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Original Research Paper

Pathology

DIAGNOSTIC ROLE AND UTILITY OF CONVENTIONAL SMEAR AND CELL BLOCK IN BODY FLUID CYTOLOGY

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ABSTRACT **Aim** The aim of this study was to compare the cytological features of exudative fluids by conventional smear (CS) method and cell block (CB) method and also to assess the utility of the combined approach for cytodiagnosis of these effusions. **Materials and Methods:** One hundred cases pleural and peritoneal exudative fluid samples were subjected to evaluation by both CS and CB methods over a period of 6 months between March 2019 to September 2019. Cellularity, architecture patterns, morphological features and yield for malignancy were compared, using the two methods. Along with the conventional smears, cell blocks were prepared by using 10% alcohol–formalin as fixative agent. **Result** Cellularity and additional yield for malignancy was 5% more by the CB method. **Conclusions** CB produced significantly better results while detecting malignant lesions and reducing suspicious results. CB technique definitively increased detection of malignancy in fluid effusion when used as an adjunct to CSs. Also, CB provides material suitable for molecular genetic analysis for targeted therapies.

KEYWORDS : Cell block, conventional smear, fluid cytology.

Introduction

Cytological examination of serous fluids is one of the commonly performed investigation. The body fluid sent for cytological examination is subjected to total leukocyte count and differential count and presence of tumor cells. Preparing cell blocks (CBs) from effusion samples, in addition to smears, allow for "microhistology" of the cellular solid portion which may lead to greater diagnostic accuracy. Its main advantage is the preservation of tissue architecture and obtaining multiple sections for special stains and immunohistochemistry. the cellblock technique, by using 10% alcohol–formalin as a fixative, was a simple, inexpensive method.

Result

A total 100 cases of body fluids were processed in Jawaharlal medical college, Bhagalpur subjected to conventional smear and cell block method. The findings of conventional smears and that of CB prepared from effusion fluid are categorized into three classes: benign, suspicious, and malignant according to their cellularity, morphology, and architectural pattern. Maximum sample were from 20 to 50 yrs. The male: female ratio was 1.5:1. While doing cell typing, lymphocytes were the most common cells found followed by polymorphs, mesothelial cells, and atypical mononuclear cells. Most common cause of malignant peritoneal effusion was due to ovarian malignancies in females. and adenocarcinoma of stomach in males. Whereas, in case of pleural effusion, it was breast carcinoma in females, and lung carcinoma in males.

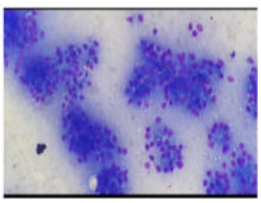
Comparison of cytological diagnosis on conventional smear and cell block study.

	Conventional Smear	Cell Block
Benign	85	85
Suspicious	5	
Malignant	10	15

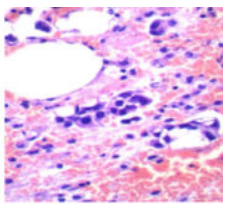
Relation of gender with body fluid

Male	Female
60	40

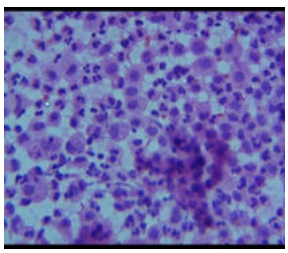
Figure



Suspicion of Adenocarcinoma in conventional smear



Adenocarcinoma in cell block



Reactive mesothelial cells

Method and material

10ml of fresh pleural fluid and peritoneal sample was received. It was divided into two equal parts of five ml each. One part was subjected to conventional smear cytology and the other part for the cell block technique. The fluid aspirated was examined for physical characteristics such as appearance, color, and coagulum. Total leukocyte count was obtained using the Neubauers modified counting chamber.

Half of the specimens were centrifuged for 5 min at 2000 rpm. The sediment acquired was applied on the slide and stained with routine Giemsa and hematoxylin–eosin stains. The other half of the specimens were fixed with 10% formalin and centrifuged. Residual amount of centrifuged deposit is mixed with 10% alcohol-formalin solution and centrifuged again. The cell button obtained was kept for overnight fixation. The next day, the cell button obtained was taken in a filter paper and processed through three changes of alcohol, two changes of xylene, and two changes of paraffin and a CB was obtained. Microtomy was done, and sections were stained with hematoxylin and eosin.

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 safe, cost-effective, and reproducible even in resource-limited rural areas.

In our study male to female ratio is 1.5, Padmavathi etal.[8] have reported M:F ratio of 1.4:1 while Bansode etal.[7] have reported M: F ratio of 2.1:1. In my study, most cases were in the age group 21–50 years, Bansode etal.[7] and Padmavathi et al.,[8] who have reported modal number of cases in the age group 41–60 years as 54% and 69.3%, respectively. In the present study, diagnostic yield for malignancy was 10 percent on CS examination which was increased to 15 percent by CB technique. Hence, additional yield of malignancy was reported as 5 percent which was confirmed by histology. Similarly, in a study by Bansode et al.,[7] 15% yield for malignancy on CS examination was increased to 18% on CB study. Most of the malignant peritoneal effusions were due to ovarian malignancy in females. The next common malignancy causing peritoneal effusion in males was due to primaries in the stomach followed by primaries in gallbladder and colon. The most common cause of malignant pleural effusion was lung carcinoma in males. In females, the most common cause of pleural effusion was breast carcinoma. Khan et al. showed carcinoma lung was the most common site of malignant effusion followed by carcinoma ovary and gastrointestinal tract.[3] Similarly, Murphy and Ng described the most common primary lesions were in breast followed by lung and ovary.[6] DiBonito et al. also reported a similar pattern of primaries in malignant pleural and peritoneal effusions.[7]. The cellular yield was more with CB methods as compared to conventional smear method. The CB concentrated the cellular material into a small area which was useful in screening the material in lesser time. Similar findings were noted in studies by Yang et al.,[11] Dekker and Bupp, [1] and Thapar et al.

Conclusions

our present study results showed that the cellblock technique, by using 10% alcohol–formalin as a fixative, was a simple, inexpensive method, and did not require any special training or instrument. CB techniques definitively increased detection of malignancy in body cavity effusion. The CB method provides high cellularity, better architectural patterns, better morphological features, additional yield of malignant cells and increased sensitivity for cytodiagnosis of malignant lesions as compared to the CS method.

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