# ROLE OF FIBREOPTIC BRONCHOSCOPY IN EVALUATION OF PLEURAL EFFUSION CASES

Somnath Dash, Sushanta Kumar Mishra, G. Srinivas, K. V. Ramana Rao, N. Durga Prasad

1. Associate Professor. Department of Pulmonary Medicine, GSL Medical College, Rajahmundry.
2. Professor, Department of Community Medicine, GSL Medical College, Rajahmundry.
3. Professor. Department of Pulmonary Medicine, GSL Medical College, Rajahmundry.
4. Professor. Department of Pulmonary Medicine, GSL Medical College, Rajahmundry.
5. Post Graduate Student. Department of Pulmonary Medicine, GSL Medical College, Rajahmundry.

**CORRESPONDING AUTHOR:**
Dr. Somnath Dash,
Associate Professor,
Department of Pulmonary Medicine,
GSL Medical College,
Laxmipuram, RAJAHMUNDRY,
Andhra Pradesh (India)533296
E-mail: chestsomnath@gmail.com

**ABSTRACT:** Fibreoptic bronchoscopy which is usually used as a diagnostic modality in many tacheobronchial pathologies is not routinely recommended for evaluating patients with pleural effusion. Present study was conducted in a tertiary care hospital in Rajahmundry where bronchoscopy is in regular use. Among 59 cases of pleural effusion in which fibreoptic bronchoscopy was performed, the bronchial aspirate reports were compared with the reports of the pleural fluid analysis. It was observed that out of the 59 patients only in 19 patients the diagnosis could be established. In comparison to the pleural fluid analysis report the yield was better. As per as tubercular pleural effusion is concerned the bronchoscopic yield was good. We conclude in the study that fiberoptic bronchoscopy can be used as a diagnostic tool in the cases of pleural effusion where cause is unknown.

**KEY WORDS:** Fibreoptic Bronchoscopy, Pleural Effusion, Pleural fluid analysis, Bronchial aspirate cytology

**INTRODUCTION:** Fiberoptic bronchoscopy (FOB) is an important tool for diagnosing tracheobronchial abnormalities. After its invention by Ikeda in 1966 it is being in wide use for diagnosing and treating a number of diseases[1]. But this apparatus has limited approach to extrabronchial and extrapulmonary diseases. In patients with pleural effusion the most widely accepted investigation is thoracocentesis and analysis of the aspirated pleural fluid[2]. In countries like India where the prevalence of tuberculosis is high, most of the cases with exudative pleural effusion with lymphocyte predominant cytology are empirically treated with anti-tubercular drugs. In the present study we used fiberoptic bronchoscope to find out the causes of pleural effusion. The aim was to find out any pathology in the tracheobronchial tree that led to the pleural effusion. It was also to know if there is any added benefit of conducting bronchoscopy in such patients over the routine pleural fluid analysis. **MATERIALS & METHODS:** The present study is a hospital based cross-sectional study conducted upon the patients reported in the department of Pulmonary Medicine where fibreoptic bronchoscopy was used routinely as a diagnostic tool. The study was conducted between February 2005 to January 2010 (five years) and all the patients diagnosed clinically and radiologically as pleural effusion

were considered for the study. Out of total 238 patients, fifty nine patients were subjected for fiberoptic bronchoscopy, after screening. Ethical clearance from the Institutional Ethical Committee was obtained and Informed consent was also taken from all the participants before the study. Patients having HIV seropositivity, cardiac and renal diseases, hepatic failure and pregnancy were excluded from the study. FOB was performed with Olympus BF P40 Fibroscope. Patient profile & clinical history were recorded in a predesigned proforma. In all the 59 patients thoracocentesis was performed under aseptic measures and the pleural fluid analysis was also conducted. The reports of pleural fluid analysis, the bronchial aspirate cytology, endobronchial biopsy and post-scopy sputum examination were analyzed thoroughly. During the bronchoscopy procedure the bronchial aspirates were subjected for cytological study. Simultaneously each specimen of aspirate was stained with Ziehl-Neelson stain and examined under the microscope for acid fast bacilli (AFB). The post bronchoscopy sputum was also examined microscopically for AFB. Biopsy was conducted only in 3 subjects where endobronchial growth was found at bronchoscopy.

All statistical analyses were performed by using MS Excel 2007 and SPSS version 16. Values were presented as mean ± SD and in percentages. Chi-square test was used for examining the qualitative data. For all statistical analyses $p < 0.05$ considered statistically significant. **RESULTS:** Among the 59 subjects, 42 were male and 17 were female. Sex was not significantly associated with different age groups among study participants (Table. 1). The mean age of the study participants was 45±15.51 years. Smoking history suggested that 17 (28.81%) were active smokers.

Table 1: Demographic character of study participants

| Age (yrs) | Male | | Female | | Total |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| 18-27 | 3 | 7.14 | 1 | 5.88 | 4 (6.78%) |
| 28-37 | 7 | 16.67 | 2 | 11.77 | 9 (15.25%) |
| 38-47 | 12 | 28.57 | 5 | 29.41 | 17 (28.81%) |
| 48-57 | 19 | 45.24 | 9 | 52.94 | 28 (47.46%) |
| >58 | 1 | 2.38 | 0 | 0 | 1 (1.70%) |
| Total | 42 | 100 | 17 | 100 | 59 (100%) |

$p = 0.941 > 0.05$

Clinical profile data suggested that, majority of the patients i.e. 41 (70%) were symptomatic for a duration of 1-2 weeks. The main presenting symptom was found to be cough (89%), breathlessness (86%), chest pain (76%) and fever (22%).

Table -2 (Pleural fluid analysis report of study participants)

| Test results | Male | | Female | | Total |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Inflammatory | 37 | 88.10 | 15 | 88.24 | 52 (88.14%) |
| Malignancy | 5 | 11.90 | 2 | 11.76 | 7 (11.86%) |
| AFB + | 0 | 0 | 0 | 0 | 0 |
| Total | 42 | 100.00 | 17 | 100.00 | 59 (100.00%) |

P = 0.988

In all the subjects the pleural fluid biochemistry was in favor of exudative effusion. Inflammatory cytology was reported in 88% of cases. Pleural fluid for AFB was negative in all the study subjects.

Table-3 (Post bronchoscopic report analysis of the study participants)

| Cytology | Males | Females | Total | |
|---|---|---|---|---|
| Normal Cytology | 5 | 1 | 6 | 10.16% |
| Inflammatory | 30 | 14 | 44 | 74.57% |
| Malignancy | 7 | 2 | 9 | 15.25% |
| Total | 42 | 17 | 59 | 100% |

p= 0.665

Cytologic report revealed inflammatory aspirate in 74.57% cases

Table 4 (Bronchial aspirate and post scopy sputum microscopic status among the study subjects)

| Post scopy Sputum / bronchial aspirate for AFB staining | Male | Female | Total | |
|---|---|---|---|---|
| AFB positive | 3 | 7 | 10 | 16.95% |
| AFB Negative | 39 | 10 | 49 | 83.05% |
| Total | 42 | 17 | 59 | 100% |

p = 0.002

Endobronchial biopsy was taken in three subjects because of presence of endobronchial growth. The histopathological study of these specimens confirmed the presence of malignancy (two squamous cell and one adeno carcinoma).

Table-5: Comparison of yield of the two different procedures

| Results | Yield from Pleural Fluid analysis N = 59 | Yield from FOB N = 59 |
|---|---|---|
| Malignancy | 7 | 9 |
| Tuberculosis | 0 | 10 |
| Non-specific inflammation | 52 | 34 |
| Normal Cytology | 0 | 6 |

p = 0.000

After analysis of the records it was observed that the bronchoscopy revealed 9 cases of malignancy out of which only 7 detected in the pleural fluid analysis. The evidence of tuberculosis was confirmed by AFB staining of bronchial aspirate and post scopy sputum in 10 patients out of the 44 whose bronchial aspirate cytology showed non-specific inflammation. In three cases where endobronchial growth was found, histopathology revealed evidence of endobronchial malignancy. All other patients due to unconfirmed reports were treated empirically with anti tubercular treatment.

**DISCUSSION:** Cases of pleural effusion are usually approached after thorough clinical history, clinical examination and chest radiology. Thoracocentesis is the most common practice in vogue and investigation of choice in all pleural effusion cases where there is no strong causative evidence of a transudative effusion. In many patients the pleural fluid analysis is not conclusive. In only 50 to 70 % of cases, pleural fluid cytology gives the evidence of malignancy[3]. Williams et al in a study concluded that FOB was of value in investigating patients with undiagnosed pleural effusion[4]. In our study we could find confirmed evidence of malignancy in two cases that could not be diagnosed by pleural fluid cytology alone. The yield was 9 by bronchoscopy vs 7 by pleural fluid analysis (Table-5). There was significant increase in the yield of fiberoptic

bronchoscopy in diagnosing malignancy as a cause of pleural effusion ($P < 0.005$). In a retrospective study Steven H. Feinsilver et al found that the yield in FOB in patients with malignant pleural effusion is slightly higher. Hence it is helpful in searching the primary tumour. But they have suggested that in undiagnosed pleural effusion cases the overall yield of bronchoscopy is low. So they did not recommend routine use of fiberoptic bronchoscopy in all cases of pleural effusion[5]. Commenting on the role of FOB in pleural effusion R.W. Heaton et al concluded that it should be performed only in those patients who have independent clinical evidence suggestive of a bronchial carcinoma[6]. We are also agreeing with the same statement as in our study only in three patients we got histopathological evidence of endobronchial malignancy out of total 9 cases of malignant pleural effusion. Moreover localizing a bronchial primary in patients with malignant pleural effusion will not influence more on the management of the disease. As per as tuberculosis is concerned the role of fibreoptic bronchoscopy has been given importance by many authors[7, 8, 9]. Gupta et al in a study on smear negative tubercular pleural effusion observed that bronchoscopy leads to increased bacteriological yield and they recommended this procedure as it is a safe intervention[10]. In our study also we got smear positive for acid fast bacilli in bronchial aspirate and post scopy sputum in 10 cases (16.49%) in contrast to pleural fluid analysis report where no AFB positivity was found. It was observed to be statistically significant ($P < 0.005$) as per the table-5. So particularly in cases of pleural effusion where the fluid is exudative showing lymphocyte predominant pattern it is useful to perform the fibreoptic bronchoscopy before going for an empirical anti-tubercular therapy. Bronchial aspirate confirms the involvement of lungs in many cases of pleural diseases. In the present era of evidence based medicine we can go for a safer intervention like fibreoptic bronchoscopy in cases of pleural effusions where the pleural fluid analysis is not conclusive.

Since the present study was conducted in fewer patients, a larger multi-centric study in this regard can definitely throw more light for a better diagnostic benefit.

**REFERENCE:**


1. Jose F. Landa; Indications for bronchoscopy; CHEST 73:5, May 1978 Supplement; 686 - 690.
2. Allan F. Seibert, Johnson Hayne,Robert Middleton, John B. Bass, Tuberculous Pleural Effusion Twenty-Year Experience; Chest 1991;99:883-86)
3. Salyer WR, Eggleston JC, Erozan YS. Efficacy of pleural needle biopsy and pleural fluid cytopathology in the diagnosis of malignant neoplasm involving the pleura. Chest 1975; 67:536–539.
4. Williams T, Thomas P. The diagnosis of pleural effusion by fiberoptic bronchoscopy and pleuroscopy. Chest 1981; 80: 566 – 569.
5. Steven H. Feinsilver, Albert A. barrows, Sidney S. barman. Fiberoptic bronchoscopy and pleural effusion of unknown origin. Chest 1966; 90: 516 – 519.
6. R.W.Heaton, C.M.Roberts. the role of fibreoptic bronchoscopy in the investigation of pleural effusion. Post graduate Medical Journal 1988;64: 581 – 582.
7. A.P.Lale. Role of bronchoscopy and allied procedures to evaluate overdiagnosis of tuberculosis. Ind. F. Tub. 1999; 46: 193 – 196.
8. Danek S.J, Bower J.S. Diagnosis of pulmonary tuberculosis by flexible fibreoptic bronchoscopy.Am.Rev. Resp. Dis. 1979; 80: 575 -578.

9. T.Jayachandra, Somnath Dash, G.Srinivas, P.V.Prabhakara Rao. A study on rapid confirmation of pulmonary tuberculosis in smear negative acid fast bacilli cases by using fibreoptic bronchoscopy, done through a trans oropharyngeal spacer; Journal of family and community medicine 2012;19: 43 -46.
10. K.B.Gupta, Puneet Chopra. Use of fibreoptic bronchoscopy in increasing diagnostic yield in smear negative tubercular pleural effusion. Lung India 2007; 24: 17 – 19.