

Original Research

Assessment of the utility and sensitivity of the cell block microscopy method and brush smears microscopy in the cytodiagnosis of pleural effusions

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ABSTRACT

Background: The cytological examinations of serous effusions have been well-accepted, and a positive diagnosis is often considered as a definitive diagnosis. The present study was conducted to assess the utility and sensitivity of the cell block microscopy method and brush smears microscopy in the cytodiagnosis of pleural effusions. **Materials & Methods:** The present study was conducted in the Department of General Pathology of Mulayam Singh Yadav Medical College, Meerut. It comprised of 100 specimens of brush tip washings from suspected cases of carcinoma lung. In all patients, comparison of brush smear microscopy and cell block microscopy was done. **Results:** Out of 100 patients, males were 60 and females were 40. Common findings was hilar mass seen in 40 patients, upper lobe mass in 24 patients, lower lobe mass in 10 patients, pleural effusion in 6 patients, cervical lymph nodes in 6 patients, x- ray opacity in 8 patients and multiple nodules in 6 patient. The difference was significant ($P < 0.05$). **Conclusion:** The CB method provides high cellularity, better architectural patterns, morphological features and an additional yield of malignant cells, and thereby, increases the sensitivity of the cytodiagnosis when compared with the CS method. 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 cancer, pleural effusions.

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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.¹In 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.² The combination of asbestos

exposure and smoking greatly increases the risk of developing lung cancer.

Cytological examination of serous fluids is one of the commonly performed investigation. The accurate identification of cells as either malignant or reactive mesothelial cells is a diagnostic problem in conventional cytological smears. The cell block (CB) technique is one of the oldest methods for the evaluation of body cavity fluids.

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.³

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 to assess the utility and sensitivity of the cell block microscopy method and brush smears microscopy in the cytodagnosis of pleural effusions. It comprised of 100 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.

Smearing technique: Immediately after centrifuging, the supernatant fluid was drained off. Two to four smears were then prepared immediately. Slides were then fixed in fixative containing 50% ethanol + formalin and sent for pathological examination.

Cell-blocking: The supernatant fluid was decanted. The residual cell pellet which was left was fixed in freshly prepared Bouin's Solution (Saturated picric acid + glacial acetic acid + formalin) which was followed by processing & embedding the cell pellet in a paraffin block. These were later stained with routine H&E staining. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 100		
Gender	Males	Females
Number	60	40

Table I shows that out of 100 patients, males were 60 and females were 40.

Table II Radiological findings in patients

Findings	Number	P value
Hilar mass	40	0.01
Upper lobe mass	24	
Lower lobe mass	10	
Pleural effusion	6	
X- ray opacity	8	
Cervical lymph node	6	
Multiple nodules	6	

Table II shows that common findings were hilar mass seen in 40 patients, upper lobe mass in 24 patients, lower lobe mass in 10 patients, pleural effusion in 6 patients, cervical lymph nodes in 6 patients, x- ray opacity in 8 patients and multiple nodules in 6 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	8	14
Benign or inflammatory	52	0
Atypical	6	12
Carcinoma	10	10
SCC	20	48
Adeno CA	4	16

Table III shows that acellular was seen in 8 case of brush smear cytology whereas it was 14 in cell block microscopy. Benign or inflammatory lesions were found in 52 cases whereas cell block microscopy did not reveal any case, atypical was seen in 6 case in brush smear cytology whereas cell block microscopy showed 12 cases, carcinoma was seen in 10 cases of brush smear cytology whereas cell block microscopy revealed in 10 cases. SCC was evident in 20 in brush smear cytology and 48 in cell block microscopy. AdeoCa was evident in 4 cases of brush smear cytology and 16 in cell block microscopy.

DISCUSSION

The cytological examination of serous effusions has increasingly gained acceptance in clinical medicine, to such an extent that a positive diagnosis is often considered the definitive test and obviates explorative surgery. It is important not only in the diagnosis of malignant lesions, but also helps in staging and prognosis.

The development of malignant pleural effusion is a common complication of cancers like pulmonary and gastric carcinomas. 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.⁵ 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 1000 patients, males were 60 and females were 40. We found that common findings was hilar mass seen in 40 patients, upper lobe mass in 24 patients, lower lobe mass in 10 patients, pleural effusion in 6 patients, cervical lymph nodes in 6 patients, x- ray opacity in 8 patients and multiple nodules in 6 patient.

Bibbo et al⁶ 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 al⁷ 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 al⁸ 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.

Kakodkar UC et al⁹ aimed to evaluate the diagnostic utility of CB of bronchial washings when compared with CS. Out of 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.

CONCLUSION

The CB method provides high cellularity, better architectural patterns, morphological features and an additional yield of malignant cells, and thereby, increases the sensitivity of the cytodiagnosis when compared with the CS method. 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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