ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 02 | February - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

DIAGNOSTIC EFFICACY OF BRONCHIAL WASHING CYTOLOGY AND BRONCHOSCOPIC NEEDLE ASPIRATION CYTOLOGY IN THE EVALUATION OF MASS LESIONS OF LUNGS – AN OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL.

Pathology

Dr. Rahul Kumar Bharti* Post Graduate resident, 3rd year, Deptt of Pathology, AGMC *Corresponding Author

Dr. Alpana Banerjee Associate Professor, Deptt of Pathology, AGMC

Dr. Kumarjit Sinha Assistant Professor, Deptt of Respiratory Medicine, AGMC

Dr. Abhijit Datta Professor & HOD, Deptt of Pathology, AGMC

ABSTRACT

Lung cancer is the most common cancer diagnosed worldwide. It is also the foremost contributor to cancer-related mortality, resulting in 1.38 million deaths per year worldwide. There are various diagnostic modalities for lung mass lesions including bronchial washing (BW), bronchoscopic needle aspiration (BNA) and bronchoscopic biopsy (BB). **Objectives:-** To determine sensitivity (Sn), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV) of both BW and BNA as individual test and as combined tests, taking BB results as gold standard. **Material and methods:-** This was an observational cross-sectional study conducted in a tertiary care hospital of this part of North-East India over a period of two years (July 2020 to June 2022). 55 cases of lung mass lesions underwent BW, BNA and BB during the study period & were analysed. **Result:-** The study found highest sensitivity in combined BNA & BW (95%), highest specificity in BNA (81%), highest PPV in BNA (95%) and highest NPV in combined BNA & BW(88%). **Conclusion:-** This study concluded that BNA is a better diagnostic modality than BW and if BW is done it should always be supported with BNA which contribute to more precise diagnosis.

KEYWORDS

Bronchial washing, Bronchoscopic needle aspiration, Bronchoscopic Biopsy, Lung mass

INTRODUCTION

Lung cancer is the most common cancer diagnosed worldwide. It is also the foremost contributor to cancer-related mortality. Lung cancer accounts for more deaths than any other type of cancer. There are various diagnostic modality when a lung mass is suspected, i.e. bronchoscopic Needle aspiration(BNA), Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA), Trans-bronchial needle aspiration (TBNA), Bronchial wash (BW) cytology, Broncho-alveolar lavage (BAL), Bronchoscopic biopsy (BB) . Various studies done on the cytological diagnostic modalities revealed variable sensitivity (Sn), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV).[2,3,7] In this study BW, BNA and BB were used for the diagnosing lung mass lesions.

The study was planned to evaluate the utility of individual and combined techniques of BW and BNA in the diagnostic evaluation of lung mass lesions as from this part of North-East India there is no such study done and in general there are only limited studies available in literature.

AIM

To study the different cytomorphological pattern of various lung mass lesions and to find out individual and combined efficacy of bronchial washing and bronchoscopic needle aspiration cytology in the diagnostic evaluation of lung masses.

OBJECTIVES

1. To determine sensitivity (Sn), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV) of both BW and BNA as individual test, taking BB results as gold standard.
2. To determine sensitivity (Sn), specificity (Sp), positive predictive value (PPV) and negative predictive value (NPV) of combined BW and BNA, taking BB results as gold standard.

MATERIALS AND METHODS

It was an observational cross-sectional study done on 55 cases for the period of 2 years (July 2020 – June 2022) and all patients with clinical and radiological suspicion of lung mass lesions were included , while patients who were already diagnosed with the specific type of lung mass lesion and/or whose general physical condition was very poor/moribund patients and inadequate sampling material were excluded.

All patients with clinically and radiologically suspected lung mass lesions underwent BW, BNA and BB under standard protocol. All Biopsy slides were stained with H&E stain and all cytological slides were stained with Geimsa stain. PAP stain & PAS stain were used wherever applicable. All the prepared slides were examined by 3 pre-decided pathologists, where each pathologist evaluated all the slides (BW/BNA/BB).

RESULTS

Table 1: Sn, Sp, PPV, NPV of individual and combined tests

	BW	BNA	BW+BNA
Sn	20%	93%	95%
Sp	45%	81%	72%
PPV	60%	95%	93%
NPV	12%	75%	88%

The study showed highest sensitivity in combined BNA & BW (95%), highest specificity in BNA (81%), highest PPV in BNA (95%) and highest NPV in combined BNA & BW (88%).

Table 2: Spectrum of malignant neoplasm

	Number of cases (%)
Squamous Cell Carcinoma	33 (75%)
Adenocarcinoma	7 (16%)
Small cell Carcinoma	3 (7%)
Poorly differentiated Carcinoma	1 (2%)
Total	44

The study showed most of the cases were of Squamous cell carcinoma followed by Adenocarcinoma.

Table 3: Distribution of cases according to gender

	Male	Female
Overall	(35) 79%	(9) 21%
Squamous Cell Carcinoma	82%	18%
Adenocarcinoma	57%	43%
Small cell Carcinoma	100%	0%
Poorly differentiated Carcinoma	100%	0%

The study showed definite male predominance.

Table 4: Distribution of cases according to age

Age distribution in years	No. of cases (%)
40-49	5 (11%)
50-59	10 (23%)

60-69	18 (41%)
70-79	11 (25%)

The study showed that the age group (60-69 years) were majorly affected followed by (70-79years) age group and (50-59years) age group.

Table 5: Distribution of cases according to ethnicity

	Tribal	Non-Tribal
Squamous Cell Carcinoma	4 (12%)	29 (88%)
Adenocarcinoma	2 (28%)	5 (72%)
Small cell Carcinoma	0 (0%)	3 (100%)
Poorly differentiated Carcinoma	0 (0%)	1 (100%)

The study showed that majority of affected population belonged to non-tribal population.

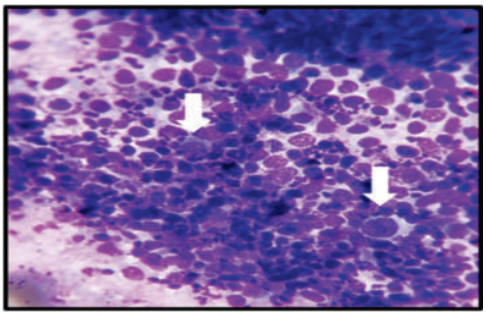

Figure 1: (Bronchial Washing) Squamous Cell Carcinoma, Dysplastic squamous cells with keratinization (white arrow), Geimsa Stain (400X)

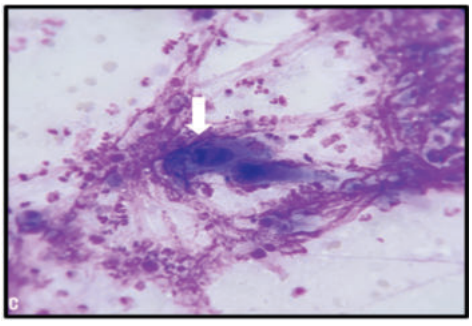

Figure 2: (Bronchoscopic Needle aspiration) Squamous Cell Carcinoma, Dysplastic squamous cells with caudate shaped hyperchromatic nucleus. (white arrow), Geimsa Stain (400X)

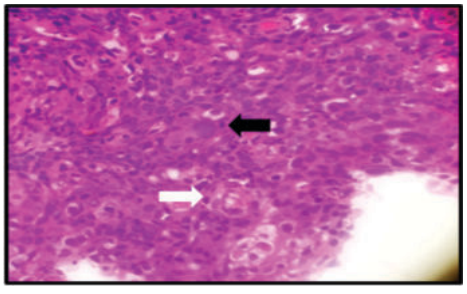

Figure 3: (Bronchoscopic Biopsy) Moderately Differentiated Squamous Cell Carcinoma, Dysplastic squamous cells along with keratin pearls (white arrow) and mitosis (black arrow), H&E Stain (400X)

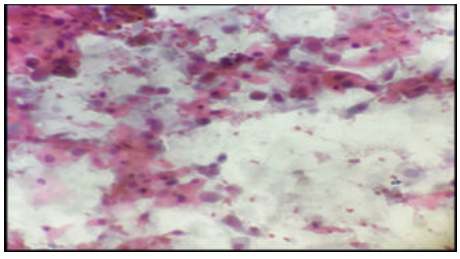

Figure 4: (Bronchoscopic Needle aspiration) Squamous Cell Carcinoma, Dysplastic squamous cells, PAP Stain (400X)

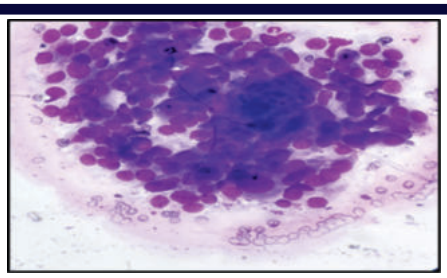

Figure 5: (Bronchoscopic Needle aspiration) Adenocarcinoma, Cell cluster showing cells with dense abundant cytoplasm, Geimsa Stain (400X)

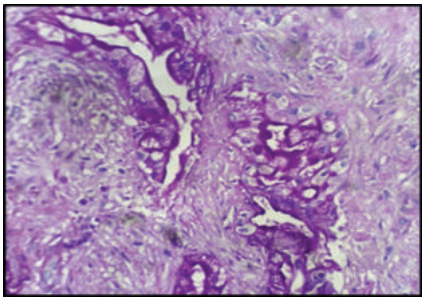

Figure 6: (Bronchoscopic Biopsy) Adenocarcinoma, Dysplastic glands brightly highlighted by PAS Stain, PAS Stain (400X)

DISCUSSION

The present study showed similar findings as most of other studies regarding BW, ie. Low Sn(20%) and low Sp(40%).[1,2,4,5,6,7,8,9,10,11,12,13] But on contrary, the study conducted by Rao S et al showed Sn & Sp 52.6% and 80% respectively.[3] Regarding BNA, our study showed higher Sn, Sp, PPV and NPV than most of the studies, but overall conclusion was similar to other studies ie. BNA is a better diagnostic modality than BW. [1,4,5,6,7,10,11,12,13] The present study showed a similar spectrum of malignant lung mass lesion as of other studies ie predominant cases belonged to squamous cell carcinoma followed by adenocarcinoma.[4,9,10,11,12,13] but the study conducted by Raghavendra et al showed predominance of adenocarcinoma followed by squamous cell carcinoma.[1] The present study showed slight variation in distribution of lung mass lesions according to age, ie age group (60-69 years) were majorly affected followed by (70-79years) age group and (50-59years) age group whereas other studies showed upstream pattern where cases increased with age. [1,2,4,5,6,7,8,9,10,11,12,13] The present study showed similar distribution of cases according to gender, i.e. there was male predominance. [1,2,4,5,6,7,8,9,10,11,12,13] The present study also showed predominance of cases in non-tribal population which was not reported by any other study.

In the present study BW was found to be inferior as a diagnostic modality for lung mass lesions, but if supplemented with BNA the Sn of the combined tests got increased. Our finding is similar to the finding of study conducted by Mufti et al.[7]

CONCLUSION

This study concluded that BNA is better diagnostic modality with better Sn, Sp, PPV, NPV than BW, and if BW is done it should always be supported with BNA which contribute to more precise diagnosis.

Squamous cell carcinoma was most common type of malignant lung mass lesion followed by adenocarcinoma and small cell carcinoma. The age group (60-69 years) were majorly affected followed by (70-79years) age group and (50-59years) age group and males were most commonly affected. The present study also showed predominance of cases in non-tribal population in this part of North-East India. This study will definitely open up new avenues for future research on the field of pulmonary pathology.

REFERENCES:

1. Raghavendra C, Gupta G, RamanaReddy V. Assessment of diagnostic efficacy of BAL and FNAC with reference to biopsy in suspected cases of pulmonary malignancy. IP Indian J Imm Res Med. 2020;5(3): 2581-4222.
2. Jay SJ, Wehr K, Nicholson DP, Smith AL. Diagnostic sensitivity and specificity of pulmonary cytology: comparison of techniques used in conjunction with flexible fiber optic bronchoscopy. Acta Cytol. 1980 Jul-Aug;24(4):304-12.
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 Apr-Jun; 31(2): 63–67.

4. Jones A, Hansoi I, Armstrong G, O'Driscoll B. Value and accuracy of cytology in addition to histology in the diagnosis of lung cancer at flexible bronchoscopy. Arch Res Med. 2001; 95: 374-78.
5. Gaur S, Kusum A, Harsh M, Kohli S, Kishore S, Pathak P. Efficacy of bronchial brushings and trans-bronchial needle aspiration in diagnosing carcinoma lung. J cyt. 2007; 24(1): 46-50.
6. Tuladhar A, Panth R, Joshi AR. Comparative analyses of cytohistologic techniques in diagnoses of lung lesions. J path Nepal. 2011;1: 126-30.
7. Mufti S, Mokhtar A. Diagnostic value of bronchial wash, bronchial brushing, fine needle aspiration cytology versus combined bronchial wash and bronchial brushing in the diagnosis of primary lung carcinomas at a tertiary care hospital. Arch Bio Res 2015; 26(4): 777-784.
8. Bhat N, Nazeir M, Bashir H, Bashir N, Farooq S, Fatima K et al. Correlation of bronchial biopsy with bronchoalveolar lavage in lung malignancies. Int J Res Med Sci. 2016 Feb;4(2):428-35.
9. Tomar V, Vijay N, Nuwal P, Dixit R. Comparative study of bronchoalveolar lavage, bronchial brushing, and FNAC in diagnosing malignant neoplasms of lungs. J Cytol. 2016 Oct-Dec; 33(4): 210–213.
10. Sultana B, Patwary M, Rahman M, Islam S, Hossain D. Role of Bronchial Brush Cytology in Diagnosis of Central Bronchial Carcinoma. J Bangladesh Coll Phys Surg 2017; 35: 68-74.
11. Sharma K, Patidar V, Jain A, Taneja S, Sudan, Sharma M et al. Comparison of efficacy of different diagnostic modalities of lung cancer: Bronchoscopic methods (BAL, TBNA, EBLB), CT-FNAC, pleural fluid (Aspiration cytology, Pleural biopsy), Lymph node FNAC. Int J Cur Res. 2017; 9(11): 60567-60573.
12. Agarwal A, Sharma P, Saluja M, Lohchap K, Jain N. To Study the Efficacy of Bronchoalveolar Lavage, Bronchial Brush Cytology and Bronchial Biopsy in Diagnosing Lung Cancer. Int J Con Med Res. 2018;5(1): 2393-915.
13. Ojha P, Madan R, Bharadwaj R. Correlation between sputum and bronchoscopy-guided cytology (bronchoalveolar lavage fluid, transbronchial needle aspiration, and bronchial brush) with bronchial biopsy in the diagnosis of pulmonary pathology. Arch Med Health Sci 2019;7:25-32.