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Original Research Article

Comparative Study of Bronchial Wash, Bronchial Brush Cytology and Bronchial Biopsy in Patients with Lung Malignancy

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Abstract

Early diagnosis of lung cancer plays a pivotal role in reducing death rate due to lung cancer. Bronchial washing, brushing and fine needle aspirations not only compliment tissue biopsies in diagnosis of lung cancer but also comparable. We aim to assess the diagnostic utility of bronchial wash and brush cytology and bronchial biopsy in diagnosing various pulmonary lesions and to compare the bronchial wash and brush cytology with bronchial biopsy in patients with lung cancer. All the patients who underwent fiberoptic bronchoscopy at Alluri Sitarama Raju Academy of Medical Sciences, Eluru during the period of August 2016 to June 2018 for suspected lung lesions on chest radiograph/ CT scan and came to cytology division of pathology department for bronchial wash & brush cytology were included in the study along with biopsy in available cases. Total 60 cases of bronchoscopically visible abnormal lesions underwent bronchial wash and/or brush cytology and/or bronchial biopsy. Of them, only 11.8% of cases of lung malignancy was detected by bronchial wash where as 28.9% of cases of lung malignancies were detected by bronchial brush and 58.8% of cases by bronchial biopsy. We conclude that endobronchial biopsies along with bronchial brush give better cellularity and yield when compared to bronchial wash. The probability of finding the histological subtypes is higher in Endobronchial biopsy when compared with brush and wash samples.

Keywords: Bronchoscope, bronchial wash, bronchial brush, lung cancer.

INTRODUCTION

Currently, Lung cancer is the fourth most frequently diagnosed major cancer in the world and most common cause of cancer mortality [1]. It accounts for 13% of all new cancer cases and 19% of cancer related deaths worldwide [1]. In India, lung cancer constitutes 6.9% of all new cancer cases and 9.3% of all cancer related deaths in both genders [1]. There is increasing awareness to render the most accurate diagnosis using the least invasive procedures like bronchoscopy [2]. As such respiratory tract cytology has been well established throughout the world as a diagnostic procedure in the evaluation of patient with suspected lung malignancy [2].

Fiber optic bronchoscopy has become an important diagnostic and therapeutic tool for management of chest diseases and has revolutionized practice of pulmonary medicine [3]. Early diagnosis of lung cancer plays a pivotal role in reducing death rate due to lung cancer. Bronchial washing, brushing and fine needle aspirations not only compliment tissue biopsies in diagnosis of lung cancer but also comparable.

AIMS AND OBJECTIVES

- To assess diagnostic utility of bronchial wash and brush cytology and bronchial biopsy in diagnosing various pulmonary lesions.
- To compare the bronchial wash and brush cytology with bronchial biopsy in patients with lung cancer.

MATERIALS AND METHODS

The present study included 60 patients.

Inclusion Criteria

All the patients who underwent fiberoptic bronchoscopy for suspected lung lesions on chest radiograph/ CT chest and came to cytology division of pathology department for bronchial wash & brush cytology were included in the study along with biopsy in available cases. Bronchial brush smears are fixed in

absolute alcohol for Pap and haematoxylin and eosin (H and E) stain. Bronchial wash fluids taken before brushing were first centrifuged (1500 rpm for 5 min) and smears are prepared, which are fixed in absolute alcohol and stained with H and E and Pap stain, respectively. Bronchial biopsy specimens were fixed in 10% formalin, processed in automated tissue processor and paraffin embedded sections are cut at 3–4-micron thickness and stained with H and E.

Exclusion Criteria

Patients who refused to give consent.

Data is compiled by using MS Office 2010 and descriptive statistics were used.

Study conducted in Department of Pathology at Alluri Sitarama Raju Academy of Medical Sciences, Eluru.

Study Period: August 2016 to June 2018.

Approval for this study was taken from the institutional ethical committee.

Consent was taken from all patients included in the study.

RESULTS

Total 60 cases of bronchoscopically visible abnormal lesions underwent bronchial wash and/or brush cytology and/or bronchial biopsy. Six of these 60 patients are positive for lung cancer. One case was reported as inflammatory on bronchial wash and unsatisfactory in bronchial brush and biopsy to compare and comment. Correlation between bronchial wash and brush cytology and biopsy is done in 14 cases.

As shown in Figure-1, the most common age groups involved are from 41-70.

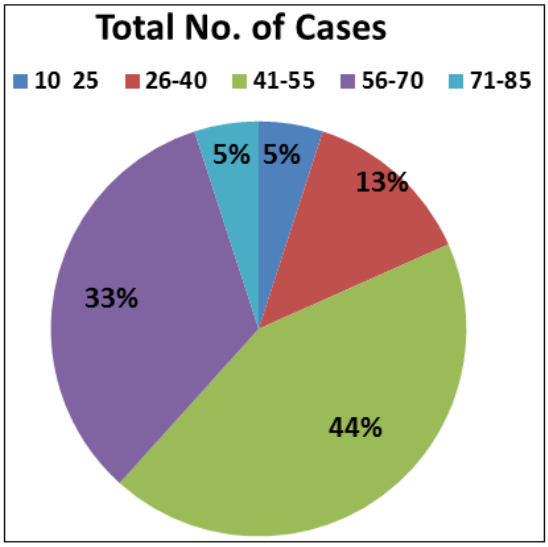

Fig-1: Age wise distribution of cases that underwent bronchoscopy

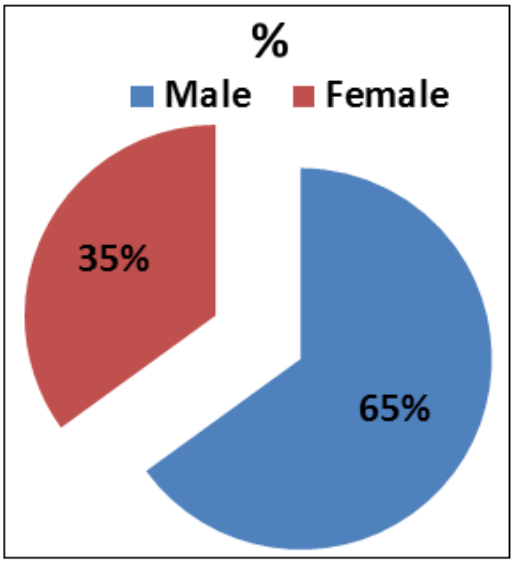

Fig-2: Gender wise distribution of cases that underwent bronchoscopy

As shown in Figure-2, males are commonly involved than females with an M: F ratio of 1.6:1.

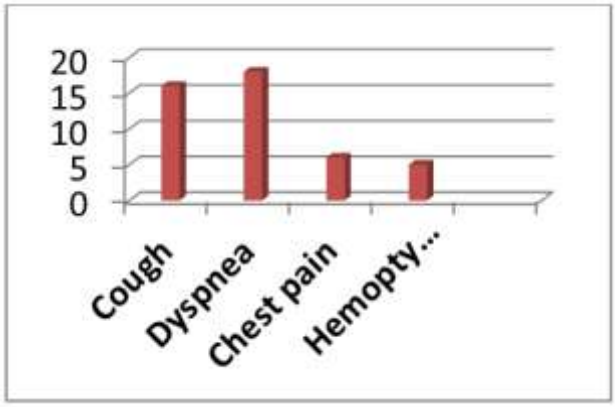

Fig-3: Frequency of clinical features in patients with lung lesions

As shown in Figure-3, most of them are presented with cough and dyspnoea followed by chest pain and haemoptysis.

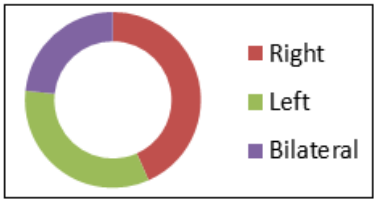

Fig-4: Doughnut showing Lung lobes involved with abnormal lesions

As shown in Figure-4, right lung is more commonly involved than left and both lobes are involved in 14 cases.

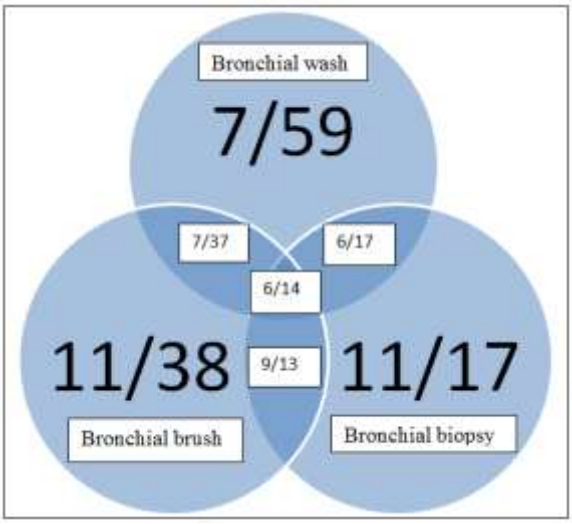

Fig-5: Venn diagram representing malignant cases detected by 3 methods

As shown in Figure-5 & Table-1, only 11.8% of cases of lung malignancy were detected by bronchial wash where as 28.9% of cases of lung malignancy were detected by bronchial brush and 58.8% of cases by bronchial biopsy. By combining bronchial wash and brush cytology only 18.9% of malignant cases were detected. By combining bronchial wash cytology and bronchial biopsy 35.2% of malignant cases were detected. By combining bronchial brush cytology and bronchial biopsy 69.2% of malignant cases were detected. By combining bronchial wash and brush cytology and bronchial biopsy 42.8% of malignant

cases were detected. One case of small cell carcinoma detected only in bronchial brush cytology which has haemorrhagic yield in bronchial wash and biopsy was not done as it was bleeding. In addition, two cases of suppurative/necrotising granulomatous inflammation were detected in bronchial wash/bronchial brush cytology.

Table-1: Histological types of malignancy in confirmed cases of Lung Cancer

Diagnosis	No. of cases	Percentage
Adenocarcinoma	6	54.5
Squamous cell carcinoma	3	27.2
Poorly differentiated carcinoma	2	18.1

As shown in Figure-5 & Table-1 adenocarcinoma is the most common lung malignancy (Figure 6 and 7), followed by squamous cell carcinoma (Figure-8) and one case of small cell carcinoma detected in bronchial brush cytology and biopsy was abandoned in view of bleeding (Figure 6 and 7).

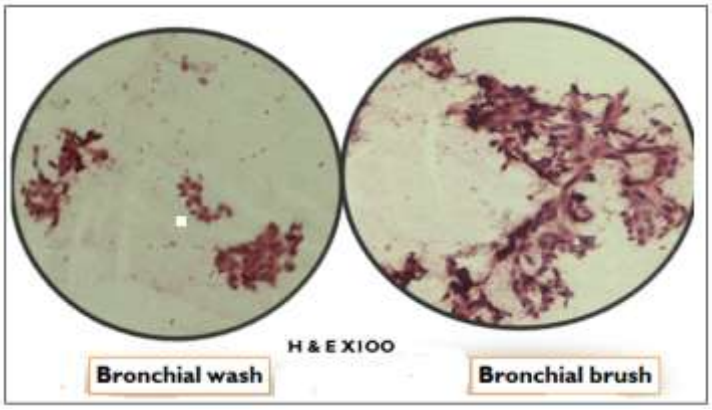

Fig-6: Adenocarcinoma of lung detected by bronchial wash and bronchial brush cytology

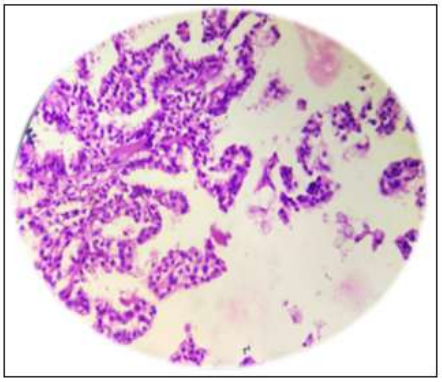

Fig-7: Papillary Adenocarcinoma of lung (H&EX100)

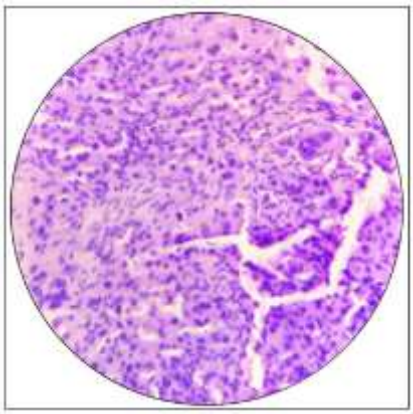

Fig-8: Squamous cell carcinoma of lung (H&EX100)

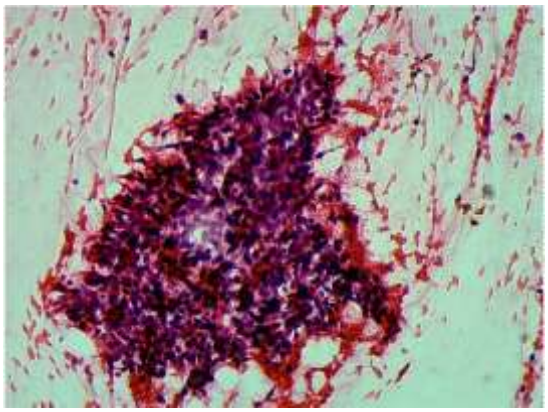

Fig-9: Suspicious case of small cell carcinoma lung which is reported on bronchial brush cytology (H&EX100)

DISCUSSION

Present study suggests that there is a male preponderance of lung malignancy with an M: F ratio of 1.6:1 and in fourth decade probably due to higher prevalence of smoking in males, more environmental and occupational exposure to carcinogens [3]. Similar male predominance was reported in various studies by Neerav Tyagi *et al*., [3], Jagdish Rawat *et al*., [4], Anupam sarma *et al*., [5] and Manoj Kumar *et al*., [6].

Table-2: Comparison of present study with previous other studies.

Procedure	Neerav tyagi *et al*., [3] (n=63) (2018)	Irom Ibungo *et al*., [9] (n=73) (2016)	J. Rawat *et al*., [7] (n=107) (2007)	Present study (n=60)
Bronchial biopsy	9 (14.2%)	71 (97.3%)	89(83.1%)	11/17(61.1%)
Bronchial brush cytology	11(17.4%)	-	74(69.1%)	11/38(28.9%)
Bronchial wash cytology	-	2 (2.7%)	51(47.6%)	7/59(11.8%)
Bronchial biopsy and bronchial brush cytology	**32(50.7%)**	-	97(90.6%)	**9/13(69.2%)**
Bronchial biopsy and bronchial wash cytology	-	**71 (97.3%)**	91(85%)	6/17(35.2%)
Bronchial biopsy, bronchial wash and brush cytology	6(9.5%)	-	**99(92.5%)**	6/14(42.8%)

As shown in Table-2, bronchial brush cytology along with bronchial biopsy has given highest yield in bronchoscopic procedure with adenocarcinoma being the most common type in our study, which is similar to study done by Neerav tyagi *et al*., [3]. J.Rawat *et al*., [7] and surekha *et al*., [8] reported the highest yield in bronchoscopic procedure by combining the results of Bronchial biopsy, bronchial wash and brush cytology.

In contrast to our study, Irom Ibungo *et al*., [9] and Mufti and Mokhtar *et al*., [10] reported the highest yield in bronchoscopic procedure by combining the results of Bronchial biopsy and bronchial wash cytology, when compared to any of the three techniques employed individually. In our study, Bronchial brushing is a much superior technique in the diagnosis and morphological typing of lung cancer than bronchial wash cytology, as it demonstrates far better cellular yield and morphology which is similar to study done by Gaur *et al*., [11].

CONCLUSION

In advent of progress in bronchoscopy with flexible bronchoscope over rigid bronchoscope, the quality of cellular material provided for cytology has improved with time. Both skill and advances in bronchoscopy has led to good quality material to improve diagnosis of lesion. This study suggests that the Endobronchial biopsy along with bronchial brush gives better cellularity and yield when compared to bronchial wash. The probability of finding the histological subtypes is higher in Endobronchial biopsy when compared with brush and wash samples.

Limitations

The limitation is small sample size, there by analysing variety of cases was minimal. The pitfalls in diagnosis by bronchial washings are that the malignant cells are not well represented; hence the diagnostic utility of bronchial washings is limited.

Conflicts of interest: Nil

Financial assistance: Nil

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