

**Correlation of Bronchoalveolar Lavage, Bronchial Brushings and Cell Block in Lung Malignancies: A Tertiary Care Hospital Based Study**Nishu<sup>1\*</sup>, Gunja Dwivedi<sup>2</sup>, Ravi Kumar Sharma<sup>3</sup>, Seema Meena<sup>4</sup>, Laxmi Kumari<sup>5</sup><sup>1</sup>Resident, Department of Pathology, RNT Medical College, Udaipur<sup>2</sup>Associate Professor, Department of Pathology, RNT Medical College, Udaipur<sup>3</sup>Assistant Professor, Department of Psychiatry, AIIMS, Udaipur<sup>4,5</sup>Assistant Professor, Department of Pathology, RNT Medical College, Udaipur

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Conflict of interest: Nil

**Abstract:****Background:** Lung cancer is one of the most common malignancies with high mortality, 13% of all new cancer cases and 19% of cancer related deaths worldwide are due to lung cancer. A 6.9% of all new cancer cases and 9.3% of all cancer related deaths in India are due to lung cancer.**Materials and Method:** This is a 1 year descriptive from January 2023 to December 2023 conducted in the department of pathology. 30 cases were included in the study. Bronchial wash, bronchial brushing and cell block were obtained.**Result:** In our study of the total 30 cases, adenocarcinoma was the most common lung cancer followed by squamous cell carcinoma (SCC) and Small cell carcinoma.**Conclusion:** Bronchial wash, brush cytology with cell block are an important basic diagnostic tool in the diagnosis of lung cancers. This technique can be used concurrently with bronchial biopsy whenever required.**Keywords:** Bronchoalveolar Lavage, Bronchial Brushing, Cell Block, Lung Cancer.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Lung tumor is most prevalent and also leading cause of cancer deaths worldwide. Lung cancer has been estimated to be most frequent among all newly diagnosed cases of malignancy in males and is emerging as an important cause of cancer deaths in females as well.

Prognosis of lung cancer is strongly related with stage of cancer at the time of diagnosis. 5-year survival rate ranges from 5% for IV stage and 80% for stage I cancers. So early diagnosis is essential for improving prognosis of lung cancer. [1] The size & location of the lesion, sampling technique, physicians' level of experience, retrieval & processing of specimen being the determinants of variable yield.

Bronchoscopy is a safe and effective means of diagnosing bronchogenic carcinoma with varying diagnostic yield.

It has been shown that a combination of various histological & cytological procedures has significantly increased the overall yield of diagnostic bronchoscopy in the management of lung cancers. [2]

**Aims and Objective**

1. To study the correlation of cytological methods with cell block in diagnosis and sub typing the malignancy
2. To diagnose changes in cytological and histological features

**Material and Methods**

This was a descriptive cross sectional study conducted in the department of pathology, RNT medical college Udaipur, from January 2023 to December 2023.

A total of 30 cases were included in the study. Already prepared Bronchial brushing slides and Bronchoalveolar lavage were received in our laboratory where lavage was centrifuged at 1500 rpm for 10 mins. and prepared into smears.

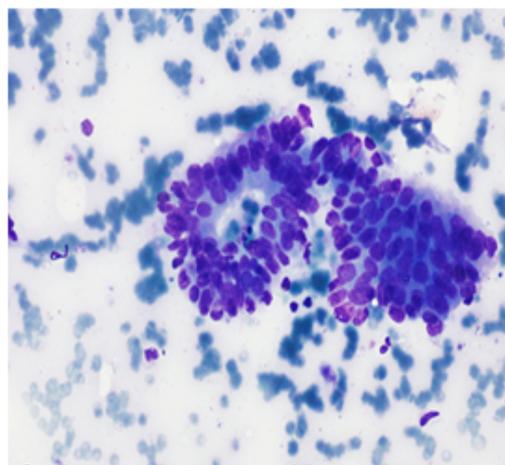
The smears were immediately fixed in methyl alcohol and stained with Giemsa stain. For cell block the supernatant fluid was decanted. The residual cell pellet which was left was fixed in formalin which was followed by processing & embedding the cell pellet in a paraffin block.

These were later stained with routine H&E staining. Final diagnosis was made taking into consideration three BAL, bronchial brush and cell block findings. Wherever required a bronchoscopic biopsy was advised.

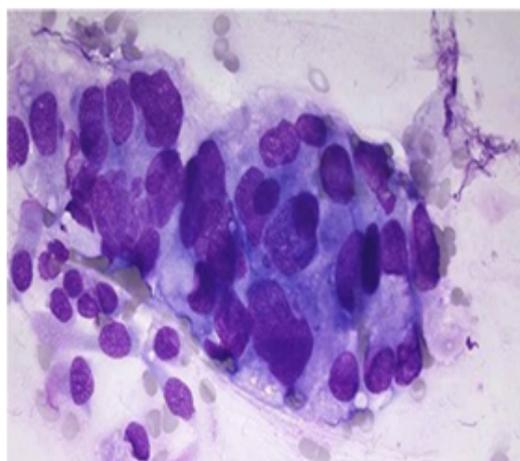
**Result:** Majority of lung cancer patients belongs to 5th and 6th decades (60%). 53.3% of lung

tumors occurred in males compared to 6.6% in females.

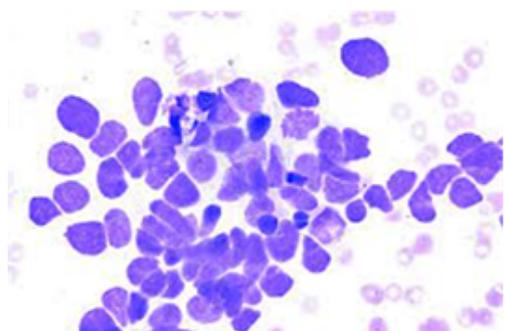
This may be attributed to habitual smoking in males compared to females. The most common symptoms at the time of presentation were cough with expectoration, hemoptysis and dyspnoea. A few cases presented with chest pain, associated weight loss and anorexia.



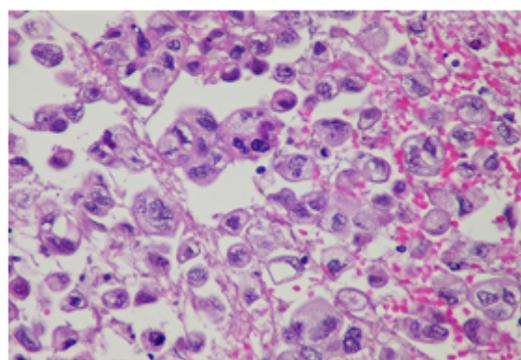
Adenocarcinoma on BB



Squamous cell carcinoma on BB



Small cell carcinoma on BAL



Adenocarcinoma on cell block

Figure 1:

Table 1: Cell Block

Malignancy	No. of cases	%
Adenocarcinoma	9	30%
Squamous cell carcinoma	5	16.7%
Small cell carcinoma	4	13.3%
Poorly differentiated non- small cell Ca	2	6.7%
Degenerate	8	26.7%
Negative	2	6.7%

Table 2: Bronchial brushing

Malignancy	No. of cases	%
Adenocarcinoma	9	30%
Squamous cell carcinoma	5	16.7%
Small cell carcinoma	4	13.3%
Poorly differentiated non-small cell carcinoma	2	6.7%
Negative for malignant cell	10	33.3%

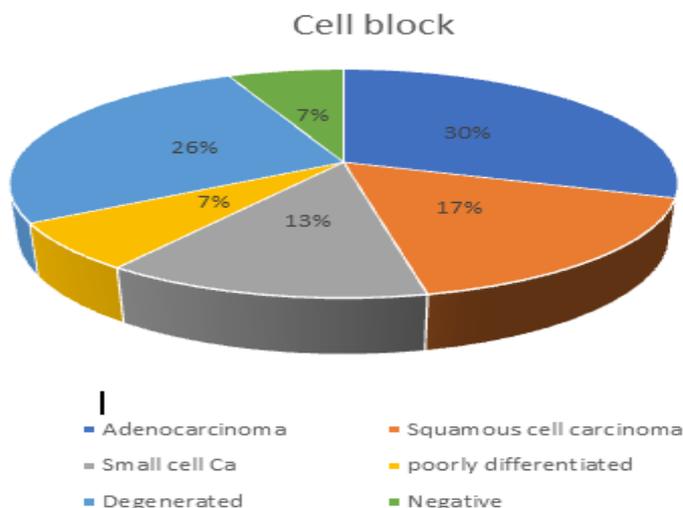


Figure 2: Cell block

Table 3: Bronchoalveolar lavage

Malignancy	No. of cases	%
Positive for malignant cells	17	56.6%
Negative for malignant cells	8	26.7%
Acellular	5	16.6%

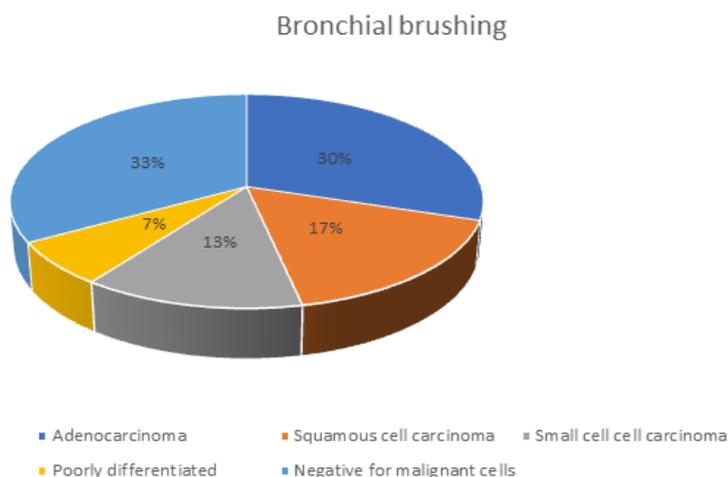


Figure 3: Bronchial brushing

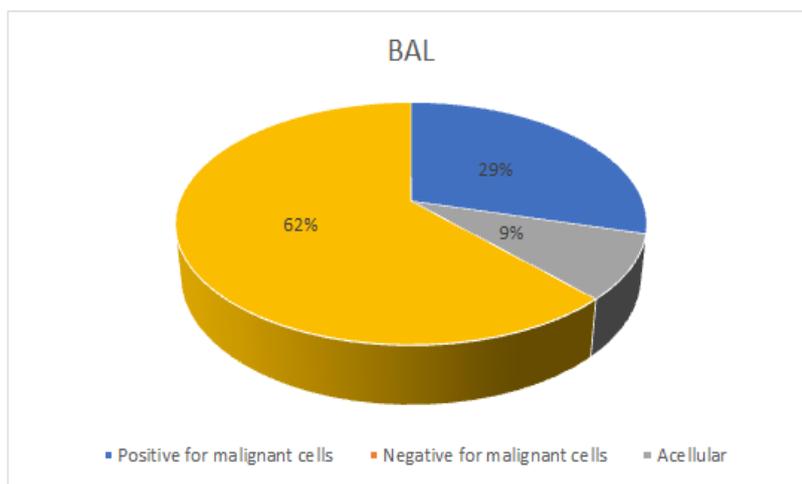


Figure 4: BAL

Among 30 cases, 17 cases (66.66%) were giving same result on BAL, bronchial brushing and cell block. In our study, 27 male and 3 female patients included (male: female ratio=9:1) Mean age was 64.3±8.05 years.

Among 30 cases 17 cases were reported as positive/suspicious/atypical cells on BAL, whereas 20 cases out of 30 cases on bronchial brushing were reported as positive/suspicious or suggestive of malignancy and 20 cases showed malignancy on cell block. In our study of the total 30 cases, adenocarcinoma was the most common lung cancer followed by squamous cell carcinoma (SCC) and Small cell carcinoma.

### Discussion

With the advent of fiberoptic bronchoscopy, respiratory cytology took a new turn as cytological samples like BB and BW could be collected from respiratory tract, yielding significant amount of cytologic material. This study mainly assessed diagnostic value of Cell block, BB and BW cytology in detecting lung malignancies in patients with suspicious lung cancer who underwent fiberoptic bronchoscopy.

In study by Vivekanand et al among 448 cases, adenocarcinoma was the most common lung cancer diagnosed (34.82%) followed by squamous cell carcinoma (SCC) (31.02%). All the epithelial tumors which could not be subtyped into either SCC (or) adenocarcinoma because of their poor differentiation were grouped under poorly differentiated non-small cell carcinoma comprising 73 cases (16.29%) of all tumors. Small cell carcinoma comprised 6.9% and adenosquamous 0.4% of all cancers.[4]

In a study by Udai et al which included 104 patients, 92 were diagnosed by bronchoscopy with a cumulative diagnostic yield of all sampling techniques being 88.46%. Yield of CB of bronchial washings (44.23%) was higher than Bronchial washings – conventional smears (36.53%). CB detected additional 8 cases of malignancy where corresponding bronchial washings-conventional smears were negative. Exclusive diagnosis by CB was obtained in 2 cases. Brushings and biopsy confirmed malignancy in 49.03% and 57.69% cases. [2]

The yield of our study was comparable to the other studies with high yield despite limitation of biopsy and cases in our department. Cell block and bronchial brushings are more sensitive as three cases who were negative on BAL came out to be positive for adenocarcinoma on cell block and brushing. CB preparations of bronchial washings play an important role in recovery of cellular material for further histopathological study. Studies

have shown improvement in the diagnostic yield by CB preparations when compared with smear cytology.

### Conclusion

With the advent of FOB sampling the respiratory tract by bronchial washing and brushing with cell block technique has become an important basic diagnostic tool in the diagnosis of lung malignancies.

These techniques can be used concurrently with bronchial biopsy and immunocytochemistry wherever required. The correlation of bronchoalveolar lavage, bronchial brushings, and cell blocks in lung malignancies underscores the importance of a multidisciplinary approach to diagnosis and treatment.

Integrating data from these techniques enhances diagnostic accuracy, provides valuable prognostic insights, and supports personalized therapeutic decision-making for patients with lung cancer.

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