

## Harsukh Educational Charitable Society

### International Journal of Community Health and Medical Research

Journal home page: [www.ijchmr.com](http://www.ijchmr.com)

doi: 10.21276/ijchmr

ISSN E: 2457-0117 ISSN P: 2581-5040

Index Copernicus ICV 2018=62.61

## Original Research

### Evaluation of utility of brush smears microscopy and cell block microscopy

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#### ABSTRACT

**Background:** Lung cancer is one of the commonest cancers worldwide. The present study was conducted to evaluate the diagnostic utility of brush smear microscopy and cell block microscopy. **Materials & Methods:** The present study was conducted in the department of general pathology. It comprised of 50 specimens of brushtip washings from suspected cases of carcinoma lung. In all patients, comparison of brush smear microscopy and cell block microscopy was done. **Results:** Out of 50 patients, males were 30 and females were 20. Common findings was hilar mass seen in 20 patients, upper lobe mass in 12 patients, lower lobe mass in 5 patients, pleural effusion in 3 patients, cervical lymph nodes in 3 patients, x- ray opacity in 4 patients and multiple nodules in 3 patient. The difference was significant ( $P < 0.05$ ). **Conclusion:** Cell block preparation is a simple method that increases diagnostic yield of flexible bronchoscopy, is cost effective & hence can be routinely used.

**Key words:** Bronchoscopy, Cell block, Lung

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**This article may be cited as:** Agrawal S. Evaluation of utility of brush smears microscopy and cell block microscopy. HECS Int J Comm Health Med Res 2019; 5(2):54-56.

## INTRODUCTION

Lung cancer is one of the commonest cancer worldwide and cause of cancer related deaths all over the world followed by breast cancer. It accounts for 13 per cent of all new cancer cases and 19 per cent of cancer related deaths worldwide. Among males lung cancer is the most common one whereas in females breast cancer is the commonest followed by lung cancer.<sup>1</sup> In India, breast cancer is most prevalent followed by lung cancer and the cancer of the cervix. The estimated new cases of lung cancer during 2016 were 1.14 lakhs. Although tobacco smoking remains the most important risk factor for development of lung cancer, association of indoor/outdoor air pollution, occupational exposures like asbestos and genetic factors with development of this disease has been identified especially amongst non-smokers.<sup>2</sup> The combination of asbestos exposure and smoking greatly increases the risk of developing lung cancer. Brush tip washings (BTW) is a recent modality which utilizes the cells that remain on the bronchoscope cytology brush following smearing onto cytology slides. This material would otherwise be discarded, and reports suggest BTW may contribute to diagnostic utility of bronchoscopy.<sup>3</sup> The present study was conducted to evaluate the

diagnostic utility of brush smear microscopy and cell block microscopy.

## MATERIALS & METHODS

The present study was conducted in the department of general pathology. It comprised of 50 specimens of brush tip washings from suspected cases of carcinoma lung. The study was approved from institutional ethical committee. All were informed regarding the study and written consent was obtained. Bronchoscopic investigation of pulmonary lesions is performed with intravenous sedation and topical lignocaine 2%. The procedure was performed using a standard video-bronchoscope. After the lesion was located, sampling instruments were passed down the sheath and specimens collected under direct vision using the established technique for cytology brushing. Routine brushings were taken and smeared onto two slides for rapid on site examination (ROSE) using rapid Romanowsky stain. Once the smears were collected from the brushings, the brush tip was rinsed with NAFS. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 50		
Gender	Males	Females
Number	20	20

Table I shows that out of 50 patients, males were 30 and females were 20.

**Table IV Radiological findings in patients**

Findings	Number	P value
Hilar mass	20	0.01
Upper lobe mass	12	
Lower lobe mass	5	
Pleural effusion	3	
X- ray opacity	4	
Cervical lymph node	3	
Multiple nodules	3	

Table II shows that common findings was hilar mass seen in 20 patients, upper lobe mass in 12 patients, lower lobe mass in 5 patients, pleural effusion in 3 patients, cervical lymph nodes in 3 patients, x- ray opacity in 4 patients and multiple nodules in 3 patient. The difference was significant (P< 0.05).

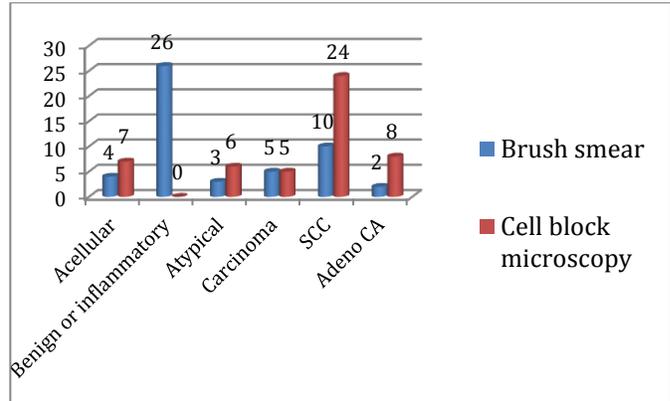
**Table III Comparison between brush smear microscopy and Cell block microscopy**

Diagnosis	Brush smear	Cell block microscopy
Acellular	4	7
Benign or inflammatory	26	0
Atypical	3	6
Carcinoma	5	5
SCC	10	24
Adeno CA	2	8

Table III shows that acellular was seen in 1 case of brush smear cytology whereas it was 7 in cell block microscopy. Benign or inflammatory lesions were found in 26 cases whereas cell block microscopy did not reveal any case, atypical was seen in 3 case in

brush smear cytology whereas cell block microscopy showed 6 cases, carcinoma was seen in 5 cases of brush smear cytology whereas cell block microscopy revealed in 5 cases. SCC was evident in 10 in brush smear cytology and 24 in cell block microscopy. AdeoCa was evident in 2 cases of brush smear cytology and 8 in cell block microscopy.

**Graph I Comparison between brush smear microscopy and Cell block microscopy**



**DISCUSSION**

Worldwide, 1.8 million patients were diagnosed with lung cancer in 2012 that caused an estimated 1.6 million deaths. In the United States, there are approximately 225000 new cases of lung cancer and over 160000 deaths annually. Around 1953, lung cancer became the most common cause of cancer deaths in males, and in 1985, it became the leading cause of cancer deaths in females. However, due to decreased smoking habits, there is a decline in lung cancer deaths in both genders. The 2015 World Health Organization (WHO) classification that should be the foundation for lung cancer recognizes four major histologic cell types: Adenocarcinoma (including bronchioalveolar carcinoma), squamous cell carcinoma, large cell carcinoma, and small cell carcinoma.<sup>4</sup>

Lung cancer may come to clinical attention as a result of various signs and symptoms, the most common of which are weight loss, cough, dyspnea, weakness, chest pain, and hemoptysis. To further diagnose, next step involves application of the various diagnostic modalities which are categorized into invasive and non-invasive procedures. These include chest X ray, sputum cytology, pleural fluid cytology and bronchoscopy, CT/MRI scanning. Furthermore, the bronchoscopy guided sampling modalities include forceps/transbronchial lung biopsy(TBLB), transbronchial needle aspiration, brushings and washings and bronchoalveolar lavage, with optimal diagnostic performance achieved by combining methods.<sup>5</sup>The present study was conducted to evaluate the diagnostic utility of brush smear microscopy and cell block microscopy. The 2015 WHO classification also has guidelines to perform molecular studies that are crucial in the targeted therapies. Accumulating evidence suggests that lung cancer represents a group of histologically and molecularly heterogeneous diseases. In addition, increasing knowledge of the molecular pathology of lung cancers has led to their classification into specific subtypes according to appropriate treatments and molecular-targeted therapies.

In present study, out of 50 patients, males were 30 and females were 20. We found that common findings was hilar mass seen in 20 patients, upper lobe mass in 12 patients, lower lobe mass in 5 patients, pleural effusion in 3 patients, cervical lymph nodes in 3 patients, x- ray opacity in 4 patients and multiple nodules in 3 patient.

Bibbo et al<sup>6</sup> found that p63 and CK 5/6 seem to be useful for differentiating AC and SCLC from SCC with 100% specificity and 82% sensitivity, 89% specificity and 79% sensitivity, respectively. Thaparet al<sup>7</sup> conducted a study on 283 cases of SCLC. The expression of p63, p40 and CK5/6 were 20.7%, 7.9% and 0.5%, respectively in the cases of SCLC.

Shivakumarswamy et al<sup>8</sup> found that out of 77 bronchoscopic biopsies of lung carcinoma, 28 SCLC displayed TTF-1 positive, p63 negative immunoprofile, most of the SCC (32/39) had the opposite immunoprofile. All of the 10 ACs were negative for p63 and most of them (8/10) were negative for CK5/6. p63 and CK 5/6 seem to be useful for differentiating AC and SCLC from SCC with 100% specificity and 82% sensitivity, 89% specificity and 79% sensitivity, respectively. It seems that to achieve histologic typing of lung cancer as accurate as possible, TTF-1 in combination with p63 and CK 5/6 might be useful.

## CONCLUSION

Author concluded that cell block preparation is a simple method that increases diagnostic yield of flexible bronchoscopy, is cost effective & hence can be routinely used.

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