



**ORIGINAL RESEARCH PAPER**

**Pulmonary Medicine**

**DIAGNOSTIC YIELD OF BRONCHIAL WASHINGS, BRUSHINGS AND BIOPSY WITH FIBRE OPTIC BRONCHOSCOPY IN THE DIGNOSIS OF LUNG CANCER-A PROSPECTIVE OBSERVATIONAL STUDY.**

**KEY WORDS:** Carcinoma, Bronchial Washings, Brushings, Biopsy, Hilar Mass, Collapse.

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**ABSTRACT**

**Introduction:** Lung cancer is one of the commonest malignant neoplasm all over the world. It accounts for more cancer deaths in both men and women worldwide than any other cancer and is increasingly being recognized in India. For early diagnosis different diagnostic modalities are available which include; sputum cytology, imageology with guided procedures such as FNAC or biopsy, bronchoscopic sampling methods such as washings, brushings, and biopsy. It is not possible to perform all techniques in each patient because each has specific advantages and disadvantages and also not feasible in all patients. However, their combined use yields the best results **Aims And Objectives:** To evaluate the individual and combined diagnostic yield of bronchial washings, brushings and biopsy from the lesions with clinical and/ or radiological evidence suggestive of lung malignancy. **Materials And Methods:** An institution based prospective observational study was conducted over a period of 2yrs on 37 patients with clinical and/or radiological evidence suggestive of lung cancer. All the patients were subjected to bronchoscopic procedures such as washings, brushings and biopsy. **Results:** Out of 37 cases selected for study,32 patients were subsequently shown to have lung malignancy. Of them 30 cases were diagnosed by bronchoscopic procedures. Males were 23 (71.88%) and females were 09(28.12%).25 patients were smokers (78.13%) and 7 patients were non-smokers (21.87%). Most common radiological presentation was collapse pleural effusion (34.37%), followed by collapse (28.12%), mass lesion only (12.50%), hilar mass with collapse (12.50%). Yield of bronchial washings was 43.75%, brushings was 90.63%, biopsy was 86.96% and the total yield of procedures was 93.75%. Total yield of procedures in visible lesions was 100% and in peripheral lesions was 77.77%. Most common histological type of lung cancer was adenocarcinoma (36.36%), followed by squamous cell carcinoma (33.33%)

**INTRODUCTION**

Lung cancer is a significant public health concern, causing a considerable number of deaths globally. GLOBOCAN 2020 estimates of cancer incidence and mortality produced by the International Agency for Research on Cancer (IARC) show as lung cancer remains the leading cause of cancer death, with an estimated 1.8 million deaths (18%) in 2020.

Most patients are found to have advanced disease at the time of diagnosis and thus treatment of this population is disappointing, very often only palliative. Several studies however, have demonstrated that early detection, localization, and aggressive treatment of lung cancer results in five year survival rate of 70 to 80%.

To combat the disease successfully, it should be diagnosed at earliest possible stage. For early diagnosis different diagnostic modalities are available which include; sputum cytology, imageology with guided procedures such as FNAC or biopsy, bronchoscopic sampling methods such as washings, brushings, and biopsy. However their combined use yields the best results.

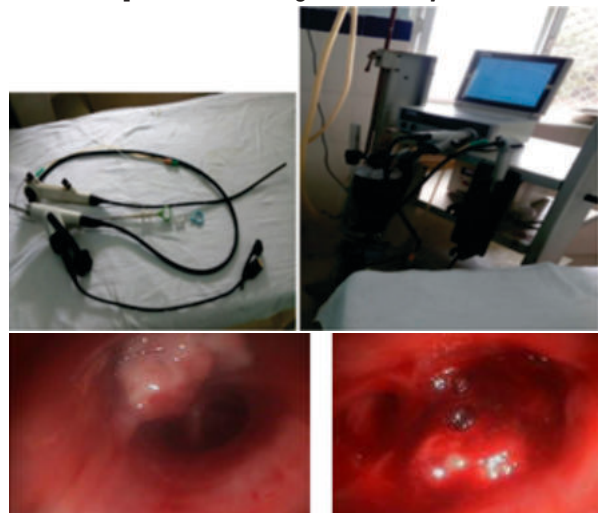
Fibreoptic bronchoscope helps in early detection of lung cancer by providing an avenue for inspection of peripheral airways including those of the upper lobes. Fibreoptic bronchoscopy has an excellent result in diagnosis of lung cancer when combined with brushing cytology & biopsy.

**MATERIALS AND METHODS:**

An institution based prospective observational study was conducted over a period of 2yrs on 37 patients with clinical and/or radiological evidence suggestive of lung cancer.

After obtaining well-informed written consent, bronchoscopies were performed as an elective procedure. Pre-bronchoscopy screening was done after taking history, physical examination, BT, CT, PT, platelet count, fresh X-ray

chest PA and lateral views and ECG, sputum smear for AFB on two consecutive days, xylocaine sensitivity test. bronchoscopies were performed with the patient lying supine with the operator standing at the head end. Transnasal passage was used. The brush and biopsy instrument are withdrawn through internal channel. The same fibreoptic bronchoscope was used throughout the study.



**OBSERVATION AND RESULTS:**

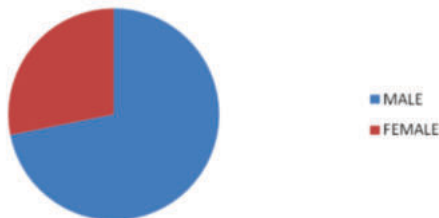
In the present study, out of 37 patients with clinical and/or radiological evidence suggestive of lung cancer 32 patients were confirmed to have lung cancer. 5 out of 37 patients were shown to have inflammatory changes, so they were started on ATT and responded well.

**Table 1: Age distribution**

Age distribution in years	Number of patients
31-40	3

41-50	6
51-60	16
61-70	11
71-80	1

sex distribution



The age of the patients being studied was between 34 to 75 years. Mean age was 57.24 years. In present study among 32 patients who were confirmed to have lung cancer, 23 were males and 09 were females. Male to female ratio is 2.55:1.

Table 2 Clinical Presentation

Cough	32	100%
Breathlessness	25	78.12%
Hemoptysis	12	32.50%
Chest pain	17	53.12%
Fever	6	18.75%
Hoarseness of voice	5	15.62%
Facial puffiness	2	6.25%
wheeze	3	9.37%

out of 23 male patients who were confirmed to have malignancy, all were smokers. In females, out of 9 patients 2 were smokers and 7 were non-smokers. clubbing was present in 19 patients

Table 3 Smoking Status

	Male	Female
Smokers	23	2
Non smokers	0	7

Table 4 Radiological Presentation

PRESENTATION	No. patients	Percentage (%)
Mass lesion only	04	12.50
Mass with collapse	01	3.12
Mass with rib destruction	01	3.12
Collapse	09	28.12
Collapse with pleural effusion	11	34.37
Mass with pleural effusion	02	6.25
Hilar mass with collapse	04	12.50

Table 5 :Yield of bronchoscopic procedures in confirmed cases(n=32)

S.NO	Procedures	Positive yield	Percentage (%)
1	Bronchial washing(n=32)	14	43.75
2	Bronchial brushing(n=32)	29	90.63
3	Bronchial biopsy(n=23)	20	86.96
	Total yield of procedures	30	93.75

Table 6:Yield of bronchoscopic procedures in visible and peripheral lesions:

Visible lesions (n=23)			Peripheral lesions (n=9)		
Procedure	No	%	Procedure	No	%
Washings	11	47.82	Washings	3	33.33
Brushings	22	95.65	Brushings	7	77.77
Biopsy	20	86.96	-	-	-
Total	23	100	Total	7	77.77

Table 7:Nature of the lesion and yield of bronchoscopy:

Nature of the lesion	Bronchial wash yield	Bronchial brush yield	Bronchial biopsy yield
Exophytic growth(n=13)	06	12	10
Polypoid growth(n=3)	03	03	03
Nodular lesion(n=1)	00	01	01
Mucosal ulcer(n=6)	02	06	06
Mucosal rugosity(n=3)	01	02	-
External compression(n=6)	02	05	-

Table 8 Types of cancers diagnosed by FOB(n=30)

Histological type	No. patients	Males	Females	Percentage(%)
Adenocarcinoma	12	07	05	36.36
Sq.cell carcinoma	10	08	02	33.33
Small cell carcinoma	05	04	01	16.67
Adenosquamous carcinoma	02	01	01	6.67
Other types(round cell tumor of lung)	01	01	-	3.33

DISCUSSION:

Lung cancer is the most common cause of cancer related deaths in males, and is now emerging as an important cause of neoplastic mortality in females. In the present study a total of 37 patients of clinically and/or radiologically suggestive of lung cancer were included, among them 32 patients were found to have lung cancer. 5 out of 37 patients were shown to have inflammatory changes and started on ATT and responded well.

In the present study, the mean age of the patients was 57.24 years. Most of the patients belongs to 5th or 6th decade. Out of Patients with confirmed malignancy 23(71.87%) were males, and 09(28.12%) were females with male to female ratio of 2.56:1. And 25(78.12%) patients are smokers and 07(21.87%) patients are non-smokers. Smokers to non-smokers ratio was 3.57:1.

Most common clinical presentation in the present study was cough (100%) followed by breathlessness (78.12%). This is similar to a previous study done by Dr Srividya et al in which cough was the most common symptom (100%) and haemoptysis was present in 32.50% and chest pain in 53.12% which is also similar to a study done by Ehsan ullah et al in which haemoptysis present in 39% and chest pain in 52.1% of patients.

In the present study, lung cancer was predominantly involved the right lung in 68.25% of patients. In a study done by Dr Srividya et al right lung was involved in 60% and left lung was involved in 40% of patients.

The most common radiological presentation was collapse with pleural effusion (34.37%) and collapse(28.12%). In other previous studies done by Dr Srividya et al and Jindal et al most common radiological presentation was mass lesion that was 55% and 64% respectively followed by pleural effusion.

In the present study out of 32 patients who were confirmed to have lung malignancy, bronchial washings were positive in 43.75% and bronchial brushings was positive in 84.37% of patients, and biopsy shown malignancy in 82.61% of patient. Yield of bronchial washings in visible lesions and peripheral lesions was 47.82% and 33.33 respectively. In a study done by Jones et al yield of bronchial washings from visible lesions was 48% which is similar to the present study.

In the present study in one case only bronchial washing was positive for malignant cells, brushings and biopsy were negative for malignant cells, which may suggest that addition of bronchial washings is beneficial in all suspected cases of malignancy. J Rawat et al also found in their study that only bronchial washings were diagnostic in 2 cases (1.86%)

In the present study the overall yield of bronchial washings in suspected lung malignancy was 43.75%. Where as in other study done by AB Fuladi et al reported that the overall yield of bronchial washings from suspected lung cancer was 70.76%, which is higher than the present study. The low diagnostic results in washing might be due to the following reasons as explained above. 1) Tumours just confined to bronchial wall not infiltrating into lumen. 2) Tumour necrosis 3) Lack of exfoliation due to poor communication of tumour with bronchus secondary to bronchial stenosis. 4) Improper interpretation of wash cytology

In the present study bronchial brushing yield for endobronchial visible lesions was 95.65%. In a study done by Kotadia et al yield of bronchial brushings was 83.3%. The higher diagnostic yield of brushing might be due to increased likelihood of collecting malignant cells from the lesion by back and forth strokes made during the collection of brushing material as it covers larger area and also due to better cellular yield with minimal cell degeneration in brushings rather than in washings and other cytological specimen.

In the present study yield of bronchial biopsy was 86.96%. In a previous study conducted by Gaber et al showed that yield of bronchial biopsy was 79% which is close to the present study. And the overall yield of bronchoscopy from visible lesions was 100%.

In the present study most common histological type of lung cancer was adenocarcinoma. In a previous study done by Prabhat Singh Malik et al and Vivekanand N et al have reported that Adenocarcinoma was the most common histological type in their study.

In the present study 3 patients had developed mild bleeding and 2 patients developed fever after bronchoscopy which were subsequently treated. No serious complications had occurred during or after bronchoscopic procedure.

**Limitations OfThe Present Study:**

1. Small sample size
2. Less number of samples(2 to 3) taken by biopsy in the present study due to risk of bleeding.
3. EBUS and EMN were not done.

**CONCLUSIONS:**

It can be inferred that bronchoscopy safe and important diagnostic modality in the early diagnosis of bronchogenic carcinoma. In investigating suspected cases of lung malignancy, a bronchoscopist should adopt all the three diagnostic procedures such as biopsy, brushing, and washing to increase the yield of diagnosis. Even though in the present study yield of brushing is more than biopsy (due to less number of samples taken in the present study because of risk of bleeding), we suggest that biopsy should be done in all cases wherever possible for better yield and accurate cell typing.

**REFERENCES:**

1. Pancharia A, Yadav V, Taneja C, Chauhan S, Chauhan R, Gauttam V. A study of correlation of bronchial brushing cytology with bronchial biopsy in diagnosis of lung cancer. *J Pharm Biomed Sci* 2014;04(06):492-496.
2. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, 1. Mathers C, et al. *GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11*. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>, accessed on January 21, 2014.
3. National Cancer Registry Programme. Three Year Report 2. of Population Based Cancer Registries: 2009-2011. Indian Council of Medical Research; 2013. Available from: <http://www.ncrpinidia.org>, accessed on January 21, 2014.
4. 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.
5. Aziz F, Ihsan H. Diagnostic evaluation of bronchial washing, brushing and biopsy in bronchogenic carcinoma: a prospective study of 97 cases. *Ann King Edward Med Cell* 1998; 4:5-6.
6. Karahalli E, Yilmaz A, Turker H, et al. Usefulness of various diagnostic techniques during fiberoptic bronchoscopy for endoscopically visible lung cancer: should cytologic examination be performed routinely? *Respiration* 2001; 68:564-5.
7. Chaudhry MK, Rasul S, Iqbal ZH, et al. Fiberoptic bronchoscopy - role in the diagnosis of bronchogenic carcinoma. *Biomedica* 1998; 14:32-6.
8. D Behera; epidemiology of lung cancer - global and Indian perspective; *JACM* 2012; 13(2):131-7
9. Minoru Matsuda, Takeshi Horai, Shinichiro Nakamura, Bronchial Brushing And Bronchial Biopsy: Comparison Of Diagnostic Accuracy And Cell Typing Reliability In Lung Cancer *Thorax* 1986; 41:475-478
10. Ahmad M, Afzal S, Saeed W, Mubarik A, Saleem N, Khan SA et al.; Efficacy of Bronchial Wash Cytology and its correlation with Biopsy in Lung Tumours. *Journal Of Pakistan Medical Association*, 2004.
11. J. Rawat, G. Sindhwani, S. Saini, S. Kishore, A. Kusum and A Sharma usefulness and cost effectiveness of bronchial washing in diagnosing endobronchial malignancies, *Lung India* 2007; 24 : 139-141.
12. Dr. Srividya. V.V.L, Dr. Sailendra. Vaddadi, Dr. Dost Mohmadkhan correlation study of lung tumors by bronchial washings, brush biopsy & forceps Biopsy, *Int J Biol Med Res.* 2014; 5(1): 3817-3826.
13. Tarun P Kotadia, Jasmin H Jasani and Parul N Vekaria, Comparison of bronchial biopsy, broncho alveolar lavage (BAL), brush cytology and imprint cytology in suspected cases of lung cancer, *IJBAR* (2013) 04 (09):579-584
14. Sarma A, Sharma JD, Bhuyan C, Katak AC, Sangma RA; A study of cytological evaluation of bronchial washing and brushing in Bronchogenic Carcinoma. *International Journal of Scientific and Research Publications*, 2013; 3(8): 1-7.
15. Ehsan Ullah, Nadeem Rreyaz, Farooq Aziz, A.H. Nagi and M. Ashraf; demographic and clinicopathological parameters in lung cancer in a chest hospital, lahore - Pakistan; *Biomedica Vol. 28* (Jan. - Jun. 2012) 14-17
16. Arora VK, Seetharaman ML, Ramkumar S, Mamatha TV, Subbarao KSVK, Banerjee A et al.; Bronchogenic carcinoma. Clinicopathological pattern in South Indian Population. *Lung India*, 1990; 8(3): 133-136.
17. Jindal SK. 1982 Jindal SK, Malik SK, Datta BN, and SK Gupta (1982): Experience with flexible fiberoptic bronchoscopy in lung cancer: *Indian Journal of Chest Disease and Allied Sciences* : 24 : 239 - 43
18. Mori K, Yanase N, Kaneko M, et al. Diagnosis of peripheral lung cancer in cases of tumors 2 cm or less in size. *Chest* 1989; 95:304-308.
19. Chhajed PN, Athavale AU, Shah AC. Clinical and pathological profile of 73 patients with lung carcinoma: Is the picture changing? *JAPI* 1999; 47 (5): 44-8.
20. Sayami G, Sayami P. Bronchial brushing cytology in suspected lung cancer. *JNMA*. 1993; 31:132-7.