

Study of lesions in bronchial brush and wash cytology

ABSTRACT

Aims:The aim of the study is to compare and evaluate the diagnostic efficacy of bronchial brush and wash cytology for neoplastic and non- neoplastic bronchopulmonary lesions and to relate the cytological findings with the clinical diagnosis.

Study design:Retrospective descriptive studies

Place and Duration of Study:Saveetha Medical College and Hospital, between January 2019 and December 2019

Methodology:Cases with both Bronchoalveolar lavage (BAL) and Bronchial brush (BB) samples were included in the study. The slides were stained with Hematoxylin & Eosin stain, PAP stain, and were studied under a light microscope. The clinical points of interest were obtained from the case records at the medical records division and the histopathological findings from the histopathology registers at the Department of Pathology.

Results: A total of 35 cases were studied. Follow up with histopathology after a cytological diagnosis revealed that the accuracy to predict malignancy from BAL specimen was 58 % and that of Bronchial brush sample was 92% significantly higher

Conclusion:The study confirms that the efficacy in assessing the risk of malignancy by respiratory cytology using a bronchial brush specimen is higher than the bronchoalveolar lavage specimen.

Keywords: Bronchial brush, BAL, malignant cells, bronchopulmonary lesions.

1. INTRODUCTION

Lung cancer is one among the foremost prevalent malignancies. At present, lung cancer is the primary cause of cancer related deaths globally[1]. The foremost solution for the treatment of lung cancer is an early diagnosis at an early possible stage. Primary lung carcinomas are classified as Non-small cell lung carcinoma (NSCLC) and Small cell lung carcinomas (SCLC). [2] Small cell lung cancers are highly malignant, most aggressive form of lung cancer that usually arise from the bronchi and has a high metastatic potential. These cancers account for nearly roughly 15 percent of lung cancers. SCLC is mostly metastasized by the time of diagnosis and is associated with poor prognosis. Concurrent chemotherapy and radiation therapy are attempted in limited stage SCLC. NSCLC is all sorts of lung cancer apart from small cell lung cancer. NSCLC usually grows and spreads more slowly than the small cell lung cancer and hence they are mostly resectable. Types of NSCLC are Squamous cell carcinomas that usually arise in the center of large bronchi.

Adenocarcinoma that are formed from glandular structure in the epithelial tissues and are mostly peripherally located. Large cell carcinomas that can occur in any part of the lung and tend to spread faster than the other two types.

Diagnosing the carcinomas at an early stage is key for early and effective treatment. The various diagnostics tests include chest X-rays, Computerized Tomography scans, Magnetic resonance imaging, Fiber optic bronchoscopy. Cytology specimens are best suited aids in diagnosis for most of the lung cancer patients. There are various cytological methods which are accessible that includes sputum cytology the fiber optic techniques like bronchial brushing, bronchoalveolar lavage. Bronchoscopy gives a direct view of airways and allows a lot of specific sampling of cells and tissues. It helps us in diagnosing endobronchial and centrally located lesion like squamous cell carcinoma and carcinoid tumor.

Broncho-alveolar lavage (BAL), initially evolved as a beneficial instrument for lung conditions like pulmonary alveolar proteinosis, cystic fibrosis and intractable asthma, and has gained acceptance and steady popularity as a tool for diagnosing carcinoma.[3] BAL are often used for the acceptable diagnostic tools for alveolar hemorrhage, malignancies and infections caused by bacteria, fungus and virus as it improves the diagnostic yield.

Bronchial brushing (BB) is a cytological technique where surface of suspected lesions, visualized through a bronchoscope, is scraped and the cytological sample is obtained[3] There is an added advantage of sampling directly from the visualized mucosal abnormality.

2. MATERIAL AND METHODS

This study was conducted at saveetha medical college and hospital. It is a retrospective study of bronchial brush and bronchial wash cytology specimen for neoplastic and non- neoplastic bronchopulmonary lesions received by the department of pathology, saveetha medical college and hospital during the period of one year from january 2019 and december 2019. A total of 35 cases in which both bronchoalveolar lavage and bronchial brush samples were selected. The samples were obtained by the fiber optic bronchoscopy done by the pulmonologist and were received in 95% isopropyl alcohol and processed as per standard procedures of cytology.

Bronchoalveolar lavage was performed with 20ml of saline infused in the syringe with observing the flow of saline with the distal tip of the bronchoscope. By maintaining the wedge position, a suction of 50 – 80 mmhg was applied to collect the lavage specimen in the collecting trap. This step was repeated nearly 5 times as needed to obtain an adequate specimen. The bronchoalveolar lavage specimens were processed as soon as possible and stained hematoxylin and eosin stain for microscopic examination.

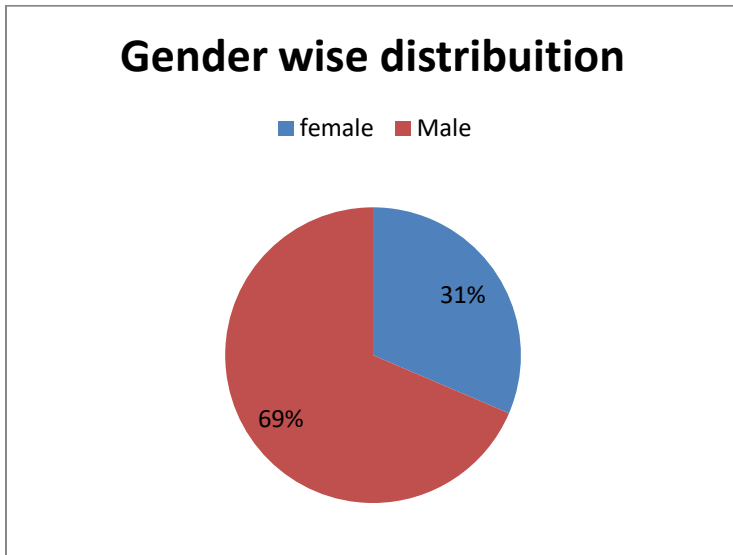
Bronchial brushing were obtained with a small threaded brush through a separate channel in the fiber optic bronchoscope, guided to a selected site under visual control. The wash specimens were obtained by the guidance of bronchoscopy and aspirating the accumulated contents of the bronchus in the initial sample, and then additional samples were obtained by repeatedly installing and aspirating normal saline from the selected bronchus. The slides were stained by h&e stain and pap stain and studied under light microscope.

The clinical points of interest were obtained from the case records at the medical records division and the histopathological findings from the histopathology registers at the department of pathology.

3. RESULTS AND DISCUSSION

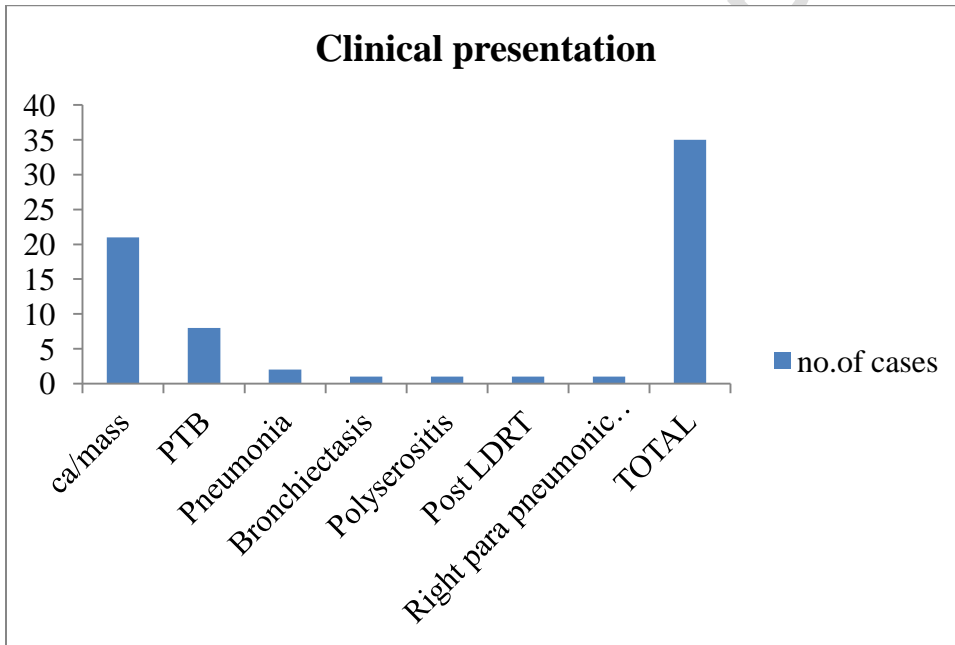
The present study comprised of 35 patients which includes 24 male and 11 females (as given in Figure 1.) The male: female ratio is 0.7: 0.3.

Figure 1: Gender wise distribution of lesion studied



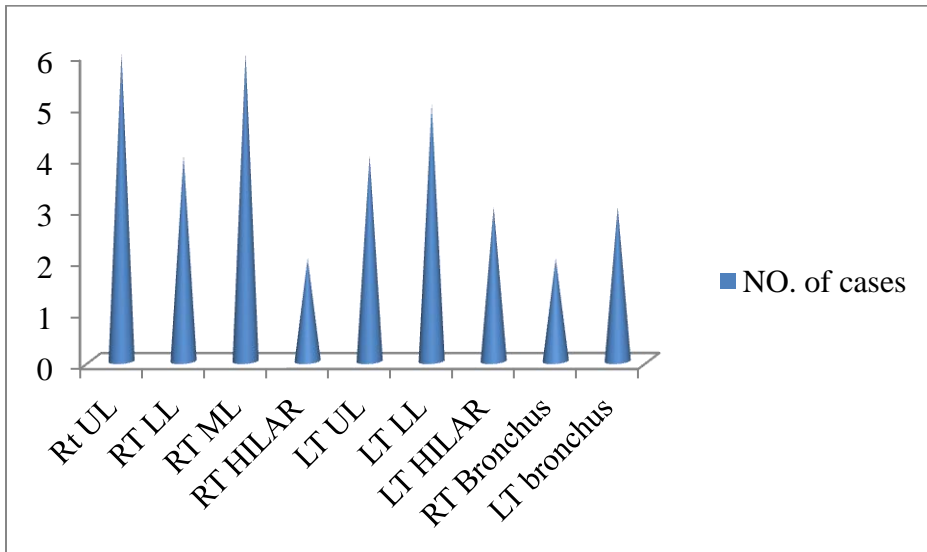
Out of 35 cases, 21 were clinically diagnosed as mass lesions, 8 as pulmonary TB, Bronchiectasis, polyserositis, Post LDRT and Right para pneumonic effusion each. (Figure 2)

Figure 2 : Various clinical diagnosis of the patients studied

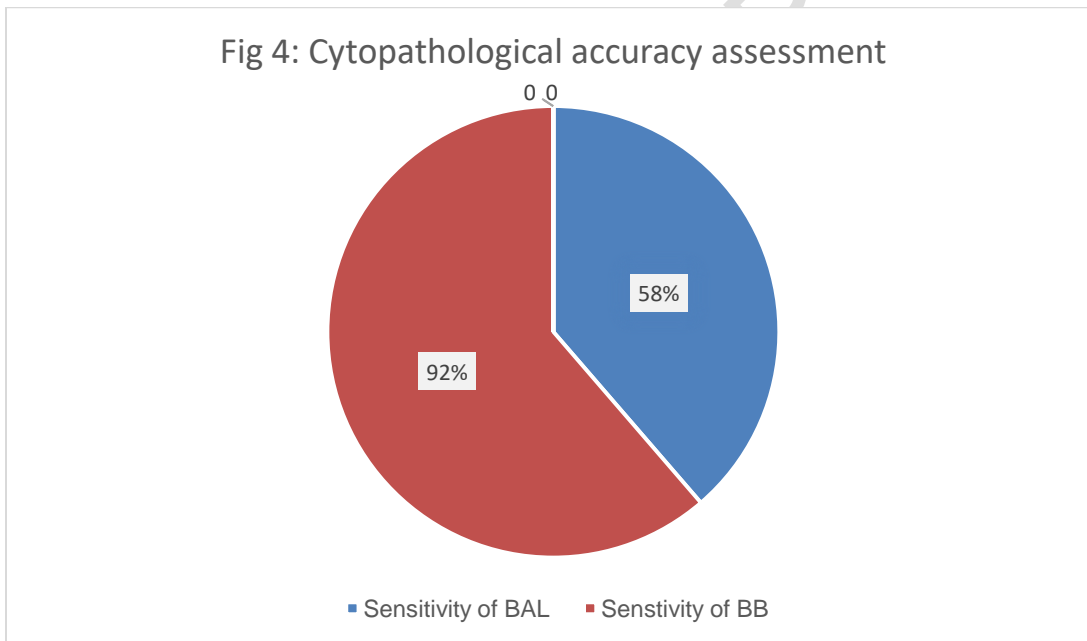


On analyzing the sites most involved, it was inferred that Right upper lobe and right middle lobe of the lung were the most commonly affected site of lesion. A total of 20 cases of lesions seen in right lung and in 15 cases the lesions are confined to the left lung (Figure 3 shows the pictorial representation of the location of lesions)

Figure 3: Pictorial representation of the sites of lesion



On Further Histopathological examination 12 cases were found to have lung cancer, while rest revealed tuberculous lesion or lesions with no specific pathological changes. Keeping histopathology as gold standard the cytological diagnosis was compared. BAL specimen analysis positively predicted malignancy in 7 cases whereas bronchial brushings had a higher predictive accuracy where malignancy was positively predicted in about 11 cases by bronchial brushing cytology. Sensitivity of malignant cytopathological diagnosis by BAL is 58% whereas in BB is about 92 % which is substantially greater. (As shown in Figure 4)



3.1 DISCUSSION

With the materialization of fiber optic bronchoscope, respiratory cytology took a new turn as samples like bronchial washings, broncho alveolar lavage could be collected from respiratory tract, providing a good yield of respiratory specimen. With this, the emphasis shifted from diagnosis of malignancy in potentially operable patients and confirmed metastasis, and cytology was made use as a first line diagnostic procedure in which crucial management decisions could be based [4,5]. Bronchoscopy provides direct visualization of the airways and permits more focused sampling of cells /tissue [6]

In our study, out of 35 cases of suspected malignancies, 24 were males and 11 were females with their ages ranging between 18 to 80 years indicating the gap in tests done for male when compared to female. The male cases are about 69% whereas the female is about 31% with the male: female ratio of 0.7:0.3. The prevalence of lung malignancies has been on rise and is the major cause of death due to cancer in males [4]

In our study, out of the 35 people on whom both the tests were performed, BAL was found to have a specificity of 58% and the specificity of bronchial brushings was 92%

In general, less differentiated lesions have more loosely cohesive cells in comparison to well differentiated lesions. [3] and these exfoliated cells in bronchial cavity degenerate losing its cytomorphological features to classify as malignant and nonmalignant cells [3] in BAL, saline is instilled through the bronchoscope and wash samples are collected. If the procedure of the physician was not good enough the specimen collected may be fewer and there may be lesser cytological evidence than assumed and as a consequence there is furthermore possibilities of increased false negative results. All these elements might influence the overall yield and the diagnostics value of BAL specimens. The cell yield is usually much better in BAL, especially in peripheral lung lesions, as lavage reaches the distal bronchial units and samples out more than one bronchus at the same time [7,8]

Bronchial brushing sampling is done by directly visualizing the lesion using a bronchoscope and scrapping the surface to make smears [9]. This technique enables scrapping of surface containing cells that are not normally exfoliated and are difficult to dislodge from their surface and are subjected to degenerative changes. This increases the sample yield better when compared to BAL specimens.[3] however, studies show that repeat BAL sampling improves its sensitivity, specificity and accuracy.

Our study is comparable with, a study conducted by shalineerao et al[4] where it was concluded that bronchial wash cytology has low sensitivity in detecting pulmonary lesions. This can be made use in patients with contraindications for biopsy. Another study by dinesh r et al [11] where BAL predicted malignancy in 15(30%) individuals and bronchial brush 44(88%) individuals which correlates with our study.

4. CONCLUSION

The aim of the present study was to compare the successfulness of BAL and BB cytology techniques in diagnosing malignancy of lung and to correlate with the clinical diagnosis which revealed that Bronchial Brush lung cytology has superior diagnostic efficacy for bronchopulmonary lesions when compared to Broncho alveolar Lavage.

REFERENCES:

1. Thoracic tumours / edited by WHO Classification of Tumours Editorial Board. Fifth edition. Lyon: International Agency for Research on Cancer, 2021
2. Shagufta Tahir Mufti, Ghadeer A. Mokhtar ; 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. Biomedical Research 2015; 26 (4): 777-784

3. Gaur DS, Thapiyal NC, Kishore S, Pathak VP: Efficacy of bronchial alveolar lavage and bronchial brush cytology in diagnosing lung cancers. *J Cytol* 2007, 24:73-77
4. Shaline R et al. Bronchial brushing for the diagnosis of lung cancer. *Eur Respir Mon.* 2008; 12: 1-6
5. Apar Agarwal¹, Prakhar Sharma², Mahi Saluja³, Komal Lohchap⁴, Nitin Jain⁵ To Study the Efficacy of Bronchoalveolar Lavage, Bronchial Brush Cytology and Bronchial Biopsy in Diagnosing Lung Cancer. *International Journal of Contemporary Medical Research.* 2018;5(1):1-4.
6. Atkins KA. The diagnosis of bronchioloalveolar carcinoma by cytologic means. *Am J Clin Pathol* 2004;122:14-6
7. Pirozynski M. Bronchoalveolar lavage in the diagnosis of peripheral, primary lung cancer. *Chest* 1992;102:372-4.
8. Henderson AJ. Bronchoalveolar lavage. *Arch Dis Child* 1994;70:167-9.
9. Johnston WW, Elson CE. Respiratory tract. In: Bibbo M, editor. *Comprehensive cytopathology.* 2nd ed. Philadelphia: W.B. Saunders Company; 1997. p. 325-401.
10. William et al. The Bronchoscopic Diagnosis of Lung Cancer: A Prospective Correlation between the Bronchoscopic Appearances and Cytology and Biopsy Results. *J Broncho Inter Pulm.* 2000; 16-26.
11. Dinesh Reddy, Vaibhav Krishna, Nitish Gupta. Bronchoscopy in Lung Malignancies At Indian Rural centre. *J Dent Med Sci.* 2016; 92-96.