip of the branchoscopic upto the level of the vocal cords, 1 ml of 2% Xylocaine was instilled to anaesthetize vocal cords and the scope was advanced below the vocal cords into the trachea. At the level of the caringa, 2 ml of 2% Xylocaine was again instilled. Meanwhile a thorough examination of the nasopharynx, vocal cords and tracheobronchial tree was done. With about 10 -15 ml of 0.9% sterile saline (instilled with a syringe) and by application of 50-80 mm Hg negative pressure from a suction apparatus and fluid was collected into 75 ml disposable sterile specimen traps. The collected fluid was sent for Ziehl – Niesleon, Gram's stain as well as for malignant cytology. When endobronchial lesions / growths were found, ebdibribcguak biopsies were done. Following bronchoscopy, the patients were closely observed for a certain period of time which baried from patient to patient depending on the general medical status. The patients were instructed to be nil oral till 3-4 hours after bronchoscopy and to be alert for the development of symptoms suggesting late complications.All the patients in our study were hemodynamically stable.

## OBSERVATIONS AND RESULTS

After completion of the study, results of 30 patients with FOB have been analyzed. Descriptive statistics like mean, SD and percentage were use to express the date. Data were presented in tabular and graphical form.

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**Table 3: Distribution of study group by age**

| Age (Years) | No. of patients | Percentage (%) |
|---|---|---|
| 20-40 | 5 | 16.7 |
| 41-60 | 20 | 66.7 |
| >60 | 5 | 16.7 |

The most common age group involved in the study was 41-60 Year (66.7%). The youngest patient was aged 26 years and the olde3st was 85yr. Mean age was 52.96yr.

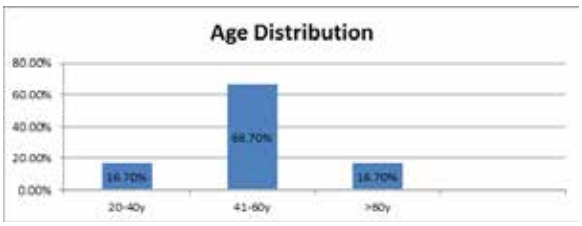


**Figure 4: Distribution of study group by age**

**Table 4: Distribution of study group by sex**

| Sex | Number of patients | Percentage (%) |
|---|---|---|
| Male | 20 | 66.7 |
| Female | 10 | 33.4 |

The total number of patients involved in the study was 30. Out of which 20(66.7%) were male and 10 (33.4) were female. Male patients outnumbered female patients.

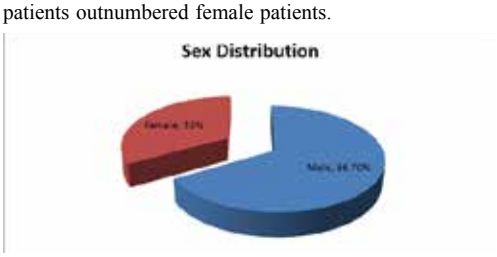


**Figure 5: Distribution of study group by sex**

**Table 5: Distribution of study group by symptomatology**

| Sl. No | Symptoms | Number of patients | Percentage (%) |
|---|---|---|---|
| 1 | Dysnea | 25 | 83.4 |
| 2 | Cough | 30 | 100 |
| 3 | Expectoration | 25 | 83.4 |
| 4 | Fever | 8 | 26.7 |
| 5 | Chest Pain | 11 | 36.7 |
| 6 | Hemoptysis | 8 | 26.7 |

Analysis of symptoms among the patients studied showed that cough was the most common symptiom bening reported by all 30 patients (100%) followed by dyspnesa in 25 patients (83.4%), expectoration in patients (83.4%), chest pain in 11 patients (36.7%), fever in 8 patients (26.7%), hemoptysis in 8 patients (26.7%).

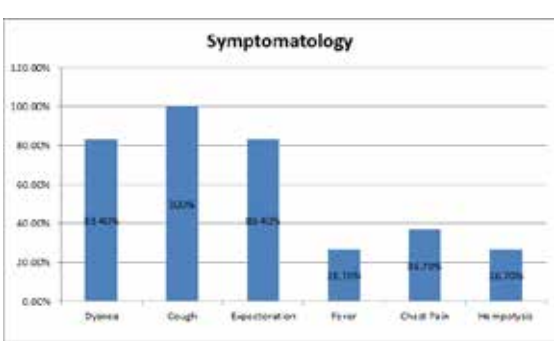


Figure 6: Distribution of study group by symptomatology

**Table 6: Distribution of study group by duration of symptoms**

| Duration of symptoms | Number of Patients | Percentage (%) |
|---|---|---|
| < 1month | 15 | 50 |
| 1-2 month | 3 | 10 |
| >2 month | 12 | 40 |

Analysis of duration of symptoms among patients who were included in the study showed that, the majority of patients (50%) presented to hospital in < 1 month of onset of symptoms. 3 patients (10%) between 1-2 month and 12 patients (40%) after 2 months of onset of symptoms.

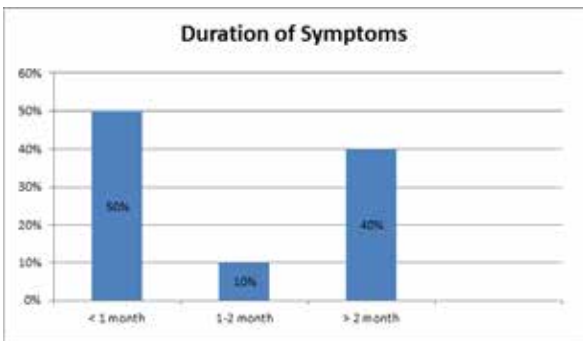


**Figure 7: Distribution of study group by duration of symptoms**

**Table 7: Distribution of study group by personal history (n=30)**

| Personal History | Number of Patients | Percentage (%) |
|---|---|---|
| Tobacco Smoking | 17 | 56.7 |
| Alcohol | 13 | 43.4 |
| Tobacco Chewing | 0 | 0 |
| None | 12 | 40 |

Analysis of personal history among patients who were included in the study showed that, 18 patients (60%) had singnigicant personal history in 18 patients, 17 (56.7%) patient had history of tobacco smoking, and 13 patients (43.4%) had history of alcohol consumption.

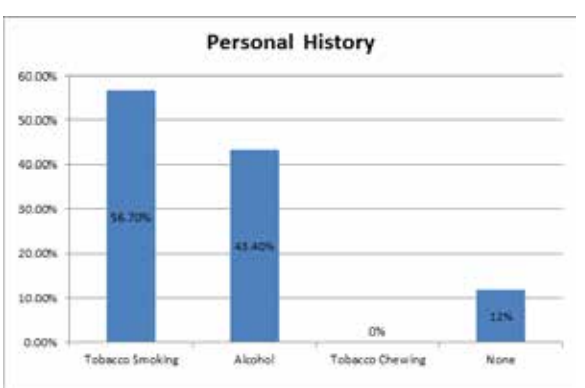


**Figure 8: Distribution of study group by personal history**

| Sl.No | Parameter | Min | Max | Mean | SD |
|---|---|---|---|---|---|
| 1 | Haemoglobin (gm %) | 5 | 14.2 | 10.36 | 2.49 |
| 2 | Total count (cells/mm$^3$) | 5600 | 14600 | 8711 | 2236.6 |
| 3 | Absolute Eosinophil count | 150 | 800 | 408.34 | 158.15 |
| 4 | Platelet count (lakh/mm$^2$) | 1.5 | 5 | 2.94 | 0.95 |

| | | | | | |
|---|---|---|---|---|---|
| 5 | Random bloode sugar (mg/dl) | 62 | 190 | 102.1 | 27.33 |
| 6 | Blood Urea (mg/dl) | 14 | 42 | 24.5 | 6.47 |
| 7 | Serum Creatinine (mm/dl) | 0.5 | 1.8 | 0.97 | 0.345 |
| 8 | Serum Bilirubin )mg/dl) | 0.2 | 0.6 | 0.433 | 0.095 |

The above table depicts the analysis of basic investigation parameters with minimum value, maximum value, mean and Standard Deviation of each parameter in the Study of 30 patients.

**Table 9. Lung involved in Collapse**

| Lung involved | Number of patients | Percentage (%) |
|---|---|---|
| Right Lung | 17 | 56.7 |
| Left Lung | 13 | 43.4 |
| Total | 30 | 100 |

Analysis of radiological findings among patients who were Included in the study showed that, 17 patients (56.7%) had collapse on right side and 13 patients (43.4%) had collapse on left on left side.

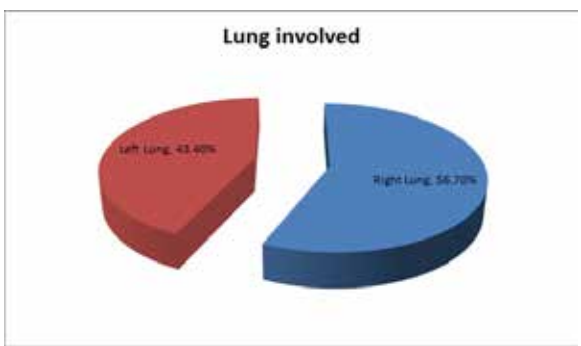


**Figure 9: Lung involved in Collapse**

**8. Site of lung involved in Collapse**

**Table 10: Site of lung involved in Collapse**

| Site | Number of patients | Percentage (%) |
|---|---|---|
| Right Upper Lobe | 3 | 10 |
| Right Middle Lobe | 7 | 23.4 |
| Right Lower Lobe | 3 | 10 |
| Right Total Lung | 4 | 13.4 |
| Left Upper Lobe | 4 | 13.4 |
| Left Lower Lobe | 3 | 10 |
| Left Total Lung | 6 | 20 |

Analysis of Chest X-Ray findings among patients who were included in the study showed that, right upper lobe is involved in 3 patients (10%), right middle lobe is involved in 7 patients (23.4%), Right lower love is involved 3 patients (10%), right total lung is involved in 4 patients (13.4%), left upper lobe is involved in 4 patients (13.4%), left Lower love is involved in 3 patients (10%) and left total is involved in 6 patients (20%.)

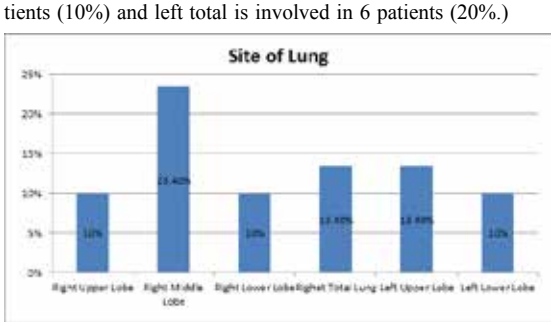


**Figure 10: Site of Lung involved in Collapse**

**9. Gross Fiberoptic Bronchoscopy Findings**

**Table 11: Gross Fiberoptic branchoscopy findings (n=30)**

| FOB Findings | Number of patients | Percentage (%) |
|---|---|---|
| Endobronchial mass | 19 | 63.4 |
| Endoluminal narrowing (Stenosis or Extrinsic Comperession) | 7 | 23.4 |
| Abnormal Mucosa (edema, congestion, secretions) | 4 | 13.4 |

Analysis of gross FOB finding patients who were included in the study showed that majority of patients (19 patients, 63.4%) had endobronchial mass, followed by endoluminal narrowing which included stenosis or extrinsic compression in 7 patients (23.4%) and abnormal mucosa which included edema, congestion and mucus plug in 4 patients (13.4%_.

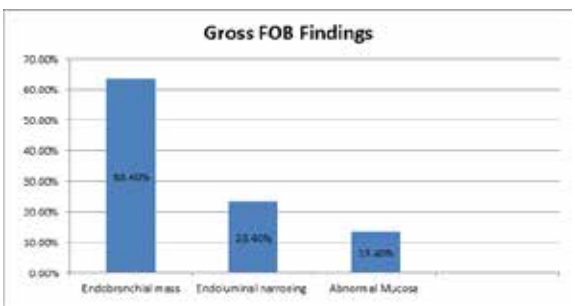


**Figure 11: Gross fibroptic bronchoscopy findings**

**Table 12: Etiological diagnosis of Collapse known by FOB (n=30)**

| Diagnosis | Number of patients | Percentage (%) |
|---|---|---|
| Known | 27 | 90 |
| Unknown | 3 | 10 |
| Total | 30 | 100 |

Among the 30 patients studied, Etiological diagnosis was known by FOB in 27 patients (90%) and unknown in 3 patients (10%). The diagnostic rate of FOB is 90%.

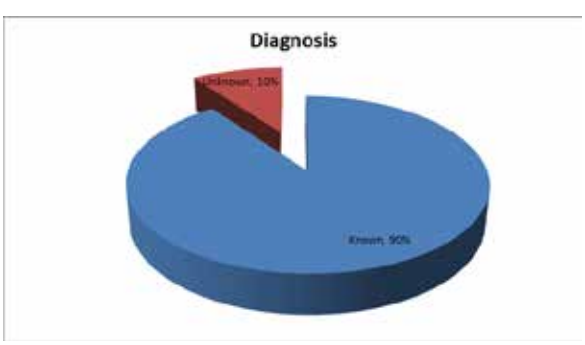


**Figure 12: Etiological diagnosis of Collapse known by FOB**

**Table 13: Etiological diagnosis (n=30)**

| Etiological diagnosis | Number of patients | Percentage (%) |
|---|---|---|
| Malignancy | 22 | 73.4 |
| Endobronchial Tuberculosis | 4 | 13.4 |
| Pneumonia | 1 | 3.4 |
| Unknown | 3 | 10 |
| Total | 30 | 100 |

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Among the 30 patients studied, etiological diagnosis was known in 27 patients (90%). Malignancy was diagnosed in 22 patients (73.4%). Endobronchial tuberculosis in 4 patients (13.4%), pneumonia causing collapse in 1 patient (3.4%) and diagnosis remained unknown in 3 patients (10%). The diagnostic rate of FOB is 90%.

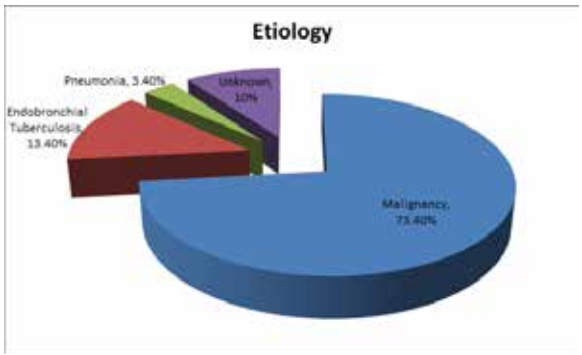


**Figure 13: Etiological diagnosis**

**Table 14: Relationship between age group and etiology**

| Age group | No. of patients | Malignancy | Non- malignant causes | Undiagnosed |
|---|---|---|---|---|
| 20-40 y | 5 | 1 | 4 | 0 |
| 41-60y | 20 | 17 | 1 | 2 |
| >60 | 5 | 4 | 0 | 1 |
| Total | 30 | 22 | 5 | 3 |

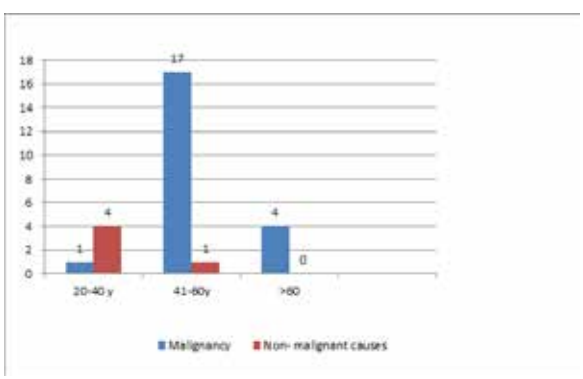


**Figure 14: Age group and Etiology**

The major cause of collapse in young patents is non-malignant causes like tuberculosis and pneumonia. The major cause of collapse in middle-aged and old-aged patients is malignancy.

**Table 15: Type of malignancy diagnosed by FOB (n=22)**

| Type of malignancy | Number of patients | Percentage (%) |
|---|---|---|
| Adenocarcinoma of lung | 8 | 36.36 |
| Squamous cell carcinoma of lung | 10 | 45.46 |
| Small Cell Carcinoma of lung | 3 | 13.63 |
| Metastasis to lung | 1 | 4.5 |
| Total | 22 | 100 |

Among the 22 patients diagnosed by FOB as malignancy, 10 patients had squamous cell carcinoma of lung (45.46%, majority), 8 patients had ademocarcinoma of lung (36.36%), 3 patients had small cell carcinoma (13.63%), 1 patient (4.5%) had metastasis to lung from malignamt fibrous histiocytoma of left thigh.

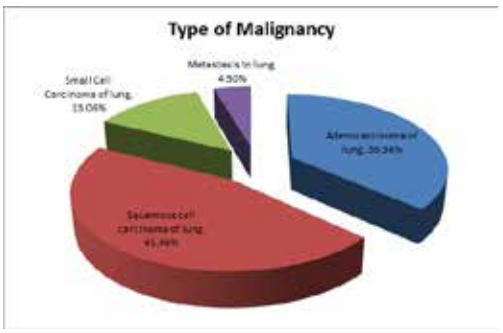


**Figure 15: Type of malignancy diagnosed by FOB**

**Table 16: Diagnostic yield of FOB specimens (n=30)**

| Diagnosis | No. of patients | Percentage (%) |
|---|---|---|
| Total cases diagnosed | 27 | 90 |
| With Bronchial Biopsy | 26 | 86.7 |
| With Bronchial Washings | 6 | 20 |

In all 30 patients, bronchial biopsy and bronchial washings were taken. In 27 patients (90%) etiological diagnosis was made. 26 patients (86.7%) (22 malignancy, 4 TB) had positive result with bronchial biopsy where as 6 patients (20%) (2 malignancy, 3 TB, 1 pneumonia) had positive result with bronchial washing.

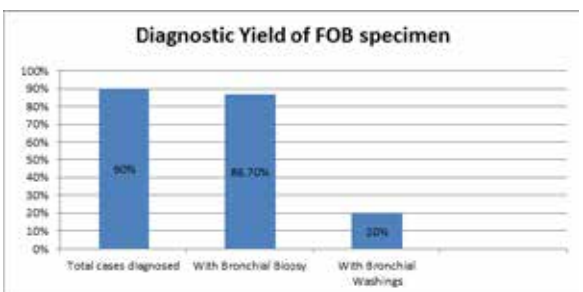


**Figure 16: Diagnostic yield of FOB specimens**

**Table 17: Result of FOB specimen in diagnosed cases of malignancy Malignancy was diagnosed in 22 patients (n=22)**

| Specimen | Positive Yield | Percentage (%) |
|---|---|---|
| Bronchial Biopsy | 22 | 100 |
| Bronchial Washings | 2 | 9.09 |
| Both | 2 | 9.09 |

Among the 22 patients diagnose by FOB as malignancy, all 22 patients (100%) had positive result with bronchial biopsy where as only 2 patients (9.09%) had positive result with bronchial washing. Both bronchial biopsy and bronchial washings were positive in 2 patients (9.09%). The two malignancies that ate positive with bronchial washings were also positive with bronchial biopsy in the rest of 20 patients with biopsy positivity, bronchial washings were negative.

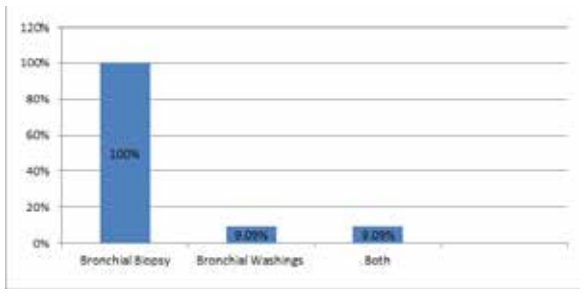


**Figure 17: Result of FOB specimen in diagnosed cases of malignancy**

**Table 16: endobronchial tuberculosis was diagnosed in 4 patients (n=4)**

| Specimen | Positive yield | Percentage (%) |
|---|---|---|
| Bronchial Biopsy | 4 | 100 |
| Bronchial Washings | 3 | 75 |
| Both | 3 | 75 |

Among the 4 patients diagnosed by FOB as endobronchial tuberculosis, all 4 patients (100%) had positive result with bronchial biopsy showing chronic granulomatous inflammation where as 3 patients (75%) had positive result with bronchial washings (positive for AFB). Both bronchial biopsy and bronchial washings are positive in 3 patients (75%). The endobronchial tuberculosos cases that are positive with bronchial washings were also positive with bronchial biopsy.

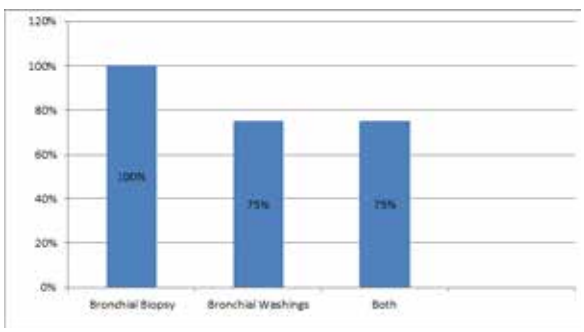


**Figure 18: Result of FOB specimen in diagnosed cases of endobronchial tuberculosis**

## SUMMARY

Out of 30 patients studied, etiological diagnosis was known by FOB in 27 patients (90%) and unknown in 3 patients (10%). The diagnostic rate of FOB is 90%.Among the 30 patients studied, malignancy was diagnosed in 22 patients (73.4%), endobronchial tuberculosis in 4 patients (13.4%), obeynibua causing collapse in 1 patient (3.4%) and diagnosis remained unknown in patients (10%).Among the 22 patients diagnosed by FOB as malignancy, 10 patients had squamous cell carcinoma of lung (45.46%, majority), 8 patients had adenocarcinoma of lung (36.36%), 3 patients had small cell carcimoma (13.63%), 1 patient (4.5%) had metastasis to lung from malignant fibrous histiocytoma of left thigh. In the present study squamous cell carcinoma in the most common type of lung cancer.In the present study, the major cause of collapse in young patents (20-40 yrs) is non-malignant cause like tuberculosis and pneumonia (80%). The major cause of collapse in middle-aged (41-60yrs) is malignancy (85%) the major cause of collapse in old-aged patients (>60yers)is malignancy (80%).In the present study, analysis of radiological findings for the lung involved in collapse among 30 patients revealed that, 17 patients (56.7%) had collapse of right lung and 13 patients (43.4%) had collapse of left lung.The most common site involved in present study is right middle lobe (23.4%).In the present study, the analysis of gross FOB findings among patients showed that, most common gross FOB finding is endobronchial mass in 19 patients, (63.4%), followed by endoluminal narrowing which included stenosis or extrinsic compression in 7 patients (23.4%) and abnormal mucosa which included edema, congestion, secretions in 4 patients (13.4%).In the present study, in all 30 patients bronchial biopsy and bronchial washings were taken. In 27 patients (90%) etiological diagnosis was made. 26 patients (86.7%) hadpostitive result with bronchial biopsy where as 6 patients (20%) had positive result with bronchial washings. Among the 22 patients diagnosed by FOB as malignancy, 22 patients (100%) had positive result with bronchial biopsy where as only 2 patients (9.09%) had positive result with bronchial washings. Both bronchial biopsy and bronchial washings were postitive in 2 patients (9.09%). The yield with bronchoscopic biopsy is better than bronchoscopic washings in the diagnosis of malignancy presenting with collapse of lung.Among the 4 patients diagnosed by FOB as endobronchial tuberculosis, all 4 patients (100%) had positive result with bronchial biospsy where as 3 patients (75%) had positive result with bronchial washings. Both bronchial biopsy and bronchial washings are positive in 3 patients (75%). The yield with bronchoscopic biopsy is better than bronchoscopic washings with AFB staining in the diagnosis of endobronchial tuberculosis presenting with collapse of lung.

## CONCLUSION

Fiber optic bronchoscopy is an important modality to diagnose the etiological case in a patient presenting with collapse of lung/lobe on chest X-ray or CT-Chest. In the present study, FOB led to a diagnosis in 90% patients. Most common cause of collapse was malignancy (73.4%). Most common bronchoscopic finding is endobronchial mass (19 patients, 63.4%). However, large scale studies are needed to further define the role of this modality in patients presenting with collapse of lung.

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