International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Diagnostic Utility of Cell Block Over Conventional Smear in Detecting Malignancy

**Dr. Aviral Srivastava[1], Dr. Ankita Srivastava[2], Dr. (Brig)Nikhilesh Kumar[3], Dr. Monika Gupta[4], Dr. Navdeep Kaur[5], Aarya Nakhate[6]**

[1]Junior Resident, Pathology, T S Misra Medical College and Hospital
[2]Associate Professor, Pathology, T S Misra Medical College and Hospital
[3]Professor and Head, Pathology, T S Misra Medical College and Hospital
[4]Professor, Pathology, T S Misra Medical College and Hospital
[5]Junior Resident, Pathology, T S Misra Medical College and Hospital
[6]MBBS Student, T S Misra Medical College and Hospital

**ABSTRACT**

**BACKGROUND:** Differentiation of reactive mesothelial cells from mesothelioma and metastatic adenocarcinomatous cells is challenging in certain situations , in such cases cell block technique could be used alongwith conventional smear for enhanced diagnostic precision .

**MATERIAL AND METHOD:** It is prospective study of 97 serous fluid sample received in the department of pathology from May 2024 to May 2025 .Conventional smears were stained with freshly prepared Leishman stain and slides from cell block were stained with routine hematoxylin and eosin ( H & E). All conventional smears and slides were examined.

**RESULT:** Mean age of the patients was 59.96± 15.5 . Pleural effusion was more common in male and peritoneal was more common in female.Most of the samples were pleural fluid. On conventional smear stained with routine Leishman stain Benign were 65 , 18 were Suspicious and 14 were malignant whereas on cell block preparation of the same sample 73 were Benign , 06 were Suspicious and 18 were Malignant

**CONCLUSION:** Cell block technique is better than the conventional smear in cytodiagnosis due to higher cellularity and better preserved architecture .

**Keywords:** Cell block, Adenocarcinoma, Susipicous, Malignant, Reactive Mesothelial cell, Mesothelioma .

## Introduction

The cytological examination of body fluids is of paramount importance not only for diagnosis but also for the staging, prognosis, and further management of the patient. Although the preparation of conventional smears (CSs) of effusion is a much simpler procedure than that of paraffin sections, it has a low sensitivity for detecting malignancy[1]. This is attributed to lack of tissue architecture, overcrowding and overlapping of cells, cell loss, artifacts due to suboptimal processing and delaying, plenty of reactive mesothelial cells, paucity of representative cells, an abundance of inflammatory cells obscuring the

morphology of atypical cells, subtle cytomorphological features of some malignant neoplasms and leaving behind useful material during processing[2]. In CS the accurate identification of cells as either malignant or reactive mesothelial cells with markedly atypical morphologic features remains a commonly encountered diagnostic challenge even to the experienced observer. The storage of CS slides is also a practical problem[3].

In contrast, cell block (CB), though it takes time, offers the following advantages. After completion of cytological preparations, the residual material often contains valuable diagnostic evidence including tissue fragments[4]. It can be recovered by CB method thus providing additional information essential to resolve the diagnostic dilemmas. The additional benefits of CB technique are cell enrichment, lesser cellular dispersal, preservation of specific tissue architecture, better morphological details, the familiarity of the Haematoxylin and Eosin (H and E) stain[5].

## MATERIAL AND METHOD

All samples of pleural and peritoneal fluid received from patients admitted in the department of medicines in T.S Misra Medical College & Hospital, Lucknow, from May 2024 to May 2025 were assessed. Conventional smear were stained with freshly prepared Leishman stain and slides from cell block were stained with routine hematoxylin and eosin ( H & E).

## RESULT

Demographic and general profile

The study included 97 patients with serous fluid effusion, The majority of patients were in the older age groups, with 26 (26.8%) between 51-60 years, 24 (24.7%) between 61-70 years, and 18 (18.6%) over 70 years. The mean age of the patients was 59.96±15.5 years

**Table 1 - Age Distribution of Patients**

| Age in year | Number of patients (n=97) | Percentage |
|---|---|---|
| **21-30 Year** | 6 | 6.2% |
| **31-40 Year** | 11 | 11.3% |
| **41-50 Year** | 12 | 12.4% |
| **51-60 Year** | 26 | 26.8% |
| **61-70 Year** | 24 | 24.7% |
| **>70 Year** | 18 | 18.6% |

The majority were male, comprising 67 (69.1%), while 30 (30.9%) were female

**Figure 1: Distribution of Patients Based on Gender**

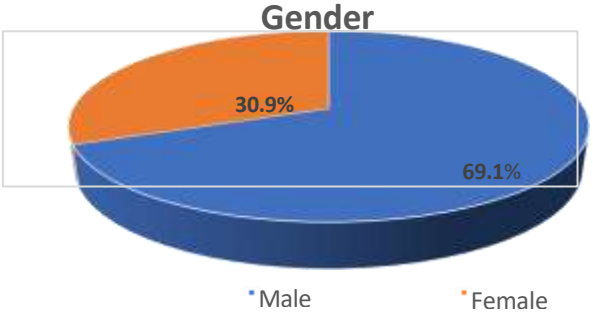
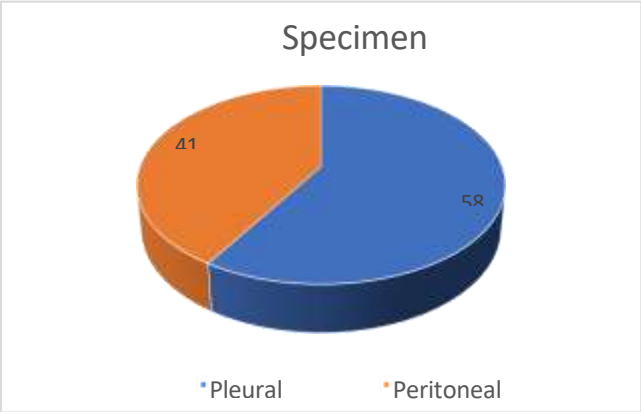


**Figure 2: Distribution of patients based body fluid specimen**




Majority of the body fluid were pleural, comprising 57 (58.8%), while 40 (41.2%) were peritoneal.

**Table 2: Analysis of result by Conventional Smear**

| Conventional Smear | Number of patients (n=97) | Percentage |
|---|---|---|
| **Benign** | 65 | 67.0% |
| **Suspicious** | 18 | 18.6% |
| **Malignant** | 14 | 14.4% |

On analysing conventional smears, the majority are benign, comprising 65 (67%), malignant 14 (14.4%) and suspicious 18 (18.6%).

**Table 3: Analysis of results by H and E stained Cell blocks**

| Nature of body fluid | Number of patients (n=97) | Percentage |
|---|---|---|
| **Reactive mesothelial cell** | 73 | 75.3% |
| **Adenocarinimatous** | 18 | 18.5% |
| **Equivocal between reactive mesothelial cell and adenocarcinoma** | 06 | 6.2% |

Cell block slides show, majority were **reactive mesothelial cells**, comprising 75.3% (73), 18 (18.6%) were **equivocal** between reactive mesothelial cell and adenocarcinoma and the remaining 6 (6.2%) were **adenocarcinomatous**.

**Table 4-Comparison of conventional smear and cell block**

| IMPRESSION | CONVENTIONAL SMEAR (Leishmann ) | CELL BLOCK (H & E) |
|---|---|---|
| **Benign** | 65 | 73 |
| **Suspicious** | 18 | 06 |
| **Malignant** | 14 | 18 |
| **Total** | 97 | 97 |

The study compared the utility of the cell block method and conventional smear in diagnosing benign and malignant etiologies. The results showed a highly significant difference between the two methods (p-value <0.001). p-value was calculated using chi-square test.

## DISCUSSION

Serous effusions—pleural, peritoneal, and pericardial—are common clinical presentations in both benign and malignant conditions. Cytological evaluation of these fluids remains a cornerstone of diagnostic pathology, particularly in resource-limited settings[6]. However, conventional smear cytology often suffers from limitations such as low cellularity, poor architectural preservation, and difficulty in sub-classifying malignancies or identifying the primary site of origin in metastatic disease[7] **Padmavathi A et al**[8] reported that most of the patients are aged between 41- 60 years. (Mean age is 50.19+14.81) and 59.3% were males. 65.0% were pleural fluid, followed by peritoneal fluid (321%) and synovial fluid (2.9%) which is similar to our study.In the present study, we did the comparison of cytological diagnoses across conventional smear and cell block. Among the 97 total cases, 65 were benign, 18 were suspicious, with distribution across categories; and 14 were malignant on conventional smear ,whereas on cell block 73 were benign 06 were suspicious and 18 were malignant. Our findings are similar to **Batool S et al**[11] who reported that based solely on cytology, 66 (44%) of the 150 patients in his study that underwent cytological evaluation were categorized as benign, 27 (18%) as malignant, and 57 (38%) as suspicious. Diagnostic yield increased to benign 95 (63.33%), malignant 48 (32%), and suspicious 7 (4.67%) when cytology was paired with CB . Our findings are supported by **Khedkar SS et al**[10] who did a study of 100 cases, most of the cases were of the benign category with 80% on CS while 82% on cell block. In the suspicious for malignancy category 11 cases were reported as suspicious for malignancy on CS and none on CB. Out of 11 cases reported as suspicious for malignancy in CS, 6 cases were diagnosed as malignant and 5 cases were benign in cell block. The cell block yields higher diagnosis of malignancy, which was missed by conventional smears .

## CONCLUSION

A total of 97 body fluid samples, received in department of pathology,TS Misra medical college & hospital Lucknow during period from May 2024 to May 2025,were studied. All body fluids specimens were either pleural or peritoneal . Conventional smear stained with Leishman stain and thereafter cell block was prepared and slides were stained with routine H and E stain . All slides were examined under light microscope and impression were drawn.

On conventional smear using Leishman stain 65 (67%) cases were benign,18 were suspicious (18.6%) while 14 were malignant (14.4).

H and E stained cell block slides show, most of the the cases were benign showing reactive mesothelial cells, comprising 75.3% (73) ,followed by malignant 18(18.6%) and least were suspicious 06 (11.4%) cases.All malignant cases were adenocarcinoma.

Comparing the utility of the cell block method and conventional smear in diagnosing benign and malignant ,a highly significant difference between the two methods (p-value <0.001) were observed. Cell block method have sensitivity 75.% ,specificity 100%.

The results of this study underscore the importance of a comprehensive diagnostic approach in the diagnosis of serous fluid effusion incorporating conventional smear , cell block.

**REFERENCES**

1 Gosai D, Patel K, Dogra A, Jasani J. Utility of the Cell Block Preparation as an Additive Tool to the Conventional Cytological Smears. Indian Journal of Forensic Medicine & Toxicology, 2021;15(2):114-119

2 Datta P, Saha R, Chakraborty J. A comparative study of conventional cytology and cell block method with immunohistochemistry in the diagnosis of serous effusions. Trop J Pathol Microbiol. 2020;6(2):146-154.

3 Grandhi B, Shanthi V, Rao NM, Reddy VC, Mohan K. The diagnostic utility of cell block as an adjunct to cytological smears. Int J Med Res Health Sci. 2014;3(2)278- 284

4 Bancroft J,Gamble M. Theory and practice of histological techniques.
Philadelphia- Churchill Livingstone. Elsevier. 2011.

5 Shivakumarswamy U, Karigowdar M, Arakeri S, Yelikar B. Diagnostic utility of the cell block method versus the conventional smear study in pleural fluid cytology. J Cytol. 2012;29(1)11.

6 Mason MR, Bedrossian CW, and Fahey CA. Value of immunocytochemistry in the study of malignant effusions. Diagn Cytopathol. 1987;3(3)215-221.

7 Ko E, Jhala N, Shultz J, Chhieng D. Use of a Panel of Markers in the Differential Diagnosis of Adenocarcinoma and Reactive Mesothelial Cells in Fluid Cytology. Am J Clin Pathol. 2001;116(5)709-715.

8 Padmavathi A, Prasad BVS, Anuradha B. A comparative study of fluid cytology with smear and ell block preparation. J. Evid. Based Med. Healthc. 2016;3(65), 3532-3535

9 Kulkarni M, Desai S, Ajit D, Chinoy R. Utility of the thromboplastin-plasma cell- block technique for fine-needle aspiration and serous effusions. Diagnos Cytopathol. 2009;37(2)86-90 .

10 Khedkar SS, Dangmali DP, Rahangdale VL and Nakate LA. Cytological Study of Serous Effusions with Conventional Smear Cytology and Cell Block Technique Res. J. Med. Sci., 2025;19:53-56.

11 Batool S, Sadaf S, Chughtai AS. Diagnostic Accuracy of Cell Block and Immunohistochemistry in Effusion Cytology. Cureus 2023;15(2): e34958.