



## 'COMPARISON OF PLEURAL FLUID CYTOLOGY AND CELL BLOCK IN PLEURAL EFFUSION'

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### ABSTRACT

**AIMS AND OBJECTIVES** To assess the diagnostic utility of cell block technique in comparison to conventional cytospin, in the study of pleural fluids. To compare our results with existing literature.

**MATERIAL AND METHODS** The present prospective study was done for a period of two years from 1st August 2015 to July 31st 2017 in the Department of Pathology, Kakatiya Medical College, Warangal. During this period, pleural fluids obtained by aspiration were analyzed. A total of 53 cases were studied

**RESULTS** Out of the total 53 cases included in our study of pleural effusion males were 32 and female were 21 contributing 60.3% and 39.6% respectively. Age range of our patient was from 18 years to oldest patient being 68 years with the dominant age group being 31-40 years. Cytospin analysis showed 35 (66.05%) benign/inflammatory effusions, 11 (20.75%) suspicious of malignancy, 7 (13.20%) malignant cytology's. On cell block analysis 43 (81.20%) were diagnosed as benign/ inflammatory effusions, 10 (18.8%) were diagnosed to be malignant.

**CONCLUSION** The present study demonstrates that the pleural fluid cytology is the most useful test in establishing the diagnosis of pleural effusion. From the results it can be concluded that cell block technique demonstrates a higher diagnostic rate of malignant effusions compared to cytospin as the morphological features were better identified by this method. We conclude that the cell block technique method when used as an adjunct to routine smear examination increases the diagnostic yield and also carries the advantage of carrying further IHC studies.

**KEYWORDS :** Pleural Effusion, Cytology, Cell Block Technique, Pleural Aspiration, Cytospin.

### INTRODUCTION

Pleural fluid cytology is one of the commonly performed investigation. The identification of cells either malignant reactive or normal mesothelial cells is difficult on conventional cytology smears. Cell block technique is a well-known method sometimes considered a complementary or an alternative to conventional cytological studies. This study focuses on newer cell block preparation technique using alcohol formalin as fixative and to compare it with the conventional smear study in terms of diagnostic capability.

### METHODOLOGY

The present prospective study was done for a period of two years from 1st August 2015 to July 31st 2017 in the Department of Pathology, Kakatiya Medical College, Warangal. During this period, pleural fluids obtained by aspiration were analyzed. A total of 53 cases were studied.

All the samples are studied by both the techniques. CS are analysed after haematoxylin and eosin staining. Cell block technique is done using 10% alcohol formalin as fixative.

### OBSERVATIONS AND RESULTS

A total 53 cases were studied. Of the 53 cases males were 32 and female were 21 contributing 60% and 40% respectively. Our study showed a male preponderance. In this study youngest patient was 18 years old and the oldest patient being 68 years. Most of the patients were in the group of 31 to 40 years of age. Age group of >60 years contributed the least number of cases. Of the 53 cases taken up for study 32 patients i.e 60.3% had a right sided pleural effusion. The rest of 21 patients (39.7%) had a left sided effusion.

**TABLE 1 : Age and sex distribution of the study population**

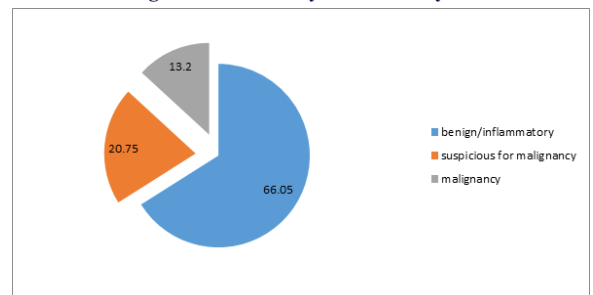
Age in years	Males	Females	total
20 or less	3	4	7
21-30	5	5	10
31-40	10	5	15
41-50	6	3	9
51-60	6	2	8
61 or more	3	1	4
Total	33	20	53

On physical examination 16 cases (30.1%) had haemorrhagic appearance and 22 (41.5%) had straw coloured appearance and 15 (36.5%) had turbid appearance.

After subjecting to Cytospin analysis the following results were observed. 35 (66.05%) cases were benign/inflammatory effusions, 11

(20.75%) cases were suspicious of malignancy, 7 (13.20%) cases were malignant cytology's.

**FIGURE 1 : Diagnostic results of cytospin analysis**



The same samples were subjected to cell block technique with 10% alcohol formaldehyde as a fixative and analysed.

Cell block analysis the observations were 43 (81.20%) of cases were diagnosed as benign/ inflammatory effusions, 10 (18.8%) of cases were diagnosed to be malignant pleural effusions.

**TABLE 2 : Diagnostic results of cell block analysis**

Sl no	Diagnosis	No of cases	Percentage
1	Benign/inflammatory	43	81.2
2	Suspicious for malignancy	0	0
3	Malignancy	10	18.8
	Total	53	100

### DISCUSSION

Pleural effusion is a sign of disease and not a diagnosis by itself. Detecting pleural effusion is easy but finding the etiological cause is difficult since both pulmonary and extra pulmonary conditions causes pleural effusion. The etiology often remains inconclusive after the biochemical, pathological and bacteriological analysis of pleural fluid. In the present study pleural effusions are studied by using a comparative approach of routine cytospins, cell block methods.

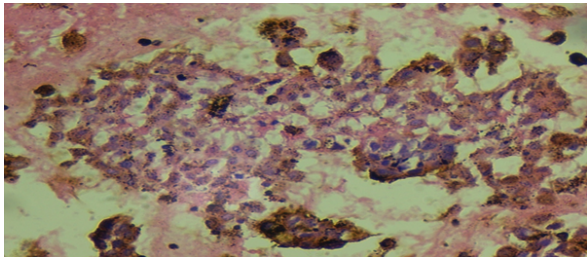
In our study males were predominant, concurrent with Sivakumaraswamy U et al<sup>1</sup>. Whereas female cases predominated in Assawasaksakul T et al<sup>2</sup>. Age range from 18 years to 68 years similar to the above cited studies. The oldest patient of 68 years was case diagnosed as malignant pleural effusion, thus emphasizing that malignancy should be

suspected in older age group. In present study out of 53 cases on cytospin examination 35(66.05%) cases were diagnosed as chronic inflammatory effusion. Lymphocytes were predominant cells followed by macrophages and reactive mesothelial cells.

The differentiation of reactive mesothelial cells and malignant cells was difficult with cytospin whereas cellular architecture and morphology was better visualized by cell block technique. Cellular yield was also higher with cell block technique. This similar observation was done by Maurice L et al<sup>5</sup> & Berg T et al<sup>6</sup>.

In the present study after subjecting on Cytospin analysis 35(66.05%) cases were benign/inflammatory effusions, 11 (20.75%) cases were suspicious of malignancy, 7 (13.20%) cases were malignant cytology's. After subjecting the same specimens to cell block analysis 43 (81.20%) of cases were diagnosed as benign/inflammatory effusions, 10 (18.8%) of cases were diagnosed to be malignant pleural effusions.

**FIGURE 2 : H&E Cell block showing Squamous cell carcinoma**



The percentage of benign cases in our study is comparable to Sivakumaraswamy U et al<sup>1</sup> & Thapar M et al<sup>4</sup>, whereas study by Assawasaksakul T et al<sup>2</sup> had predominant malignant cases of effusion. In our study 20.75% of cases were shown to be suspicious of malignancy which is higher when compared to Sivakumaraswamy U et al<sup>1</sup> who had 8.33% of cases. After cell block technique there were no cases that are suspicious of malignancy in our study similar to Sivakumaraswamy U et al<sup>1</sup> hence showing the diagnostic superiority of cell block technique. Cases diagnosed as malignant effusions was increased from 13.20% to 18.88%. In the present study cases diagnosed as malignancy by cell block technique were further subjected to immunohistochemical methods with further enhanced its diagnostic ability to subtyping of lung cancer.

Cell block technique has an increased diagnostic yield in both benign and malignant cases. Hence, the sections from CB provided additional information for a definite diagnosis, as it allowed recovery of minute cellular material and was valuable for histochemical and immunohistochemical methods [7,8].

Similar findings were documented by Sivakumaraswamy U et al<sup>1</sup>, Deniz KÖKSAL et al<sup>3</sup> & Thapar M et al<sup>4</sup>. Similar studies like Assawasaksakul T et al<sup>2</sup> & Deniz KÖKSAL et al<sup>3</sup> have shown there is improved diagnostic yield when both the methods are combined to 71.2%(p<0.001)<sup>2</sup>.

## CONCLUSION

The present study demonstrates that the pleural fluid cytology cell block technique is the most useful test in establishing the diagnosis of pleural effusion. From the results it can be concluded that cell block technique demonstrates a higher diagnostic capability for malignant effusions compared to cytospin as the morphological features were better identified by this method. We conclude that the cell block technique method when used as an adjuvant to routine smear examination increases the diagnostic yield and also carries the advantage of carrying further IHC studies.

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