



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

CYTODIAGNOSIS OF ASCITIC FLUID BY CONVENTIONAL SMEARS AND CELL BLOCK

Swarada V Kanganate¹, Jaya M Tale^{2*}

¹Swarada V Kanganate (MD Pathology), ^{2*}Jaya M Tale (MD Community Medicine)

¹Department of Pathology,

¹ GMC, Akola

Abstract: Cytological techniques have been universally recognized as the most important diagnostic tool in the recognition of malignant tumours in effusions. To differentiate between reactive mesothelial cells and malignant cells is the diagnostic problem in conventional smear method. The efficacy of cytodagnosis is increased in cell block method. This was a Hospital based Observational study, carried out during a period of one and a half years, at a Tertiary Care Hospital and Medical College, with the aim to assess the utility and diagnostic accuracy of conventional smear and cell block technique in cytodagnosis of peritoneal fluid effusions. Total 62 patients were studied. Conventional smears and cell blocks were evaluated on the basis of cellularity, predominant cell type based on morphology, cellular arrangement (architecture) and background. The maximum number of 25 cases (40.32%) was in the age group of 41-60, with average mean age 49.3 years. Females, 23 (37.09%) outnumbered males 39 (20.6%). Diagnostic accuracy of conventional smears is 97.28% and that for cell block is 99.47%. Combined approach cell block in conjunction with conventional smear should be used in suspicious for malignancy cases.

Keywords: Cytodiagnosis, Conventional smear, Cell block

I. INTRODUCTION

The mere presence of a fluid in any of the body cavities indicates a pathologic process. The presence of fluid other than blood constitutes an effusion, which in the abdomen is called ascitis. The purpose of cytological investigation is to determine the presence or absence of tumour cells, many other conditions can also be identified. The effusions may be classified as transudates or exudates. Cytological techniques have been universally recognized as the most important diagnostic tool in the recognition of malignant tumours in effusions and have been well accepted and positive diagnosis is often considered as a definitive diagnosis.¹ It also helps in staging and prognosis and also gives the information regarding infectious as well as non-infectious conditions of the membranes.^{2,3} To differentiate between reactive mesothelial cells and malignant cells is the diagnostic problem in conventional smear method.^{1,4,5} Cytodiagnosis by conventional smear has got lower sensitivity due to cell overcrowding, cell loss and different laboratory methods.^{2,4-6} Preparation of cell blocks from residual sediment is often of great diagnostic value in the recognition of morphology and origin of the tumour and in the application of special stains or other analytical procedures⁷.

Aim and objectives: This was a Hospital based Observational study, carried out during a period of one and a half year at a Tertiary Care Hospital and Medical College with an aim -

1. To study the morphological features of conventional smear and the cell block technique.
2. To assess the utility and accuracy of conventional smear and cell block technique in cytodagnosis of peritoneal fluids.

II. RESEARCH METHODOLOGY

This was a Hospital based Observational study, carried out during a period of one and a half years, at a Tertiary Care Hospital and Medical College. Total 62 patients were studied in this time span. The patient's clinical history, examination findings and investigations were noted. Pleural fluid of admitted patients, of both the sexes and all age group (irrespective of clinical diagnosis), and received for cytology in the Department of Pathology was studied.

Sample of effusion received for cytology, was subjected for cytological evaluation of conventional smear (fluid was centrifuged, Supernatant fluid was discarded and smears prepared from sediment were stained with May-Grunwald Giemsa (MGG) and Papanicolaou (PAP) stain) and cell block technique (cell block was prepared by Plasma-Thromboplastin method, fixed in buffered formalin and processed in Histopathology and slides were stained with Haematoxylin and eosin - H&E), by dividing it into two equal parts. Special staining and immunohistochemistry was done wherever needed.

Stained slides were studied for morphology considering cellularity, predominant cell type, cell arrangement (architecture) and background and the diagnosis of benign (acute or chronic inflammatory) or malignant lesion or suspicious of malignancy was reported accordingly.

III. RESULTS AND DISCUSSION

The current study is carried out for a period of one and a half years on 62 cases of ascitic fluids, which was subjected for cytological evaluation of conventional smear and cell block technique, by dividing it into two equal parts. Slides were studied individually and following observations were made:

Conventional smears and cell blocks were evaluated on the basis of cellularity, predominant cell type based on morphology, cellular arrangement (architecture) and background.

Cellular yield of cell block was better due to the advantage of concentrating the cells.

Cell morphology was distinct on both the techniques. But it was clearer on cell block technique, distinguishing the doubtful or suspicious cases of conventional smears to the definitive one.

Similar to cellular morphology, the cellular arrangement (architecture) was well defined on both the methods. But architecture was more typically seen on cell block sections.

Background was found to be obscured on conventional smears while it was clear on cell block technique.

In the present study of total 62 cases, the maximum number of 25 cases (40.32%) was in the age group of 41-60, followed by 19 cases (30.64%) in the age group of 21-40. Out of total 62 cases, 39 (62.90%) were males and 23 (37.09%) females. Out of 62 cases, 54 (87.09%) cases of ascitic fluid were diagnosed as benign, 02 (3.22%) as suspicious for malignancy and 06 (9.67%) as malignant on conventional smears. While on cell block, out of 62 cases, 56 (90.32%) cases of ascitic fluid were diagnosed as benign and 06 (9.67%) cases as malignant. No case was diagnosed as suspicious of malignancy on cell block study. 02 suspicious for malignancy cases on conventional smears were categorized as benign on cell block study.

Diagnostic accuracy of conventional smears is 97.28% and that for cell block is 99.47%

Figures and Tables

Table 1: Distribution of cases according to age, sex and type of fluid

Age (in years)	Ascitic fluid		Total
	Female	Male	
0-20	01	01	02 (3.22%)
21-40	06	13	19 (30.64%)
41-60	09	16	25 (40.32%)
61-80	07	09	16 (25.80%)
Total	23 (37.09%)	39 (62.90%)	62

Table 2: Diagnostic Distribution Based On Conventional Smears And Cell Block

Diagnosis	Conventional Smears	Cell Block
Benign	54 (87.09%)	56 (90.32%)
Suspicious	02 (3.22%)	00
Malignant	06 (9.67%)	06 (9.67%)
Total	62	62

IV. DISCUSSION

The cytological examination of serous effusions is of paramount importance in diagnostic, therapeutic and prognostic implications. It is important not only in the diagnosis of malignant lesions, but it also helps in the staging and the prognosis of these lesions.⁸ When a primary malignancy was present, the tumour cells were usually found to be numerous and they were seen in clusters. A positive effusion for malignant cells is an important prognostic indicator in oncologic patients. Malignant neoplasms, especially lymphoid neoplasms, represent a major cause of death in children and in these cases, a cytological examination is very useful for their management.⁹ Hence, presently, the examination of body fluids for the presence of malignant cells has been accepted as a routine laboratory procedure, not only for the detection of unsuspected cancers, but also for the detection of metastasis of an unknown primary origin.^{4,8,9}

In this study, an attempt was made to prepare and to analyze both the conventional smears and the cell blocks which were prepared by using 10% alcohol-formalin as a fixative, from the same specimen. Conventional smears and cell blocks were evaluated on the basis of cellularity (better on cell block), predominant cell type based on morphology (distinct on both methods), cellular arrangement (architecture) (more typical on cell block) and background. The effectiveness of the cellblock lies in the availability of the diagnostic material for the further histological examination, histochemistry and immunohistochemistry studies for a better classification of tumour and for the identification of infectious causes by using microbiologic stains.^{8,10,11,12}

In present study, most common age group was found to be 41-60 years (40.32%), followed by 21-40 years (30.64%). This was similar to the studies done by Bansode S¹³ and Grandhi B¹⁴. While Shivkumarswamy U³ found 51-60 years of age group most common.

In the study done by Shivkumarswamy U et al², female patient samples outnumbered the male patient samples, with female to male ratio 2:1. In 2015 Bansode S. et al¹³, studied total 142 cases. Out of 28 ascitic fluids, maximum cases were found to be female i.e. 16 (57.14%). Bhanvadia VM. et al⁵ studied 150 total cases, in which also female cases with ascitis outnumbered. Present study with total of 62 cases, shows 23 (12.2%) females of peritoneal effusion, while males were 39 (20.6%)

In present study, accuracy of cell block was 99.47%. Increased accuracy was also noted by Bansode S et al (97%), Thaper M et al (85.72%) and Ceelen GH (89%), when compared to conventional smears.

V. CONCLUSION

Conventional smear technique is easy and quick method for cytodiagnosis of body fluids. But, background gets obscured and may affect the diagnosis. Cell block technique is simple, reproducible, using routine laboratory reagents and processing. It also concentrates all the cellular material and increases cellular yield. But loss of cellular material and cytological details can occur during processing. Cell block technique eliminates the suspicious for malignancy category giving more definitive diagnosis. Thus, increasing diagnostic yield and even multiple sections of the same material can be processed for immunohistochemistry and special stains, if required. It is balanced by its ability to increase sensitivity and accuracy of final diagnosis. So combined approach of cell block technique in conjunction with conventional smear should be used in suspicious for malignancy cases.

REFERENCES

- 1) Shivakumarswamy U, Arakeri SU, Mahesh H Karigowdar MH, Yelikar BR. The role of the cell block method in the diagnosis of malignant ascitic fluid effusions. *Journal of Clinical and Diagnostic Research* 2012;6:1280-3.
- 2) Shivkumarswamy U, Arakeri SU, Karigowdar MH, Yelikar BR. Diagnostic utility of the cell block method versus the conventional smear study in pleural fluid cytology. *Journal of Cytology* 2012;29(1):11-15.
- 3) Bodele AK, Parate SN, Wadadekar AA, Bobhate SK, Munshi MM. Diagnostic utility of cell block preparation in reporting of fluid cytology. *Journal of Cytology* 2003;20(3):133-135.
- 4) Thapar M, Mishra RK, Sharma A, Goyal V, Goyal V. Critical analysis of cell block versus smear examination in effusions. *J Cytol* 2009;26(2):60-64.
- 5) Bhanvadia VM, Santwani PM, Vachhani JH. Analysis of diagnostic value of cytological smear method versus cell block method in body fluid cytology: Study of 150 cases. *Ethiop J Health Sci* 2014;24(2):125-131.
- 6) 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 Mag-Grunwald Giemsa stained smears and modified cell block technique. *Journal of Cytology* 2000;17(2):89-95.
- 7) Koss LG, Melamed MR. Effusions in the Absence of Cancer. Koss LG. *Koss' Diagnostic Cytology And Its Histopathologic Bases*, 5th ed. USA: Lippincott Williams & Wilkins; 2006. p. 919-922.
- 8) Dekker A, Bupp PA. The cytology of serous effusions. An investigation into the usefulness of cell blocks versus smears. *Am J Clin Pathol* 1978;70:855-60.
- 9) Wong JW, Pitlik D, Abdul-Karim FW. Cytology of pleural, peritoneal and pericardial fluids in children: A 40 years summary. *Acta Cytol* 1997;41:467-73.
- 10) Leung SW, Bedard YC. Methods in Pathology. A simple mini block technique for cytology. *Mod Pathol* 1993; 6:630-32.
- 11) Price BA, Ehya H, Lee JH. The significance of the pericellular lacunae in the cell blocks of effusions. *Acta Cytol* 1992;36:333-37.
- 12) Kung IT, Yuen RW, Chan JK. Technical notes. The optimal formalin fixation and the processing schedule of the cell blocks from the fine needle aspirates. *Pathology* 1989;21:143-45.
- 13) Bansode S, Kumbalkar D, Nayak S. Evaluation of Cell Block Technique in the Cytodiagnosis of Body Fluids. *International Journal of Science and Research* 2015;4(7):87-94.
- 14) Grandhi B, Vissa S, Mohan Rao N, Chidananda Reddy V, VenkataMurali 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.
- 15) Ceelen GH. The cytologic diagnosis of ascetic fluid. *Acta Cytol* 1964;8:175-183.