



CYTO-HISTOLOGICAL CORRELATION OF BRONCHIAL BRUSH AND BRONCHIAL BIOPSY IN LUNG MALIGNANCIES

Dr. B. Jyothi*	Assistant Professor, Upgraded Department of Pathology, Osmania Medical College, Hyderabad, Telangana*Corresponding Author
Dr. S. Vandhana	Assistant Professor, Upgraded Department of Pathology, Osmania Medical College, Hyderabad, Telangana
Dr. S.Sujatha	Professor, Department of Pathology, Government General and Chest Hospital, Erragadda, Hyderabad, Telangana

ABSTRACT **BACKGROUND:** Lung cancer is one of the most common cancer and cause of cancer related deaths in about 29% of males and 26% of females all over the world. Fiberoptic bronchoscopy has an excellent result in diagnosis of lung cancer when combined with brushing cytology and biopsy. **AIM:** The Aim of the study is to correlate cytological and histological findings in diagnosing lung carcinomas. **MATERIALS AND METHODS:** This study was done in Department of Pathology, Government General and Chest Hospital, Erragadda, Hyderabad, Telangana from June 2018 to May 2020. 240 clinically suspected cases of lung malignancies underwent both bronchial brush and bronchial biopsy and were included in this study. **RESULTS:** Out of 240 cases, malignancy was confirmed in 194 cases by histopathology of bronchial biopsy, in which 152 cases were well correlated with brush cytology. Bronchial brush cytology showed sensitivity of 78.35% , specificity of 100% and accuracy of 82.5%. **CONCLUSION** Bronchial biopsy has better detection rate than bronchial brush cytology in this study. However combination of brush cytology and biopsy can be considered as the best procedures for the diagnosis of lung malignancies.

KEYWORDS : Bronchial Biopsy, Bronchial Brush Cytology, Fiberoptic Bronchoscopy, Lung Malignancy.

INTRODUCTION

Lung cancer is the most frequently diagnosed cancer and also the leading cause of all cancer associated deaths in the world¹. It is the commonest cause of cancer related mortality in men². According to recent studies the incidence is on the rise in women³. Most patients are found to have advanced disease at the time of diagnosis and thus treatment of this population is disappointing and often only palliative⁴. To combat the disease successfully it should be diagnosed at earliest possible stage. For early diagnosis different diagnostic modalities are available which includes Radiology, Bronchoscopy, Bronchial biopsy, Exfoliative Cytology, Brushing, Washing, Sputum Cytology and Fine needle aspiration cytology. It is not possible to perform all techniques in each patient because each has specific advantages and disadvantages. Presently Fiber-optic bronchoscopy is the most widely used technique for the diagnosis of lung cancer. Bronchoscopy, followed by Brushing and Biopsy in clinically suspected cases, is the diagnostic procedure in this study. Bronchial brushings often offer excellent specimens and accurate information about the site of the lesion. In general the concordance between cytology and histopathology ranges from 70% to 90% and the bronchial biopsy is confirmatory for most of the cytological findings. The aim of the study is to determine the diagnostic accuracy of bronchial brushing with histopathological examination of bronchial tissue biopsy.

MATERIAL AND METHODS: This is a prospective study conducted in the Department of Pathology in Government General and Chest Hospital, Erragadda, Hyderabad, Telangana. Brush cytology specimens were collected. The brush along with adhered cells was smeared on glass slides and fixed immediately and stained with Hematoxylin & Eosin (H&E) after fixation. Bronchial biopsy specimens were collected by the bronchoscope. The specimens were fixed in formalin and processed in automated tissue processor and sections were prepared and stained with H&E stain.

INCLUSION CRITERIA: A total of 240 clinically suspected cases of lung cancer undergoing brush cytology and bronchial biopsy done were included in the study.

EXCLUSION CRITERIA: Cases with normal bronchoscopic findings were excluded from the study. Patients who were not willing to undergo the procedure or were not medically fit for the procedure were excluded.

RESULTS

In this study majority cases (78.33%) were males with male female ratio of 3.6:1 and the mean age of the sample was 56.72 yrs with a range of 21-80 yrs. 240 clinically suspected cases subjected to bronchoscopy were included in this study, lung cancer was confirmed in 194 cases by

histopathology, in which 152 cases were well correlated with brush cytology. In that squamous cell carcinoma was found to be the commonest lung cancer (30.83%), followed by adenocarcinoma (21.66%), and poorly differentiated carcinoma (15%).

TABLE:1 TYPES OF CARCINOMA DIAGNOSED BY BRUSH CYTOLOGY

TYPES OF CARCINOMA	NUMBER OF CASES	PERCENTAGE
Squamous cell carcinoma	60	25%
Adenocarcinoma	42	17.5%
Poorly differentiated carcinoma	28	11.66%
Small cell carcinoma	14	5.83%
Small round cell tumor	4	1.66%
Large cell carcinoma	2	0.83%
Secondary deposits	2	0.83%
No evidence of malignancy	88	36.66%
Total	240	100%

TABLE:2 TYPES OF CARCINOMA DIAGNOSED BY BIOPSY

HISTOLOGICAL TYPES OF CARCINOMA	NUMBER OF CASES	PERCENTAGE
Squamous cell carcinoma	74	30.83%
Adenocarcinoma	52	21.66%
Poorly differentiated carcinoma	36	15%
Small cell carcinoma	22	9.16%
Small round cell tumor	6	2.5%
Large cell carcinoma	2	0.83%
Secondary deposits	2	0.83%
No evidence of malignancy	46	19.16%
Total	240	100%

TABLE:3 COMPARISON BETWEEN BRUSHING AND BIOPSY

Bronchial brushing/biopsy	Biopsy positive	Biopsy negative	Total
Brushing positive	152	0	152
Brushing negative	42	46	88
Total	194	46	240

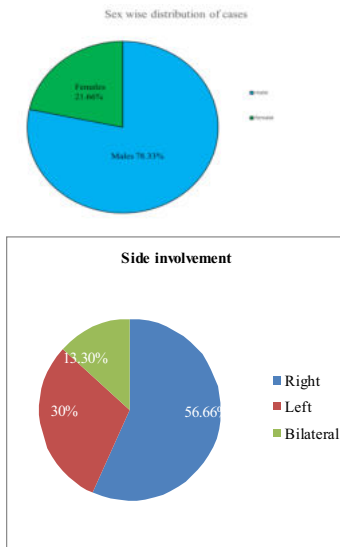
TABLE:4 DISCREPANCIES IN CYTOLOGY

TYPES OF CARCINOMA	NUMBER OF CASES	PERCENTAGE
Squamous cell carcinoma	14	33.33%
Adenocarcinoma	10	23.8%
Poorly differentiated carcinoma	8	19.04%
Small cell carcinoma	8	19.04%
Small round cell tumor	2	4.76%
Total	42	100%

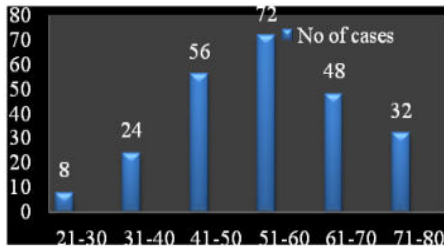
As shown in Table 4:

There were 42 cases of bronchial brush which were not correlated with bronchial biopsy of were 14 cases (33.33%)of squamous cell carcinoma, 10 cases(23.8%) of adenocarcinoma, 8 cases (19.04%) of poorly differentiated carcinoma, 8 cases(19.04%) of small cell carcinoma and 2 cases (4.76%) of small round cell carcinoma

SEX WISE DISTRIBUTION OF CASES



AGE WISE DISTRIBUTION OF CASES



BRUSH CYTOLOGY IMAGES

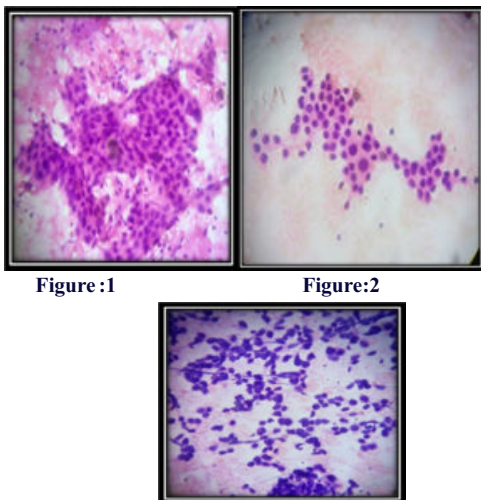


Figure:3

Figure :1- Squamous cell carcinoma

Figure:2- Adenocarcinoma

Figure:3- Small cell carcinoma

BRONCHIAL BIOPSY IMAGES:

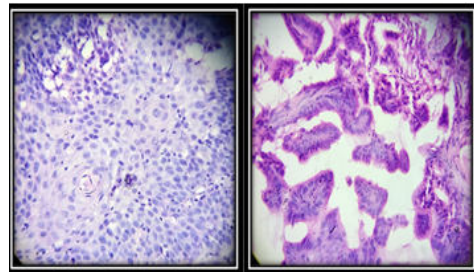


Figure:4

Figure:5

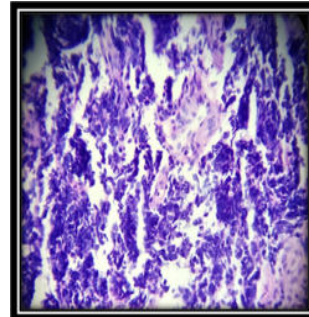


Figure:6

Figure:4- Squamous cell carcinoma

Figure:5- Adenocarcinoma

Figure:6- Small cell carcinoma

DISCUSSION:

In India, lung cancer accounts for 6.8% of all malignancies and prevalence differs from one region to other. Lung cancer is the most common malignancy in males, which accounts for 31% of all cancer deaths in men and 25% in women. Bronchial brushing helps in early diagnosis of lung carcinoma.

Out of 240 cases 188 were males (78.33%),females were 52 cases (21.66%).Right sided involvement in 136 cases (56.66%),left side involvement in 72 cases (30%),bilateral in 32 cases (13.3%). 188 cases were males which reflects greater prevalence of smoking among males. Male predominance was observed in studies by Nazia Bhat et al⁶(647 cases) and Rakan M. Haddad at al⁷(87 cases). Smoking is considered to be the cause of 85 % of deaths due to lung cancer^{8,9}

Right main bronchus was most commonly involved by visible tumour in this study which was similar to Rateesh Sareen et al¹⁰

In present study age range was 21-80 yrs and mean age was 56.72 yrs whereas in Anitha Bodh et al¹¹, age range was 25-89yrs and mean age was 62 yrs and in Gang Hou et al¹² study age range was 26-78 yrs and mean age was 57.2yrs.

In biopsy the most common carcinoma was Squamous cell carcinoma 74 cases (30.83%),followed by Adenocarcinoma 52 cases (21.66%),Poorly differentiated carcinoma 36 cases (15%),Small cell carcinoma 22 cases (9.16%),Small round cell tumour 6 cases (2.5%),Large cell carcinoma 2 cases (0.83%),Secondary deposits 2 cases (0.83%),No evidence of malignancy in 46 cases (19.16%).

In cytology 60 cases (25%) were Squamous cell carcinoma , followed by Adenocarcinoma 42 cases(17.5%), Poorly differentiated carcinoma 28 cases(11.66%), Small cell carcinoma 14 cases(5.83%), Small round cell tumour 4 cases(1.66%), Large cell carcinoma 2 cases (0.83%),Secondary deposits 2 cases (0.83%), No evidence of malignancy in 88 cases(36.66%).

Out of 240 cases malignancy was confirmed in 194 cases (80.83%) by histopathology of bronchial biopsy. In that 152 cases were well correlated with brush cytology. 42 cases which were not correlated were 14 cases (33.33%)of Squamous cell carcinoma, 10 cases(23.8%)

of Adenocarcinoma, 8 cases (19.04%) of Poorly differentiated carcinoma, 8 cases (19.04%) of Small cell carcinoma and 2 cases (4.76%) of Small round cell carcinoma.

In this study the most common carcinoma in biopsy was found to be Squamous cell carcinoma (30.83%), similar to Eva Piya et al¹³ (64.1%), and Minoru Matsuda et al¹⁴ (96.2%) studies. This study is at variance to western literature where incidence of Adenocarcinoma has surpassed Squamous cell carcinoma¹⁵ and its incidence is increasing rapidly all over the world. Studies in India by Prabhat Singh et al¹⁶ and Raj SM et al¹⁷ also reported Adenocarcinoma as the most common histological type.

Sensitivity and specificity of bronchial brushing in the present study was 78.35% and 100% whereas diagnostic accuracy was 82.5%. According to Gaur et al¹⁸ sensitivity and specificity was 39.4% and 89.6% and diagnostic accuracy was 71.40% and in the study of M. Ahmad et al¹⁹ bronchial wash cytology revealed sensitivity 80.5%, specificity 96.6% and accuracy 87.3%.

Correct histological typing of lung cancer is important in clinical management. Although histopathology remains the gold standard for diagnosis one can rely on cytology. Bronchial brush, though it is inferior to bronchial biopsy in histological typing, it is quite safe, less invasive, economical and provide quick results as compared to bronchial biopsy^{20,21}. Combination of bronchial cytology and biopsy can be considered as the best procedures for diagnosis of lung lesions.

CONCLUSION:

From this study it is concluded that, there is a definitive role of bronchial brushing in diagnosis of lung malignancies. Bronchial brushing and biopsy are complementary procedures in diagnosing bronchogenic carcinoma. But, bronchial biopsy has better detection rate than brush cytology.

So Bronchial biopsy has been used as the Gold standard diagnostic test to assess the efficacy of cytologic techniques.

REFERENCES

- 1]. Parkin DM, Bray F, Ferlay J, Pisani P. Global cancer statistics, 2002. CA: a cancer journal for clinicians. 2005 Mar;55(2):74-108.
- 2]. GLOBOCAN2012. IARC (http://globocan.iarc.fr/Pages/fact_sheets/cancer.aspx) 3]. Behera D. Epidemiology of lung cancer-Global and Indian perspective. J Indian Acad Clin Med. 2012 Apr;13:131-7.
- 4]. Vyas SP. A Correlational Study of Bronchial Brushing With Bronchoscopic Biopsy in Diagnosis of Malignant Lung Neoplasms". International Journal of Scientific Research and Management. 2017 Mar 2;5(3):5186-92. 5]. Edell ES, Cortese DA. Bronchoscopic localization and treatment of occult lung cancer. Chest. 1989 Oct 1;96(4):919-21.
- 6]. Bhat N, Nazeer M, Bashir H, Bashir N, Farooq S, Fatima K, Baba KM. Correlation of bronchial biopsy with bronchoalveolar lavage in lung malignancies. Int J Res Med Sci. 2016 Feb;4(2):428-35
- 7]. Rakan M. Haddad MD*, Khaled M. Al-Nadi MD*, Hayat Khasawneh MD**, Awatef Kaabneh MD***, Raja M. Khasawneh*, Jafar A. Al-Momani MD* Adnan S. Al-Suleihat. Bronchial brushing and biopsy: a comparison of diagnostic yield in lung cancer patients at King Hussein Medical Center. JOURNAL OF THE ROYAL MEDICAL SERVICES Vol.27 No.2 August 2020
- 8]. Rennard SI. Bronchoalveolar lavage in the diagnosis of cancer. Lung. 1990;168:1035-40.
- 9]. Lachman MF, Schofield K, Cellura K. Bronchoscopic diagnosis of malignancy in the lower airway: A cytologic review. Acta Cytol. 1995;39:1148-51.
- 10]. Sareen R, Pandey CL. Lung malignancy: Diagnostic accuracies of bronchoalveolar lavage, bronchial brushing, and fine needle aspiration cytology. Lung India: official organ of Indian Chest Society. 2016 Nov;33(6):635. 11]. Bodh A, Kaushal V, Kashyap S, Gulati A. Cytohistological correlation in diagnosis of lung tumors by using fiberoptic bronchoscopy: Study of 200 cases. Indian Journal of Pathology and Microbiology. 2013 Apr 1;56(2):84.
- 12]. Hou G, Miao Y, Hu XJ, Wang W, Wang QY, Wu GP, Wang EH, Kang J. The optimal sequence for bronchial brushing and forceps biopsy in lung cancer diagnosis: a random control study. Journal of thoracic disease. 2016 Mar;8(3):520
- 13]. Piya E, Sayami G, Srivastava B. Correlation of bronchial brushing cytology with bronchial biopsy in diagnosis of lung cancer. Medical Journal of Shree Birendra Hospital. 2011;10(2):4-7.
- 14]. Minoru Matsuda, Takeshi Horai, Shinichiro Nakamura, Hiroshi Nishio, Takahiko sakuma, Harumichi Ikegami, Rhuhei Tateishi. Bronchial brushing and bronchial biopsy: comparison of diagnostic accuracy and cell typing reliability in lung cancer. Thorax 1986;41:475-478
- 15]. Wahbah M, Boroumand N, Castro C, El-Zeky F, Eltorkey M. Changing trends in the distribution of the histologic types of lung cancer. A review of 4, 439 cases. Ann Diagn Pathol. 2007;11:89.
- 16]. Prabhat SM, Mehar CS, Bidhu KM, N K Shukla, SVS Deo, Anant M, Guresh K, Vinod R. Clinico-pathological profile of lung cancer at AHMS: A changing paradigm in India. Asian Pacific Journal of Cancer Prevention, Vol 14, 2013
- 17]. Mathan RS., Sowmiya M. Does a routine post brush bronchial wash increase the yield in diagnosis of lung cancer? Int J Res Med Sci. 2017 Jul;5(7):2878-2882.
- 18]. Gaur DS, Thapliyal NC, Kishore S, Pathak VP. Efficacy of broncho-alveolar lavage and bronchial brush cytology in diagnosing lung cancers. Journal of cytology. 2007 Apr 1;24(2):73.
- 19]. Ahmad M, Afzal S, Saeed W, Mubarik A, Saleem N, Khan SA, Rafi S. Efficacy of bronchial wash cytology and its correlation with biopsy in lung tumours. Journal-Pakistan Medical Association. 2004 Jan;54(1):13-6.
- 20]. Gaber KA. Cytologic examination of whole endobronchial brush in bronchoscopic

diagnosis of lung cancer. Respiratory Medicine. 2002;96(4):259-61.

- 21]. Thomas LP. Sputum cytology for early diagnosis of lung cancer. Current Opinion in Pulmonary Medicine. 2003;19(40):309-12.