

# A Research on Pleural and Ascitic Fluid Cytology in Suspected Malignant Effusions with Special Reference on Cell Block Preparation

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**Abstract:** *Background:* Pulmonary & gastrointestinal malignancy are life threatening problem. If we can detect those earlier by cell block preparation of ascitic fluid & pleural fluid cytology accurately then treatment will be started earlier, mortality & morbidity will be reduced. *Objective:* In India pulmonary & gastrointestinal malignancy are increasing day by day. Our aim is to assess the role of cell block preparation to detect malignancy in suspected pleural effusion & ascitic fluid sample. *Materials & Methods:* This is a cross sectional, observational study performed from February 2012 to July 2013 in sskm Hospital, Kolkata. We collected pleural and ascetic fluids from patients attending sskm hospital with clinical suspicion of malignancy. *Results:* Out of 48 cases 7 cases are diagnosed as malignant by both conventional smear and cell block methods, 31 cases are diagnosed benign by both the methods, 10 cases which are diagnosed benign by conventional smear, diagnosed malignant by cell block method. Out of 9 cases of malignant pleural effusions primary was known in 7 cases. In analysis of 8 cases of malignant ascitic fluid primary was detected in 5 cases. *Conclusion:* Combined approach of conventional smears and cell block technique helps to get an additional diagnostic yield for malignancy in suspected pleural effusion and ascetic fluid samples.

**Keywords:** Cell block preparation, Ascitic fluid, Pleural fluid

## 1. Introduction

An accumulation of fluid other than blood is called an effusion which results from an imbalance of fluid production and reabsorption. In the pleural, pericardial and peritoneal cavities this accumulation is known as a serous effusions. Effusion can indeed be placed in one of two categories. Transudates are clear straw coloured fluid characterized by low specific gravity, below 1.012 and low protein content (<3g/100ml). There is no alteration in the endothelial permeability. The cellular components of transudates are scanty and are limited to a few mesothelial cells and leucocytes. The glucose content is as plasma and pH is > 7.3. The exudates result from an accumulation of fluid within the body cavities, associated with damage to the wall of the capillaries. The exudates are cloudy opaque or various colors. The presence of blood tinged, reddish fluid is an important diagnostic sign that should be recorded because it may indicate the presence of a primary or metastatic tumor or tuberculosis. The exudates are characterized by high protein content (>3g/100ml) and, therefore, a high specific gravity (>1.018). The exudates are rich in fibrin and may coagulate on standing and usually contain a variable but often significant population of cells that are target of cytological investigation. Cytological examination of serous fluid is important not only in diagnosis but also staging and prognosis. Though combination of serosal biopsy increases the sensitivity, these biopsy procedure is limited due to several factors including high sampling errors.

We can also use the total amount of aspirate even after repeated collection and thereby it increases the sensitivity. It also helps to demonstrate better architectural patterns, which could be of great help in making correct diagnosis of the primary site. Moreover this is useful for special stains and

immunohistochemistry. The present study has been undertaken to assess the utility of cell block preparation in increasing the sensitivity of cytodagnosis of malignant effusions.

## 2. Materials and Methods

This is a cross sectional, observational study & the study period was from February 2012 to July 2013.

### Study Population

The pleural and ascetic fluids obtained from both male and female patients attending N.R.S. Medical college with clinical suspicion of malignancy. Total number of case studied were 48.

### Inclusion Criteria:

Ascitic and pleural fluids are collected from the patients admitted in S.S.K.M Hospital, Kolkata, with clinical suspicion of malignancy.

### Study Technique and Study Tools

We took proper clinical history and did physical examination of the patients. We collected pleural & ascetic fluid for conventional smear, staining & cell block technique. We examined Microscopically conventional smear and cellblock slides. We compared evaluation of conventional smear versus cellblock technique & tabulated cytomorphological characters.

Total 48 body cavity fluid samples were studied from the patients presented with suspected malignant effusions. The maximum number of the samples were in the age group of 51-60 years. In males the maximum number of samples were in the age group of 51-60 years. In females the maximum

number of samples were in the age group of 41-50years and 51-60 yrs.

### 3. Results

Total 48 body cavity fluid samples were studied from the patients presented with suspected malignant effusions. Out of which 52% cases contributed by ascetic fluid (25 cases out of 48) and 48% cases contributed by pleural fluid (23 cases out of 48). Both in ascetic and pleural fluids cellularity was more in cell block method as compared to conventional smear. Chisquare test for linear trend for cellularity from mild, moderate to marked in case of Pleural fluid = 5.16,  $P < 0.05(0.0230)$ ; in case of ascetic fluid = 5.14,  $P < 0.05(0.130)$ .

Chisquare test for linear trend in scattered cells to more definitive pattern = 6.94,  $P < 0.05(0.0084)$ . Out of the 23 pleural fluid samples cytological diagnosis of benign effusion was rendered in 16 (70%) cases and suspicious for malignancy in 2 (8%) cases in conventional smears where as in cell block, malignant effusions were diagnosed in 9 (40%) cases. There was no diagnosis of suspicious for malignancy in cellblock. Chisquare test for linear trend in Pleural fluid analysis in conventional smear and cell block = 0.63,  $P > 0.05$ .

Out of the 25 ascitic fluid samples cytological diagnosis of benign effusions was rendered in 19 (76%) cases and suspicious for malignancy in 4(16%) cases in conventional smear where as in cellblock malignant effusions we diagnosed in 8 (32%) cases.

Chi Squire test for linear trend in Ascitic fluid analysis in conventional smear and cell block = 1.47,  $P > 0.05$ . Additional 6 cases were detected as malignant by cellblock method. i.e. 24% more diagnostic yield for malignancy. In analysis of 8 cases of malignant ascitic fluid primary was detected in 5 cases which included 4 cases of ovarian tumor and one case from carcinoma of GIT.

### 4. Discussion

The age of patients in our study ranged from 11years to 90 years. Male to female ratio was 1.5:1. We received 48

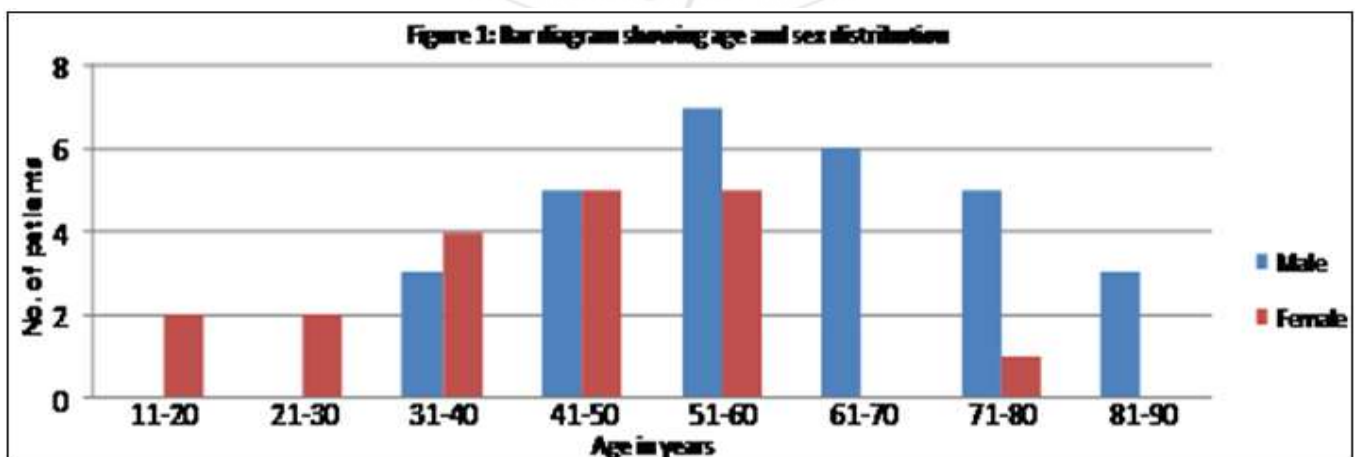
samples of body cavity fluids of which ascitic fluid samples contributed more i.e. 52%. Pleural fluid samples were 48% (Table2). Similar findings were noted by Sears et al study, in which pleural fluid samples were 61% and ascetic fluid samples were 30%. In the present study we evaluated conventional smears and cellblocks preparation for cellularity, architectural pattern, predominant cells, volume of obscuring background and the preservation of morphology. In cell block method marked cellularity was observed in 52% samples. Chisquare test for linear trend revealed statistically significant value in both pleural and ascetic fluid

cases indicating that the cellular yield was more with the cellblock method as compared to conventional smear method. In conventional smear 60% cases show single scattered cells where as only 27% cases show single scattered cells in cellblock method.

By using cellblock method tumours were subsequently demonstrated in 38% of the patient who had negative or atypical cytological reports. The present study yielded 17% more malignant cases in pleural fluid and 24% more malignant cases in ascitic fluid. By cell block method additional 4 cases were detected as malignant i.e. 17% more diagnostic yield for malignancy. In ascitic fluid, out of 25 cases difference in diagnosis was noted in 6 cases. By cell block method additional 6 malignant cases were diagnosed i.e. 24% more diagnostic yield for malignancy. The present study identified additional 24% malignant lesions by cellblock method when compared to conventional smear study. Kappa value of this study is 0.475 which indicates moderate agreement between conventional smear and cell block method.

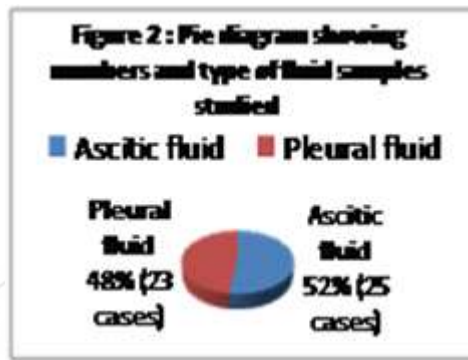
### 5. Conclusion

Morphological features were better identified by cell block method when compared to conventional smear method. A combined approach of conventional smears and cell block technique helps to get an additional diagnostic yield for malignancy in suspected pleural effusion and ascetic fluid samples.



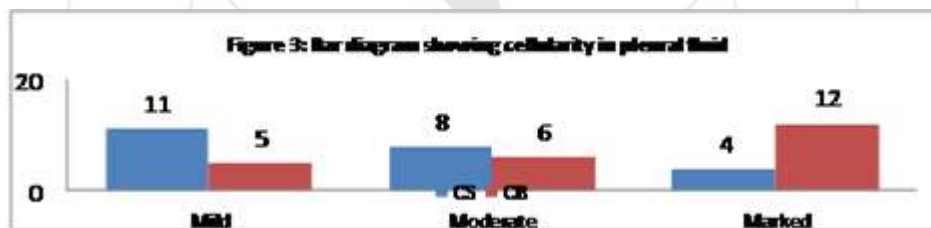
**Table 1: Age and sex distribution**

Sl. No.	Age in Years	No. of males	No. of females	Total No.	Percentage (%)
1	11-20	00	02	02	04
2	21-30	00	02	02	04
3	31-40	03	04	07	15
4	41-50	05	05	10	21
5	51-60	07	05	12	25
6	61-70	06	00	06	13
7	71-80	05	01	06	13
8	81-90	03	00	00	6
	Total	29	19	48	100



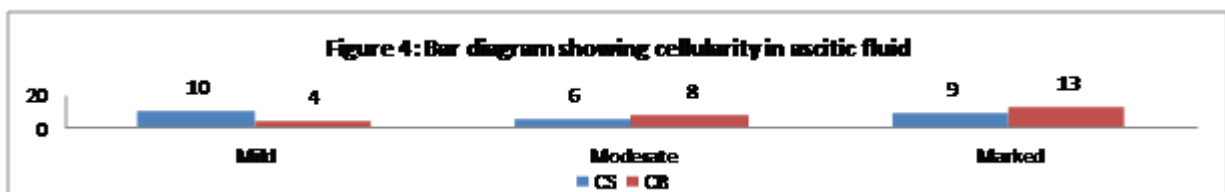
**Table 2: Number and Type of body cavity fluid**

Sl. No.	Fluids	No.	Percentage (%)
1	Ascitic	25	52
2	Pleural	23	48
	Total	48	100



**Table 3: Cellularity in conventional smear (CS) and cellblock (CB)**

Sl. No.	Cellularity	Pleural fluid				Ascitic fluid			
		CS	%	CB	%	CS	%	CB	%
1	Mild	11	48	5	22	10	40	4	16
2	Moderate	8	35	6	26	9	36	8	32
3	Marked	4	17	12	52	6	24	13	52
	Total	23	100	23	100	25	100	25	100



**Table 4: Architectural patterns in conventional smear (CS) and cellblock (CB)**

Sl no.	Architectural pattern	Conventional smears (CS) %		Cellblock (CB) %	
1	Singly scattered	29	60	13	27
2	Cell clusters	09	19	14	29
3	Papillae	03	06	08	17
4	Glands	04	09	07	15
5	Sheets	03	06	06	12
	Total	48	100	48	100

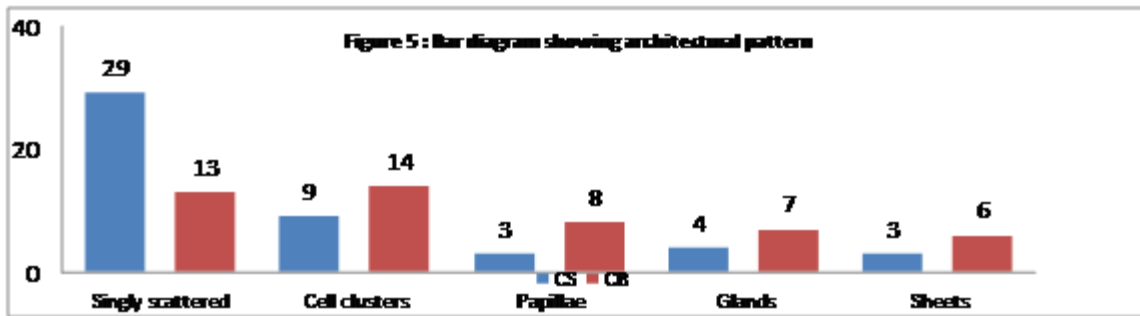


Table 5: Pleural fluid analysis

Sl. No.	Feature	CS method		CB method	
		No.	%	No.	%
1	Benign	16	70	14	60
2	Suspicious for malignancy	02	08	00	00
3	Malignancy	05	22	09	40
	Total	23	100	23	100

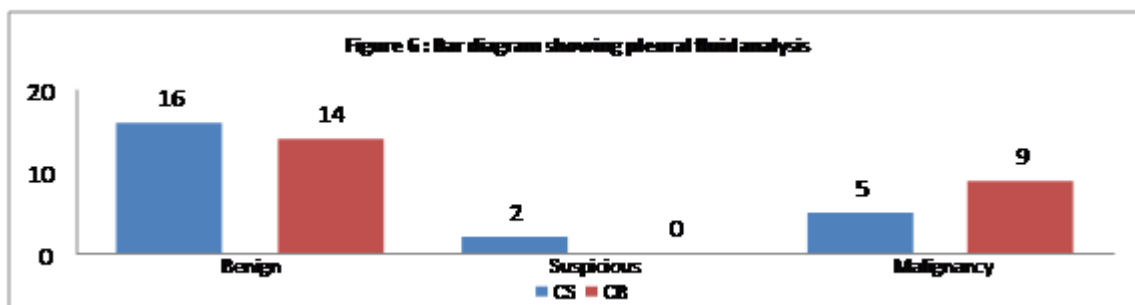
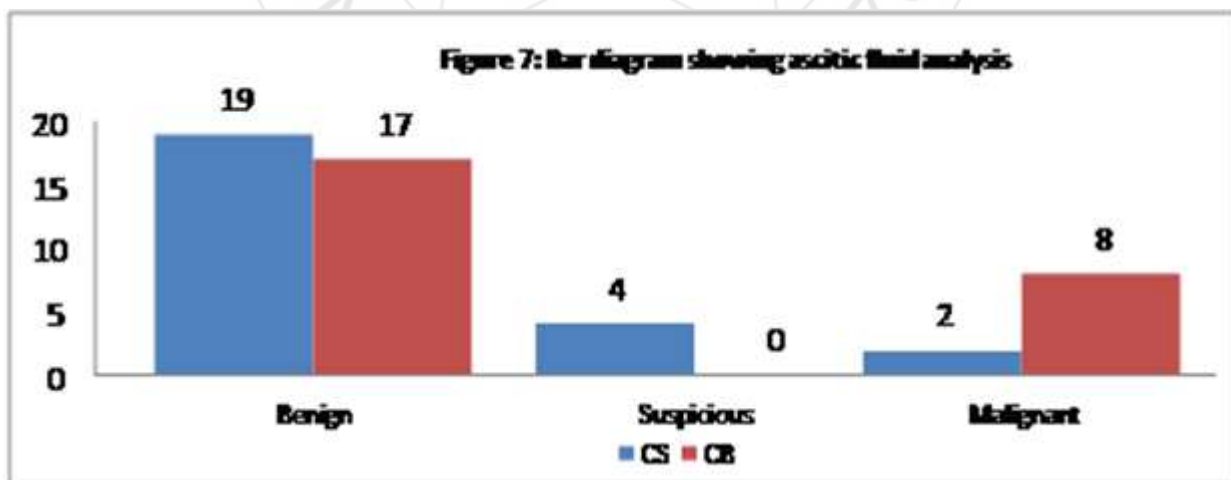


Table 6: Pleural fluid: Comparison between conventional smear and cell block method

	Conventional smear method			Cell block method		
	Benign	Suspicious for malignancy	Malignant	Benign	Suspicious for malignancy	Malignant
	2	0	0	0	0	2
	0	2	0	0	0	2
	0	0	5	0	0	5
	14	0	0	14	0	0
Total	16	2	5	14	0	9



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I expend from my personal account.

## References

- [1] ShidhamVB, Atkinson BF. Cytopathologic diagnosis of serous fluids. Elsevier, WB Saunders, 2006;155.
- [2] Thapar M, Mishra RK, Sharma A, Goyal V. Critical analysis of cellblock versus smear examination in effusions. Journal of cytology 2009; 26(2): 6064.
- [3] Sujathan K, Pillai KR, Chandralekha B, Kannan S, Mathew A, Nair MK. Cytodiagnosis of serous effusions: A combined approach to morphological features in Papanicolaou and May Grunwald Giemsa stained smears and modified cell block technique. Journal of cytology 2000;17(2):89-95
- [4] Nathan NA, Narayan E, Smith MM, Horn MJ. Cellblock cytology Improved preparation and its efficacy in diagnostic cytology. Am J Clin Pathol 2000;114: 599-606.
- [5] Takagi F. Studies on tumor cells in serous effusion. Am J Clin Pathol 1954;24:663-675.
- [6] Naylor B. Pleural, Peritoneal fluids. In: Bibbo M. editor Comprehensive Cytopathology. Third ed. Philadelphia: Saunders, 1991.p.521-551.
- [7] Chapman CB and Whalen EJ. The examination of serous fluids by cellblock technique. New Engl. J. Med 1947;237(7):215-220.
- [8] Velios F, Griffin J. The examination of body fluids for tumor cells Am J Clin Pathol 1954;24:676-681.
- [9] Foot NC. Identification of types and primary sites of metastatic tumors from exfoliated cells of serous fluids. Am J Clin Path

