

To Evaluate the Diagnostic Value of Various Procedures Like Endobronchial Biopsy, Bronchial Brushing, Bronchial Aspirate/Wash and Post Bronchoscopic Sputum Specimens in Diagnosis of Lung Malignancies

Neerav Tyagi

MBBS, MD (TB & Chest), Assistant Professor, Department of T.B. & Chest,
Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India.

ABSTRACT

Background: Fiberoptic bronchoscopy has become an important diagnostic and therapeutic tool for management of chest diseases and has revolutionized practice of pulmonary medicine. Therefore it was planned to perform this prospective study to know the diagnostic yield of various procedures done through FOB in patients whom there is a clinic-radiological suspicion of malignancy.

Material & Methods: This prospective study was performed in patients reporting to Department of T.B. & Chest, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India. Patients having radiological suspicion on the basis of (X-ray chest and or CT Thorax) presenting with or without respiratory symptoms underwent diagnostic fiberoptic bronchoscopy. Approval for this study was taken from the ethical committee of the College. Consent was taken from all patients included in the study.

Results: Out of total 75 suspected cases included in this study 63 cases were proved of confirmed lung cancer by FOB. out of 63 cases of lung cancer, 56 (88.88%) were males, 7 (11.12%) were females. 42 (66.66%) patients resided in rural area while 21 (33.33%) patients belonged to urban areas. 90.46% of the patients were in the 30-60 years of age groups and 9.5% patients more than 60 years of age group. Squamous

carcinoma is the commonest cell type 31(49.2%) & overall yield of FOB was 92% cases.

Conclusion: FOB is the most valuable diagnostic procedure available which is continuously being updated with advancements. Ease of procedure under general anaesthesia, great maneuverability of the instrument, minimum discomfort and complications has established FOB as procedure of first choice in the diagnosis of lung cancer.

KeyWords: Fiberoptic Bronchoscopy, Bronchial Wash, Bronchial Biopsy, Lung Cancer.

*Correspondence to:

Dr. Neerav Tyagi,
Assistant Professor,
Department of T.B. & Chest,
Rama Medical College, Hapur, Uttar Pradesh, India.

Article History:

Received: 07-12-2017, Revised: 02-01-2018, Accepted: 14-01-2018

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2018.4.1.143	

INTRODUCTION

Over the past century lung cancer has taken its course from being an obscure disease to a leading cause of death worldwide. Lung cancer is one of the commonest cancers and cause of cancer related deaths all over the world. It accounts for 13% of all new cancer cases and 19% of cancer related deaths worldwide. In India lung cancer constitutes 6.9% of an India all new cancer cases and 9.3% of all cancer related deaths in both sex, it is the commonest cancer and cause of cancer related mortality in men.¹ There is increasing awareness to render the most accurate diagnosis using the least invasive procedures. As such respiratory tract cytology has been well established throughout the world as a diagnostic procedure in the evaluation of patient with suspected lung malignancy.²

The generation of bronchoscopy began with German Laryngologist Gustav Killian in 1876 who is the founder of Bronchoscopy who used esophagoscope to remove Pork bone

from right bronchus of a farmer.³ In 1964 a Japanese physician Shigeto Ikeda father of Fiberoptic Bronchoscopy revolutionized the field of bronchoscopy by his novel diagnostic innovation.⁴ Flexible Bronchoscopy has shown a phenomenal exponential growth in pulmonology and clinical medicine. Due to its maneuverability, feasibility of wide spectrum of diagnostics and therapeutics, patient comfort and ease of conscious sedation has established flexible bronchoscopy as the most important diagnostic tool in a pulmonologists armamentarium⁵, radiological and clinical evaluation is very important prior to the bronchoscopy. This is shifting the focus from diagnosis of advanced lung cancer in inoperable patients to the use of cytology as a first line diagnostic tool. FFB is used to diagnose both central and peripheral lung lesions. It is the simplest method for obtaining material from the suspicious lesion with little morbidity and almost negligible mortality.⁶

Few studies regarding yield of FOB with its various procedures are reported in last one decade. With improved technology in FOB and cytopathological advancements; therefore it was planned to perform this prospective study to know the diagnostic yield of various procedures done through FOB in patients whom there is a clinic-radiological suspicion of malignancy.

MATERIALS & METHODS

This prospective study was performed in patients reporting to Department of T.B. & Chest, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India. Patients having radiological suspicion on the basis of (X-ray chest and or CT Thorax) presenting with or without respiratory symptoms underwent diagnostic fiberoptic bronchoscopy. Approval for this study was taken from the ethical committee of the College. Consent was taken from all patients included in the study.

Inclusion Criteria

The inclusion criteria for all the patients having with clinico-radiological suspicion of malignancy.

Exclusion Criteria

Patients who are moribund, not fit, refusal for consent.

The clinico-radiological suspected patients of lung cancer attending OPD as well as those admitted in the hospital were

selected in this study. As per Bronchoscopic findings (lesion) the material was collected through various procedures like Endobronchial biopsy, Bronchial Brushing, Bronchial Aspirate/Wash. These specimens were send for microbiological, cytological and histo-pathological examinations.

After Bronchoscopy

Patients were advised fluids after one & half hours of completion of procedure and solid food after 2 hour of procedure.

Specimen Collection

1. Bronchial biopsy was obtained by fenestrated or toothed forceps from visible lesions (mass or bulging from walls). The tissue obtained was preserved in alcohol and send for histopathological examination.
2. Bronchial brushings were taken by using sheath protected brush introduced through suction channel. Brush was rubbed against the lesion and the specimen obtained was spread over the glass slides. These slides were sent for cytological examination.
3. Bronchial Aspiration: For collection of bronchial aspirate the tip of the bronchoscope was placed adjacent to the lesion. 60-80 ml of normal saline was injected in small aliquotes and washing were collected in mucous trap via direct suction through FOB.

Table 1: General information of Confirmed cases of Lung Cancer

Particulars	No. of patients	Percentage
Sex		
Male	56	88.88%
Female	7	11.12%
Residence		
Rural	42	66.66%
Urban	21	33.33%
Age Group (yrs)		
30-40	13	20.63%
41-50	24	38.09%
51-60	20	31.74%
61-70	2	3.17%
>70	4	6.34%

Table 2: Diagnostic yield of different FOB procedures in Confirmed cases of Lung Cancer

Procedure	No. of cases	Percentage
Br. Biopsy+ Br. Brushing+ Br. Washing	6	9.52%
Br. Biopsy+ Br. Brushing	32	50.79%
Br. Brushing+ Br. Washing	5	7.93%
Bronchial Biopsy	9	14.28%
Bronchial brushing	11	17.46%
Bronchial aspirate	0	0%
Total	63	100%

Table 3: Histological pattern of Malignancy in Confirmed Cases of Lung Cancer

Diagnosis	No. of cases	Percentage
Squamous cell carcinoma	31	49.20%
Adenocarcinoma	22	34.92%
Small cell carcinoma	7	11.1%
Large cell carcinoma	2	3.17%
Poorly Differentiated Carcinoma	1	1.58%
Total	63	100%

Table 4: Overall yield of FOB/ Final diagnosis (N=75)

Findings	No. of cases	Percentage
Malignancy	63	84%
Pulmonary tuberculosis	4	5.33%
Pyogenic infection	2	2.66%
Total	69	92%

RESULTS

Out of total 75 suspected cases included in this study 63 cases were proved of confirmed lung cancer by FOB. out of 63 cases of lung cancer, 56 (88.88%) were males, 7 (11.12%) were females. 42 (66.66%) patients resided in rural area while 21 (33.33%) patients belonged to urban areas. 90.46% of the patients were in the 30-60 years of age groups and 9.5% patients more than 60 years of age group (table 1). Diagnostic yield of different FOB procedures in Confirmed cases of Lung Cancer seen in table 2.

Squamous carcinoma is the commonest cell type 31(49.2%) found followed by adenocarcinoma 22(34.92%), small cell & large cell 11.1% and 3.17% respectively and 1.58% poorly differentiate carcinoma in our study (table 3) & overall yield of FOB was 92% cases (table 4).

DISCUSSION

Present study suggested that male preponderance with more reside in rural area and mostly in younger age group. The male predominant pattern is probably due to higher prevalence of smoking in males, more environmental, occupational exposure and also more social awareness in males as compared to females. Similar male predominance was reported in various studies AB Fuladi et al (2004)⁷ who found M:F ratio of 6.22:1, Jagdish Rawat et al (2010)⁸ 8.2:1, Anupam Sarma et al (2013)⁹ 4.75:1 & Manoj Kumar Arya et al (2016)¹⁰ 3.5: 1. Majority of patients 65.33% were from rural areas possibly due to higher smoking habits and field work with varied environmental/occupational exposure making related symptomatology and presentation more common.

In present study, most cases (90.46%) belonged to 30-60 yrs age groups. Youngest age patient was 29 years & eldest patient was 76 years old with mean age of 47.6 years which is similar to study done by Vishal R. More et al (2017)¹¹ mean age was 47.3 years. Mean age in other studies like AB Fuladi et al (2004)⁷ was 53.76 yrs, Anupam Sarma et al. (2013)⁹ was 58.72 yrs, B. J. Arun et al (2014)¹² 60.91 yrs, Manoj Kumar Arya et al (2016)¹⁰ 54.98 years higher than our study.

Bronchial aspirate/wash collected in all cases & detected malignant cells only in 14 (18.66%) cases. There is a mixed opinion regarding performing bronchial washing as a routine FOB procedure. This could be related to timing of washings before biopsy and brushing in our patients. While studies by Van der Drift et al¹³ and Raymond et al¹⁴ showed no difference in diagnostic yield relative to the timing of washings for bronchoscopically visible tumours, Scriven et al¹⁵ showed a higher yield for washings after biopsy and brushing. Dasgupta et al¹⁶ found bronchial wash to provide least diagnostic information and was never positive when results of any of the other sampling techniques were negative.

Similar to our study Srikant Raghu et al (2016)¹⁷ found lower yield with bronchial washings (8%). AB Fuladi et al (2004)⁷ 70.76%,

Anupam Sarma et al (2013)⁹ 30% and B. J. Arun et al (2014)¹² 45.1%, have reported higher diagnostic yield of bronchial washing.

Bronchial brushing was obtained in 60 cases and in rest of the 15 cases brushing could not be performed because of excessive bleeding due to prior bronchial biopsy. Bronchial brushing was positive for malignant cytology in 76.66% cases and inconclusive in rest. Majority of studies¹⁸⁻²⁰ performed over years have concluded that brushing is a very useful procedure in which positive yield ranged from 50% to 90% with an average yield of 72% although it has a high average yield.

In present study squamous cell carcinoma was found in 56.5%, Adenocarcinoma 15.2%, small cell ,large cell and poorly differentiated carcinoma 2.17% each and smear suggestive of malignancy in 22% .^{7,9,21,22}

Overall yield of fob for diagnosing malignancy was 84% and overall yield for diagnosed lung diseases was 92%. A changing histological pattern in lung cancer is seen in many parts of the world and some studies in India report the same, but in our study no such histological drift was seen. But an overall increase in adenocarcinoma was seen compared to prior records of our hospital which is in congruence to various other authors.^{8,9,12,23}

CONCLUSION

FOB is the most valuable diagnostic procedure available which is continuously being updated with advancements. Ease of procedure under general anaesthesia, great maneuverability of the instrument, minimum discomfort and complications has established FOB as procedure of first choice in the diagnosis of lung cancer.

REFERENCES

1. World Cancer Report 2014(Updated February 2015), Indian J Med Res 141, January 2015, pp5-7.
2. Herth FJF. Bronchoscopic techniques in diagnosis and staging of lung cancer. *Breathe* 2011; 7 (4): 324-337.
3. Killian G: Direct endoscopy of upper air passages and oesophagus: Its diagnostic and therapeutic value in search for and removal of foreign body. *JLaryngolRhinolOtol* 1902;18:461-468.
4. Lkeda S: Flexible bronchofiberscope. *Ann et al rhinollaryngol* 1970;79:916-927.
5. Preyas J Vaidya, Joerg D Leuppi and Prashant N Chhajed. The evolution of flexible bronchoscopy: From historical luxury to utter necessity. *Lung India*. 2015 May-Jun; 32(3):208-210.
6. El-Bayoumi E and Silvestri GA. Bronchoscopy for the diagnosis and staging of lung cancer. *Semin Respir Crit Care Med* 2008; 29 (3): 261-270.
7. AB Fuladi, RP Munje, BO Tayade. Value of Washings, Brushings, and Biopsy at Fiberoptic Bronchoscopy in the Diagnosis of Lung Cancer. *JACM* 2004; 5(2): 137-42

8. Jagdish Rawat, Girish Sindhwani, Dushyant Gaur, Ruchi Dua, Sunil Saini. Clinico-pathological profile of lung cancer in Uttarakhand. *Lung India*; Jul - Sep 2009; 26(3): 74-76.
9. Anupam Sarma, J. D. Sharma, C. Bhuyan, A. C. Kataki, R. A. Sangma. A Study of Cytological Evaluation of Bronchial Washing and Brushing In Bronchogenic Carcinoma. *International Journal of Scientific and Research Publications*, August 2013; 3(8):1-7.
10. Manoj Kumar Arya, Mahendra Kumar Bainara, Mayanka Seth. Bronchoscopic Procedures Yield in Endoscopically Visible and Peripheral Lung Malignancy: Prospective Analysis of 100 Lung Cancer Patients. *International Journal Of Scientific Research*. September 2016; 5 (9):24-26.
11. Vishal R. More, B.O. Tayade, Sonal S. Arsude. Role of Flexible Video Bronchoscopy in Diagnosis of Pulmonary Lesions. *JMSCR*,2017; 05(03):19176-19184.
12. B. J. Arun, Guruprasad Antin, B. Vidyasagar. Role Of Fiberoptic Bronchoscopy In Suspected Cases Of Lung Cancer. *Journal of Evidence based Medicine and Healthcare*. 2014;1 (12):1494-1502.
13. Van der Drift MA, van der Wilt GJ, Thunnissen FB, Janssen JP. A prospective study of the timing and cost-effectiveness of bronchial washing during bronchoscopy for pulmonary malignant tumors. *Chest* 2005; 128:394-400.
14. Raymond NJ, McLeod S, Thornley PE. Timing of bronchial washing at fibre bronchoscopy improves the diagnostic rate of primary bronchial carcinoma [abstract]. *Thorax* 1991; 46:289P.
15. Scriven NA, MacFarlane JT, Clelland CA. Bronchial washings: when should we do them [abstract]? *Thorax* 1999; 54(suppl):84.
16. Dasgupta A, Jain P, Minai OA, et al. Utility of transbronchial needle aspiration in the diagnosis of endobronchial lesions. *Chest* 1999; 115:1237-41.
17. Srikanti Raghu, Chaitanya Sravanthi Rachaputi, Laxmi Kumari Somisetty. Flexible fiberoptic bronchoscopy (FOB) as a diagnostic tool in endobronchial lesions. *J NTR Univ Health Sci* 2016;5:173-5.
18. Choudhury M, Singh S, Agarwal S. Efficacy of Bronchial Brush Cytology and Bronchial washings in Diagnosis of non-neoplastic and neoplastic Bronchopulmonary lesions. *Turk Patoloji Derg*. 2012, 28:142-6.
19. Kvale PA, Bode FR, Kini S. Diagnostic accuracy in lung cancer; comparison of techniques used in association with flexible fiberoptic bronchoscopy. *Chest*. 1976; 69:752-7.
20. Saltzstein, SL, Harrell JH, Cameron T. Brusings, washings, or biopsy? Obtaining maximum value from flexible fiberoptic bronchoscopy in the diagnosis of cancer. *Chest*.1977;71(5):630-2.
21. Robert H. Richardson, Donald C. Zavala, Prashant K. Mukerjee, and George N. Bedell. The Use of Fiberoptic Bronchoscopy and Brush Biopsy in the Diagnosis of Suspected Pulmonary Malignancy. *American Review of Respiratory Disease*. 1974;109(1) :63-66.
22. Gauri Kulkarni and Saurabh Ambadekar. Study of Clinicoradiological Profile of Patients Undergoing Fiberoptic Bronchoscopy. *MVP Journal of Medical Sciences*, January-June 2017; 4(1): 64-69.
23. B Sultana, MI Patwary, M Rahman, Sahmm Islam, D Hossain. Role of Bronchial Brush Cytology in Diagnosis of Central Bronchial Carcinoma. *Journal of Bangladesh College of Physicians and Surgeons*. April 2017; 35(2):68-74.

Source of Support: Nil.

Conflict of Interest: None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882.

This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Neerav Tyagi. To Evaluate the Diagnostic Value of Various Procedures Like Endobronchial Biopsy, Bronchial Brushing, Bronchial Aspirate/Wash and Post Bronchoscopic Sputum Specimens in Diagnosis of Lung Malignancies. *Int J Med Res Prof*. 2018 Jan; 4(1):652-55. DOI:10.21276/ijmrp.2018.4.1.143