

EFFICACY AND UTILITY OF BRONCHIAL CYTOLOGY IN DIAGNOSING LUNG LESIONS AND ITS HISTOPATHOLOGICAL CORRELATION

M. Sushanthi¹, D. Dhanalakshmi², Mahaboob Khan³

Received : 09/09/2022

Received in revised form : 02/10/2022

Accepted : 15/10/2022

Keywords:

Lung cancer, Large cell carcinoma, bronchoalveolar lavage, Non small cell carcinoma, bronchial brush, bronchial wash

Corresponding Author:

Dr. M. Sushanthi,

Email: sush.drpath@gmail.com

ORCID: 0000-0002-5422-2245

DOI: 10.47009/jamp.2022.4.5.9

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm

2022; 4 (5); 37-39



¹Assistant Professor, Department of Pathology, Government general and chest hospital/Osmania Medical College, Hyderabad, Telangana, India.

²Associate Professor: Department of Pulmonology, Government general and chest hospital/Osmania Medical College, Hyderabad, Telangana, India.

³Professor and Superintendent, Department of Pulmonology, Government general and chest hospital/Osmania Medical College, Hyderabad, Telangana, India.

Abstract

Background: Lung cancer is the leading cause of cancer mortality. Presently, various cytologic diagnostic techniques are being used in the evaluation of suspected lung neoplasms. Though the initial diagnosis of malignancy can be made based on clinico-radiological grounds, but the definitive diagnosis needs cytological or histopathological examinations of the specimens from the respiratory tract. **Materials and Methods:** The present study is a retrospective study done in the Department of Pathology for a period of 1 year (August 2019 to August 2020). A total of 100 reported cases of bronchial brushing cytology were included and correlated with the histopathology; wherever available. Rest of the respiratory cytological samples like sputum, bronchoalveolar lavage, bronchial washings, fine needle aspiration cytology was excluded from the study. **Result:** Out of the total 100 bronchial brushing cytology specimens, 69 were males and rest 31 were females. The age of the patients ranged from 17 to 84 years, with mean age of 50.2 years. None of the cases were unsatisfactory on bronchial brushing cytology. Out of the 100 cases, histological findings were present in 50 cases (50/100). A total of 22 cases (22/ 100) were reported as malignant on bronchial brushings. The various diagnosis given on bronchial brushings were; 1) NSCLC favouring either squamous cell carcinoma, adenocarcinoma or poorly differentiated, 2) SCLC, 3) Large cell carcinoma (LGC), 4) Others [Table 1]. Figure 1A-D shows the classic feature of NSCLC, SCLC, AC & SCC on bronchial brushing cytology. Of all the 22 malignant cases, only 4 cases were in females and rest 18 cases were in males. **Conclusion:** Bronchial brushing cytology can play an excellent role in initial evaluation of lung cancer by giving an early diagnosis. Sub classification of lung tumors into SCLC or NSCLC can rarely be difficult on cytomorphology alone. In cases where biopsy is not feasible or histological findings are inadequate, bronchial brushing cytology is a reliable alternative for an early diagnosis and patient management.

INTRODUCTION

Lung cancer is the leading cause of cancer mortality. Presently, various cytologic diagnostic techniques are being used in the evaluation of suspected lung neoplasms.^[1] Though the initial diagnosis of malignancy can be made based on clinico-radiological grounds, but the definitive diagnosis needs cytological or histopathological examinations of the specimens from the respiratory tract.^[2] Cytological sampling is imperative as many lesions may not be feasible to biopsy.^[3]

Cytological diagnosis with ancillary techniques has been incorporated in the new World Health Organisation (WHO) classification of lung tumors.^[4] Our study aims at comparing the bronchial cytological techniques (Bronchial Wash, Bronchial Brush, and Bronchioalveolar Lavage) with histopathology and assessing the sensitivity, specificity and positive predictive value of bronchial cytology in diagnosing neoplastic and non-neoplastic lesions of lung.^[5]

MATERIALS AND METHODS

The present study is a retrospective study done in the Department of Pathology for a period of 1 year (August 2019 to August 2020). A total of 100 reported cases of bronchial brushing cytology were included and correlated with the histopathology; wherever available. Rest of the respiratory cytological samples like sputum, bronchoalveolar lavage, bronchial washings, fine needle aspiration cytology was excluded from the study.

The bronchial brushing samples were obtained by the pulmonologist in clinically and radiologically suspected cases of malignancy with the help of a flexible fiber-optic bronchoscope. Imprint smears were prepared from the bronchial brush and sent to cytology laboratory for further examination. Smears were fixed in 95% ethyl alcohol and air dried followed by staining with Papanicolaou and Giemsa stain; respectively. Ziehl-Neelsen staining for acid fast bacilli was also done wherever needed.

Cytological diagnosis on bronchial brushing smears were categorized into; 1) Unsatisfactory, 2) Negative for malignant cells, 3) Suspicious for malignant cells, 4) Positive for malignant cells, 5) Others.

Unsatisfactory cases were those which had only haemorrhage and absence of bronchial epithelial cells. Suspicious cases reported on cytology were included in the malignant category for further statistical analysis. All cases with a specific diagnosis other than lung carcinoma were included in the "others" category. Positive malignant cases were segregated as non-small cell lung carcinoma

(NSCLC) and small cell lung carcinoma (SCLC). Further typing of NSCLC on cytomorphology as adenocarcinoma (AC) and squamous cell carcinoma (SCC) was not possible in all cases and immunocytochemistry was not applied due to financial constraint.

Bronchial biopsy was done in feasible cases as per the clinicians' decision. Bronchial biopsy was fixed in 10% formalin for histopathological processing and subsequently stained with Hematoxylin & Eosin stain. Immunohistochemistry was applied wherever required, and final histological diagnosis was considered as the gold standard.

RESULTS

Out of the total 100 bronchial brushing cytology specimens, 69 were males and rest 31 were females. The age of the patients ranged from 17 to 84 years, with mean age of 50.2 years. None of the cases were unsatisfactory on bronchial brushing cytology. Out of the 100 cases, histological findings were present in 50 cases (50/100). A total of 22 cases (22/100) were reported as malignant on bronchial brushings. The various diagnosis given on bronchial brushings were; 1) NSCLC favouring either squamous cell carcinoma, adenocarcinoma or poorly differentiated, 2) SCLC, 3) Large cell carcinoma (LGC), 4) Others [Table 1]. Figure 1A-D shows the classic feature of NSCLC, SCLC, AC & SCC on bronchial brushing cytology. Of all the 22 malignant cases, only 4 cases were in females and rest 18 cases were in males.

Table 1: Cytological diagnosis of bronchial brushing smears

S.No	Cytological reporting category	Total no. of cases (n=100)
1	Negative for malignant cells	70
2	Suspicious for malignant cells	2
3	Positive for malignant cells	20
4	Others	
5	Tuberculosis	2
6	Fungal (Aspergillosis)	2
7	Granulomatous	2
8	Carcinoid	2

Table 2: Correlation of Cytological diagnosis with the histopathology

S.No	Cytological diagnosis (N=50)	Histological diagnosis (n=50)	
1	Positive for malignancy (x=20)	15	5
2	Negative for malignancy (y=30)	10	20

Table 3: Morphological correlation of cytological diagnosis with histopathology in lung carcinoma (n=15)

Cytological Diagnosis (n=15)	Histological diagnosis (n=15)	
	NSCLC	SCLC
NSCLC (n= 13)	10	3
SCLC (n= 2)	1	1

DISCUSSION

Lung cancer is the most common cause of mortality in males. Recent studies have shown a rising trend in females as well. Various diagnostic modalities available for an early diagnosis of lung malignancy are radiology, bronchoscopy, bronchial biopsy,

exfoliative cytology and fine needle aspiration cytology. The combined use of the above techniques yields the best result. A clear distinction between NSCLC and SCLC is important as bears treatment implications.^[6,7]

In our study, male to female ratio was 1.5:1 in malignant cases diagnosed on cytology. Comparable

results were noted in study by Gaur et al & Arora et al. The male predominance is attributed to higher prevalence of smoking, being the risk factor in lung cancers.^[8]

A study by Charles et al reviewed 105 bronchoscopically acquired pulmonary cytology specimens of which 76 cases had histological diagnosis. Few other studies also noted similar results. In our study, a total of 100 bronchial brushings cases were included of which 50 cases had histological follow up.

Primary tracheal tumors are rare and comprise of about 0.1% of respiratory tract neoplasms and less than 1% of all malignancies. In our study, a single rare case of adenoid cystic carcinoma was noted in trachea at the level of carina.

We also noted a case of primary B-cell Non-Hodgkin lymphoma with granulomatous lesion in a young female at the level of tracheal carinal level and diagnosed on bronchial brushings. It is an extremely rare neoplasm with an incidence of 0.5-1% of primary pulmonary malignancies. It is important to correctly identify these tumors for appropriate therapeutic and prognostic implications.^[9,10]

CONCLUSION

To conclude, bronchial brushing cytology has an excellent role in diagnosing lung cancer with subsequent morphological typing. It also helps exclude infectious lung lesions which mimic malignancy on radiology. In cases where biopsy is not feasible, bronchial brushing cytology is quite safe; however, requires expertise of pulmonologist and warrants careful evaluation of cytological smears.

REFERENCES

1. Jones AM, Hanson IM, Armstrong GR, O'Driscoll BR. Value and accuracy of cytology in addition to histology in the diagnosis of lung cancer at flexible bronchoscopy. *Respir Med.* 2001;95(5):374-8. doi: 10.1053/rmed.2001.1051.
2. 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. *J Pak Med Assoc.* 2004;54(1):13-6.
3. Rao S, Rao S, Lal A, Barathi G, Dhanasekar T, Duvuru P. Bronchial wash cytology: A study on morphology and morphometry. *J Cytol.* 2014;31(2):63-7. doi: 10.4103/0970-9371.138664.
4. Bodh A, Kaushal V, Kashyap S, Gulati A. Cytohistological correlation in diagnosis of lung tumors by using fiberoptic bronchoscopy: study of 200 cases. *Indian J Pathol Microbiol.* 2013;56(2):84-8. doi: 10.4103/0377-4929.118661.
5. 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.
6. Sareen R, Pandey CL. Lung malignancy: Diagnostic accuracies of bronchoalveolar lavage, bronchial brushing, and fine needle aspiration cytology. *Lung India.* 2016;33(6):635-641. doi: 10.4103/0970-2113.192882.
7. Baughman RP, Dohn MN, Loudon RG, Frame PT. Bronchoscopy with bronchoalveolar lavage in tuberculosis and fungal infections. *Chest.* 1991;99(1):92-7. doi: 10.1378/chest.99.1.92.
8. Altaf Bachh A, Gupta R, Haq I, Varudkar HG. Diagnosing sputum/smear-negative pulmonary tuberculosis: Does fibre-optic bronchoscopy play a significant role? *Lung India.* 2010;27(2):58-62. doi: 10.4103/0970-2113.63607.
9. Altaf Bachh A, Gupta R, Haq I, Varudkar HG. Diagnosing sputum/smear-negative pulmonary tuberculosis: Does fibre-optic bronchoscopy play a significant role? *Lung India.* 2010;27(2):58-62. doi: 10.4103/0970-2113.63607.
10. Kulpati DD, Heera HS: Diagnosis of smear negative pulmonary tuberculosis by flexible fiberoptic bronchoscopy. *Indian J Tuberc.* 1986;33:179-182.