



ORIGINAL RESEARCH PAPER

Pathology

ROLE OF BAL FLUID, BRONCHIAL BRUSH CYTOLOGY AND GUIDED FNAC IN EVALUATION OF CARCINOMA LUNG

KEY WORDS:

Bronchoalveolar lavage, bronchial brushing, FNAC, Lung Cancer.

Jyotirmayee Mishra

Assistant Professor, Department of pathology VIMSAR Burla.

Gitimadhuri Dutta*

Assistant Professor, Department of pathology VIMSAR Burla. *Corresponding Author

Kailash Chandra Agarwal

Professor and HOD, Department of pathology VIMSAR Burla.

ABSTRACT

Background : Lung cancer is currently the most frequently diagnosed major cancer in the world and most common cause of cancer mortality worldwide. Bronchoalveolar lavage (BAL), bronchial brushing and fine needle aspiration cytology are helpful in the early diagnosis of lung malignancies.

Materials and methods- This was a prospective study, conducted in the Department of pathology VIMSAR from a period between July 2016 to June 2018. 32 patients with suspected lung mass were included in our study group. HRCT was done prior to BAL fluid collection to locate lesion. BAL and bronchial brush samples were collected by using flexible fiberoptic bronchoscopy. CT guided FNAC was done where possible.

Results : A total of 32 suspected lung cancer presented as lung mass who had done BAL, brush and FNAC were included in our study group. Out of total 32 cases of clinically suspected lung mass 30 cases were confirmed as carcinoma lung on histopathology study with a M:F ratio 2.55 :1. Maximum number of patients were present in 6th decades. Adenocarcinoma was most common carcinoma (60%) in our study. Sensitivity of BAL was 65.5% while that of BB was 73.33%. Specificity of BAL & BB were equal (66.66%), and that of FNAC was 100%.

Conclusion: Combination of BAL, BB and FNAC increases both sensitivity and specificity in diagnosis of carcinoma of lung and it reduces the chances of false positive and false negative results.

INTRODUCTION:

Lung cancer is currently the most frequently diagnosed major cancer in the world (estimated 1.6 million new cases in 2008) and the most common cause of cancer mortality worldwide (1,380,000 deaths in 2008).⁽¹⁾ Cytological methods in the diagnosis of malignant lesions of lungs has been generally considered to be one of the most successful applications. Flexible fibre optic bronchoscope revolutionized respiratory cytology as techniques such as bronchial brushing (BB), bronchoalveolar lavage (BAL) and bronchial biopsy became more easy, accessible and popular.⁽²⁾ Fine needle aspiration cytology has proved to be the most helpful methods for diagnosis of lung tumors.^(3,4) Bronchoscopic techniques for early detection of lung cancer are a promising tool as they might allow visualising changes of early lung cancer and also permitting sampling for histological confirmation.⁽⁵⁾ Guided FNAC is often the first choice in lesions located in the mediastinum, apex of lungs, medial upper lobe and small peripheral lesions. FNAC has important value in cases in which fiberoptic bronchoscopy and biopsy are non diagnostic in centrally placed pulmonary lesions.⁽⁶⁾

FNAC is generally applied to localized lesions of lung, its use being limited to diffuse parenchymal disease. The main objective of guided FNAC is to diagnose malignancy, it can also be used for definitive diagnosis of some benign neoplasm and infection such as tuberculosis.⁽⁷⁾ All the three methods BAL, BB and FNAC provide a high yield for evaluation of pulmonary lesions.

The aim of the present study was to study the efficacy of BAL, Bronchial brush and CT guided FNAC in diagnosis of carcinoma of lung.

MATERIAL AND METHODS:

This was a prospective study conducted in the Department of Pathology VIMSAR, Burla for a period of two years from September 2016 to August 2018. Patients were diagnosed clinically and radiologically having lung masses and admitted in the Department of Pulmonary medicine. BAL fluid

and bronchial brush cytology was collected. HRCT was done prior to BAL fluid collection to locate the lesion. Optimum 10 to 20 ml BAL fluid was needed for cytology. Post brushing washing was done with normal saline. The BAL samples were centrifuged and smears were done with centrifuged deposits. Bronchial brush slides were sent to Department of Pathology along with BAL fluid. CT guided FNAC was done where possible. The patients in which all the three procedures are done were included in our study group. Slides are stained with Diff Quik, hematoxyline and eosine and PAP stain.

RESULTS:

In a period of 2 years we received total of 77 BAL fluid for analysis, out of which 45 samples were from patients presenting as interstitial lung disease, so these cases were excluded from our study group. A total of 32 patients of suspected lung cancer presented as lung mass who had done BAL, brush and FNAC were included in our study group. Out of total 32 cases of clinically suspected lung mass, on histopathology 30 cases were confirmed as carcinoma lung, in which 21 cases were male and 9 cases were female with a M:F ratio 2.55 :1 (Table 1). Age range of the patients were between 34 yrs to 70 yrs. Maximum number of patients were present in 6th decades (46.2%) (Table 2). Adenocarcinoma was most common carcinoma (60%) in our study (Fig 1), followed by squamous cell carcinoma (33.33%) (Fig 2) (Table 3). In our study we found one case of small cell carcinoma (Fig 3) and one metastatic adenocarcinoma which was confirmed in biopsy. In case of BAL 19 cases were true positive (TP), 10 cases were false negative (FN), 2 cases were true negative (TN) 1 case was false positive (FP). Bronchial brush cytology reveals 21 TP cases, 8 FN cases and 2 TN cases. FNAC study reveals 27 TP, 3 FN and 2 TN cases. Sensitivity of BAL was 65.5% and specificity was 66.66%. In case of bronchial brush cytology sensitivity was 73.33% and specificity was 66.66%. But in case of FNAC sensitivity was 90% and specificity was 100%. (Table 4)

DISCUSSION:

BAL can retrieve diagnostic malignant cells in patients with primary lung carcinoma. Lam et al. obtained diagnostic

specimens in BAL fluid in 69% of cases of bronchial carcinoma and addition of endobronchial brushing, endobronchial biopsies and post bronchoscopic sputum analysis did not significantly increase the diagnostic yield.⁽⁸⁾ In our study we found sensitivity of BAL was 66.66% .We found in comparison to BAL guided FNAC and BB had superior sensitivity and specificity with less false positive cases. Cytological sampling of by BAL relies mainly on cells exfoliated from the malignant lesions. Exfoliated cells in the bronchus show degenerating changes and progressively loses their morphological details, which are important to differentiate them from non malignant cells that are shed off by the normal bronchial epithelial lining.⁽⁹⁾ BAL is used for the diagnosis of malignancy with sensitivity ranging from 35 to 70%.⁽¹⁰⁾ False positive results are occasionally encountered as a result of atypical type II pneumocytes in the setting of pneumonia, diffuse alveolar damage, bone marrow transplant and chemotherapy.⁽¹¹⁾

Truong et al found overall sensitivity of BAL and BB was 66% and 77% respectively.⁽¹²⁾

In our study sensitivity of BAL was 66.66% and that of BB was 80% , which correlates with the study of Truong. In our study we found 60% cases were adenocarcinoma (fig -1),33.33% squamous cell carcinoma (fig -2) and 3.33% metastatic carcinoma to lung with a M:F ratio 2.55:1. DS Gour et al found in their study M:F ratio 3.6:1 with sensitivity of BAL ,BB was 39.4% and 87.3% respectively. Specificity of BB was 97.6% and that of BAL was 89.6%⁽¹³⁾

In our study we compared the positive cytological diagnosis with biopsy and or FNAC follow up.

CONCLUSION :

Bronchoalveolar carcinoma and infiltration of lung with bone marrow derived malignant cells can all give interstitial pattern on chest radiographic imaging and masquerade as Interstitial Lung Disease . Bronchoalveolar carcinoma can be diagnosed via sputum cytology, examination of BAL fluid , bronchial brush cytology or transbronchial lung biopsy ; and surgical lung biopsy is usually unnecessary. Bronchial brushing is a superior technique in diagnosing lung carcinoma. Combination of BAL ,BB and FNAC increases both sensitivity and specificity in diagnosis of carcinoma of lung and it reduces the chances of false positive and false negative results.

Table-1 :Sex distribution

	Total number Of patients	Male	Female
	30	21	09
percentage	100%	70%	30%

Table -2 :Age distribution

Age in years	No of male	No of female	Total(30)
31-40	2	1	3
41-50	5	1	6
51-60	9	5	14
61-70	5	2	7

Table-3 :Types and percentage of different types of carcinomas

Type of lung carcinoma	No of cases	Percentage
Adenocarcinoma	18	60%
Squamous cell carcinoma	10	33.33%
Small cell carcinoma	1	3.33%
Metastatic adenocarcinoma	1	3.33%

Table-4 :Sensitivity and specificity study

Type of procedure	TP	TN	FP	FN	Sensitivity	Specificity
BAL	19	2	1	10	65.51%	66.66%
BB	21	2	1	8	73.33%	66.66%
FNAC	27	2	0	3	90%	100%

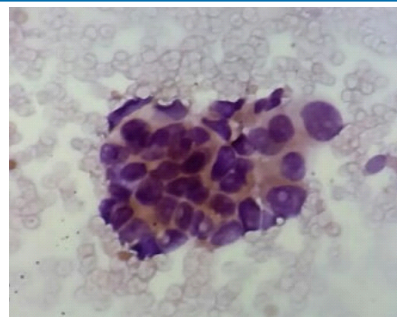


Figure -1:Adenocarcinoma--Bronchia Brush cytology smear showing pleomorphic tumor cells in acinar formation(Papanicolaou stain)

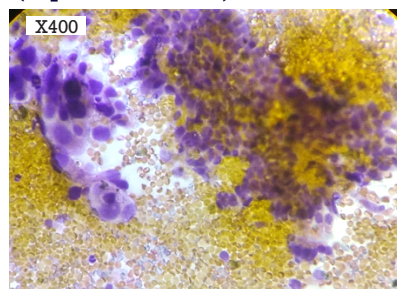


Figure-2:Squamous Cell Carcinoma-- Brush cytology smear showing malignant squamous cells in sheets (Papanicolaou stain)

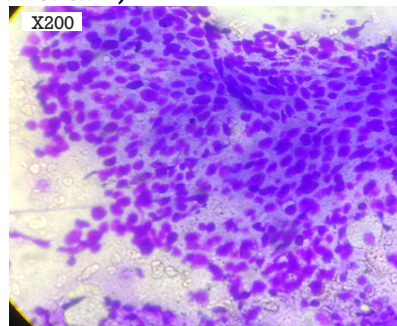


Figure-3: Small Cell Carcinoma-- FNAC smear showing uniform looking rounded cells with scant cytoplasm present in sheets (Diff Quik stain)

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