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Research Article

Efficacy of Bronchial Wash and Brush Cytology in the Diagnosis of Lung Cancers

A. Smita Reddy[1], N. Vivekanand[2]*, K. Durga[3]
[1]Assistant Professor, [3]Professor of Pathology, Govt. General Chest Hospital, Hyderabad, Andhra Pradesh, India
[2]Associate Professor, Department of Pathology, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Andhra Pradesh, India

***Corresponding author**
Dr. N. Vivekanand
Email: dnvivek2010@gmail.com

Abstract: The advent of fiberoptic bronchocopy has revolutionized the sampling of respiratory tract and has increased diagnosis of lung tumors. The study was aimed to evaluate the efficacy of bronchial wash and brush cytology in diagnosing lung tumors. This is a 3 years retrospective study from August 2010 to July 2013. 448 cases were included in the study. Bronchial wash and brush were obtained from all the 448 cases. The results had shown that adenocarcinoma was the most common tumor followed by squamous cell carcinoma. The male to female ratio in our study was 12.64:1. The most common age at presentation of lung cancers was 51-60 years. Involvement of right lung as compared to left lung was in the ratio of 1.3:1. In conclusion, Bronchial wash and brush cytology are an important basic diagnostic tool in the diagnosis of lung cancers. This technique can be used concurrently with bronchial biopsy whenever required.
Keywords: Bronchial washing, Brushing, Fiber-optic Bronchoscopy (FOB), Cytology, Lung cancer

INTRODUCTION

Bronchogenic carcinoma is the leading cause of all cancer associated deaths in the world. Lung cancer is one of the most frequent malignancies in the industrialized nations. It is the commonest cause of death from cancer in males. According to recent studies the incidence is on the rise in women. For early diagnosis different diagnostic modalities are available which include; radiology, FOB, bronchial biopsy, exfoliative cytology, bronchial brushing, washing and fine needle aspiration cytology [1].

Flexible fiber-optic bronchoscope revolutionized respiratory cytology, as techniques like bronchial brushings (BB), broncho-alveolar lavage (BAL) and bronchial biopsy became more easy, accessible and popular, shifting the emphasis from diagnosis of advanced malignancy in operable patients to the use of cytology as a first line diagnostic and management tool [2].

Cytological assessment of specimens of the respiratory tract using flexible FOB is the most commonly used technique for the diagnosis of lung cancer. Both bronchial washing and brushing used concurrently are effective in the diagnosis of neoplastic lesions of lung. These tend to preserve both the cells and their architectural arrangement. This technique can be used in conjunction with radiological and histological findings to give 100% accuracy in the diagnosis of lung cancer. Most authors agree that bronchial washings do not add significant information to that obtained from the brushings and that the preparations are of inferior quality [3].

The common symptoms of presentation were cough of long duration and chest pain. Very few cases presented with hemoptysis, change of voice and difficulty in swallowing. Shortness of breath was seen only in patients having an associated chronic obstructive pulmonary disease (or) advanced disease.

The present study was planned to assess the importance of cytological methods in diagnosis and sub tying the malignancy, age and sex distribution and frequency of involvement of tumors in the right and left lung.

MATERIAL AND METHODS

This is a 3 year retrospective study conducted in the department of pathology, Govt. General and Chest Hospital, Hyderabad from August 2010 to July 2013.

A total of 448 cases were included in the study. The samples were obtained by flexible FOB done by the pulmonologist. BB material was smeared directly onto clean glass slides. The smear were immediately fixed in isopropyl alcohol and stained with haematoxylin and eosin and Pap stains. Bronchial wash specimens were

sent to the laboratory where they were centrifuged and prepared into smears.

Final diagnosis was made taking into consideration both bronchial wash and brush cytological findings. Wherever required a bronchoscopic biopsy was advised.

RESULTS

In our study of the total 448 cases, adenocarcinoma was the most common lung cancer diagnosed (34.82%) (Fig. 1) followed by squamous cell carcinoma (SCC) (31.02%) (Fig. 2). 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% (Fig. 3) and adenosquamous 0.4% of all cancers. BB smears with scanty material insufficient for subtyping the malignancy were grouped under positive for malignant cells. These cases were sent for either a repeat bronchoscopy (or) ultrasound guided FNAC. They comprised 4.9% of all cases. The subgroup others (5.5%) included predominantly metastatic tumors with a known primary elsewhere (Table 1).

Lung cancers mostly occurred in the right lung (56.6%) as compared to the left lung (43.30%) with a right lung, left lung ratio of 1.3:1 (Table 2).

In this study out of 448 cases most lesions occurred during 5th decade 168 cases followed by 4th decade 128 and 96 cases in 6th decade, lessor numbers occured in 2nd 3rd and 7th,8th decades (Table 3). Most of the cases studied were males (72.5%) as compared to females (27.5%) with a male female ratio of 2.64:1.

Table 1: Lung cancer distribution

Lung cancer	Number of cases		Total	Percentage
	Male	Female		
SCC	105	34	139	31.02%
Adenocarcinoma	98	58	156	34.82%
Poorly differentiated non small cells	58	15	73	16.29%
Small cell carcinoma	30	01	31	6.91%
Adenosquamous	2	-	2	0.4%
Positive for malignant cells	16	6	22	4.9%
Others	16	9	25	5.5%
Total	325	123	448	100%

Table 2: Frequency of distribution of lung cancers in both lungs

Lung cancer type	Right lung	Left lung
SCC	82	57
Adenocarcinoma	89	67
Poorly differentiated carcinoma	39	34
Small cell carcinoma	17	14
Adenosquamous	02	-
Positive for malignant cells	12	10
Others	13	12
Total	254	194

Table 3: Age wise distribution of Lung Cancer

Lung cancer	21-30	31-40	41-50	51-60	61-70	71-80	81-90	Total
SCC	2	6	32	58	32	8	01	139
Adenocarcinoma	3	6	45	57	34	11	-	156
Poorly differentiated non small cell carcinoma	1	5	13	30	21	3	-	73
Small cell carcinoma	-	1	11	8	8	8	-	31
Adenosquamous	-	-	1	1	-	-	-	02
Positive for malignant cells	-	4	12	5	1	-	-	22
Others		2	14	09	-	-	-	25
Total	6	24	128	168	96	25	01	448

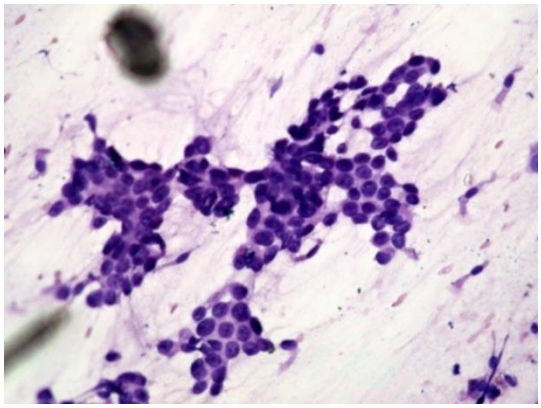

Fig. 1: Photomicrograph of bronchial brushing showing Adenocarcinoma (40x)

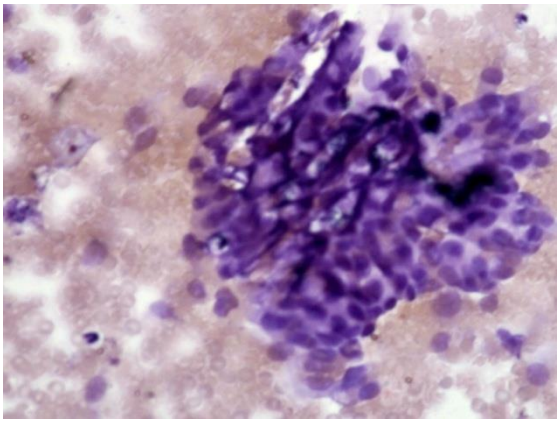

Fig. 2: Photomicrograph of bronchial brushing showing squamous cell carcinoma (40x)

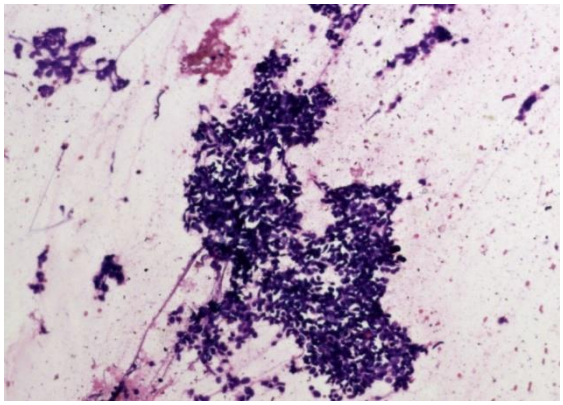

Fig. 3: Photomicrograph of bronchial brushing showing Small cell carcinoma (40x)

DISCUSSION

The present study was done to evaluate the efficacy of bronchial wash and brush cytology in diagnosing lung tumors. The results were correlated with clinical presentation, fiberoptic bronchoscopy (FOB) findings and radiological presentation.

Lung tumors are the most common cause of death due to cancer in men and are now emerging as an important cause of neoplastic mortality in females [4].

Few of the lesions had no evidence of growth (or) mucosal abnormalities by FOB. Some cases reported as consolidation / un-resolving pneumonia was malignant by bronchial brush cytology. The tumors involved either the right lung, left lung (or) had a bilateral presentation. All tumors involving the lungs were taken for the study irrespective of whether they were primary in the lung (or) metastatic.

The sensitivity for endobronchial disease is high, especially for biopsies and brushings. The sensitivity is lower for peripheral lesions, with cytobrushing showing the highest sensitivity, followed by transbronchial biopsies and BAL/washing. Flexible bronchoscopy has a poor sensitivity for peripheral lesions < 2 cm in diameter [5].

Majority of these cases are found in the 5^{th} and 6^{th} decades. It is the most common visceral malignancy of

males in Pakistan and is more prevalent in males between 40 and 70 years age with a peak incidence in 6th or 7th decade [1] age ranging from 50-79yrs. The male: female ratio was 4.3:1 [6]. The mean age was 59 years and 63.5% of patients were male [7]. Vital statistics of the United States (1997) reported that majority of bronchogenic carcinoma are between the age groups 55 – 74 years [8].

Most of the cases in our study were males (72.5%) as compared to females (27.5%) with a male female ratio of 2.64:1. This was as compared with other studies by Gaur DS et al with a male female ratio of 3.6:1 [2].

A. Vigg and associates reported male to female ratio of about 6:1 and 62% ex-smokers, 10% current smokers and 28% non-smokers amongst males [9]. This high incidence in males could be due to the higher prevalence of smoking in males.

The common symptoms of presentation were cough of long duration and chest pain, very few cases presented with hemoptysis, change of voice and difficulty in swallowing, shortness of breath. Arora *et al*. reported the common symptoms cough (92%), hemoptysis (29%), chest pain (52%), breathlessness (40%) and common physical findings were clubbing (35%), lymphadenopathy (26%) [10]. Most patients who have lung cancer present with symptoms that are related to the primary tumor or intrathoracic spread of disease (cough, hemoptysis, dyspnoea, chest pain, hoarseness, wheezing), distant metastatic disease, or nonspecific systemic symptoms (fatigue, weight loss, generalized weakness) [11].

In our study adenocarcinoma was the most commonly diagnosed tumor at 34.82% followed by SCC 31.02%. This closely compared with a study by Anupam Sharma *et al*.; 36.84% for adenocarcinoma and 42.11% for squamous cell carcinoma [8]. In other study SCC 60.6%, adenocarcinoma 21.2% [6].

SCC was found to be the commonest lung cancer (38.70%), followed by small cell carcinoma (27.10%) and adenocarcinoma (23.87%) [12]. Two cases of adenosquamous carcinoma were reported which were proved by biopsy and 31 cases (6.9%) were small cell carcinomas. It is correlated with other study 6.06% [6].

The non – small cell tumors which could not be subtyped into either SCC (or) adenocarcinoma were grouped under poorly differentiated non – small cell tumors. They comprise 16.29% of all cases in our study. BB smears with insufficient material were grouped under positive for malignant cells. This group comprises of 22 cases (4.9%). The group others (5.5%) included predominantly metastatic sarcomas.

Lung cancer mostly occurred in the right lung (56.6%) as compared to the left lung (43.30%) with a Right lung, left lung ratio of 1.3:1.

From the point of view of management, lung tumors are generally separated into small cell carcinomas and non-small cell carcinoma. For small cell carcinoma intensive chemotherapy is advised whereas non-small cell carcinoma are treated surgically.

BAL has begun to play a more important role in the diagnosis of lung cancer. BAL specimen may also be used for molecular analysis in search of diagnostic and prognostic marker [13].

CONCLUSION

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

These techniques can be used concurrently with bronchial biopsy and immunocytochemistry wherever required.

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