



A Six month Study on Cytomorphological Examination of Serous Effusions Employing Indian Academy of Cytologists Guidelines for Reporting Serous Effusions at A Tertiary Care Center

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Abstract

Introduction: Cytological examination is often the first line of investigation in the clinical setting of serous effusions. There are no uniform guidelines for diagnostic categorization of fluid samples. The current study aimed to assess the feasibility of utilizing IACGRSE reporting categories for serous fluids.

Materials and methods: Serous effusions from February 2023 to august 2023 were taken for cytological evaluation.

Results: A total of 160 samples were received.55 were from male patients and 105 were from female patients. Out of them 108 were pleural fluids (67.5%), 50 were ascitic fluids (31.2%) and 2 were pericardial fluid (1.25%). The age range spanned from 11 to 78 years. Following the guidelines of IAC, these samples were classified as follows Category 1 (Unsatisfactory for evaluation)- 4.4% Category 2 (Benign cellular changes): 71.6% Category 3(Atypical cells NOS): 7.4% Category

4 (Suspicious for malignancy): 5.9% Category 5(Malignant cells seen): 10.4%

Discussion: In this study out of total samples, the majority were from pleural fluid 108 (67.5%) followed by ascitic fluid 50 (31.2%), followed by pericardial fluid 2 (1.25%).The study showed female preponderance with a M:F ratio of 1:1.9 and majority of cases belonging to category 2(71.6%)

Conclusion: The IAC guidelines for reception, preparation and reporting of serous effusion cytology samples are expected to be followed by all laboratories to ensure quality in laboratory cytopathology practice which in turn will have an impact on patient care and management.

Keywords: Pathology, Serious Effusions, IAC guidelines, cytology, cell block.

Introduction

Serous effusion is the accumulation of fluid in the body cavities due to various causes and malignancy being one

of the important causes.¹ The most common sites from where fluid can be tapped and sent for analysis include a pleural, peritoneal and pericardial cavity.²

Cells which may be present in the serous fluids are mesothelial cells, macrophages, erythrocytes, lymphocytes, neutrophilic and eosinophilic granulocytes and malignant cells.³ The IAC has set certain guidelines to provide a standardized format for reporting effusion cytopathology right from sample receipt to its ultimate report sign out.

Aims and Objectives

To assess the plausibility of applying IAC reporting guidelines to various categories of effusions and to determine their frequency.

Materials and Methods

All the samples of serous effusions received during the period from February 2023 to August 2023 were taken for cytological evaluation. A total of 160 properly collected and labeled samples were received from various wards and the departments. The samples were processed as per the guidelines of IAC and reported as per the suggested proforma.

Proforma for Reporting Cytology

Name:

Age/Sex:

Hospital registration number:

Procedure:

Date and time of collection:

Anticoagulant used or not

Specimen type:

Quantity received:

Gross appearance:

No. of smears evaluated:

Cellularity: Low/Moderate/High[√] (Tick one)

Adequacy: Satisfactory for interpretation
Cells: Malignant cells, mesothelial cells and inflammatory cells seen.

Background:

Cellular Description (optional):

Cell Block made: Yes/No

Diagnosis:

Subtype:

Volume, color and consistency of the fluid are noted
Representative volume of the fluid was centrifuged under 2000 rpm for 10 min and the sediment formed was made into smears.

A minimum of one air dried and two wet fixed smears were prepared.

Air dried smears were stained with Leishman stain and wet fixed smears were stained by H and E / Papanicolaou methods.⁴

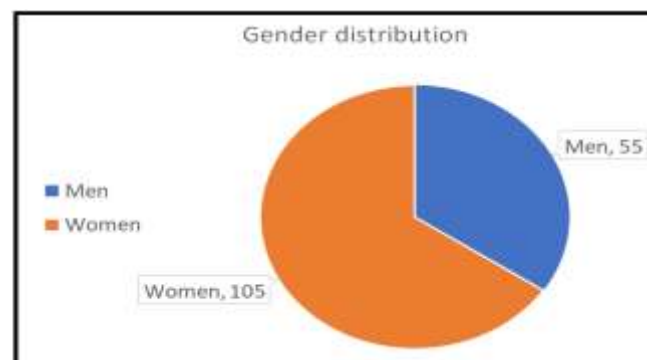
Results

A total of 160 samples were received during the study period which included pleural fluid, ascitic fluid and pericardial fluid. The age range spanned from 11 to 78 years.

Table 1: Type of fluid

Type of Fluid	Number (%)
Pleural Fluid	108 (67.5%)
Ascitic Fluid	50 (31.2%)
Pericardial Fluid	02 (1.25%)

Graph 1: Distribution according to gender



Graph 2: IAC Classification



Category 1: Smears that do not contain sufficient quantity of cells for evaluation or exhibit signs of contamination by extraneous elements such as artifacts or bacterial colonies or those displaying cellular degenerative changes were placed in this category. In this study we received 7 such samples.

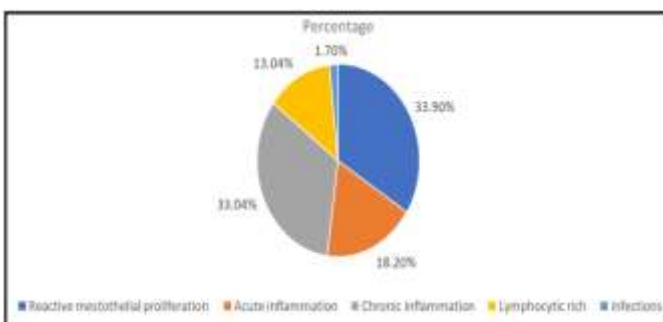
Category 2: This category represents a diverse array of effusion cases that do not involve malignancy.

The reports of the fluids in this category included

1. Reactive mesothelial proliferation
2. Acute inflammation
3. Chronic inflammation
4. Lymphocytic effusion
5. Specific infections

Out of the total of 160 cases, 115 were classified into category II emerging as the predominant etiology of effusion, irrespective of the site in this study

Graph 3: Sub categorization of category II



Category 3: Cells with cytological atypia that quantitatively or qualitatively do not favor malignancy are placed in this category. A total of 12 cases were placed in this category.

Category 4: Smears that show cells with cytological atypia that are enough to warrant suspicion of malignancy come under this category. In the present study 9 cases were placed under this category

Category 5: This category represents smear that show unequivocal malignant cells. A definite diagnosis of malignancy was made in 17 cases

Figure 1: Different volumes, color and consistency of various serous effusions

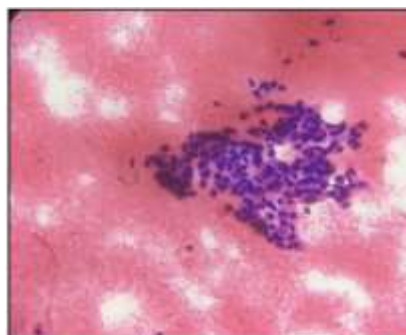


Figure 2: Leishman stain X40



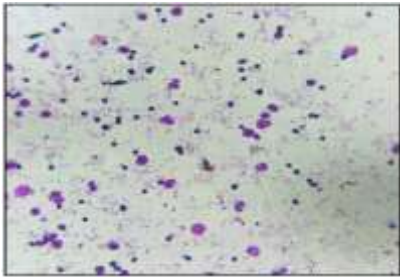
Cytosmears showing pleural fluid with hemorrhagic background (CATEGORY I)

Figure 3: H&E X40



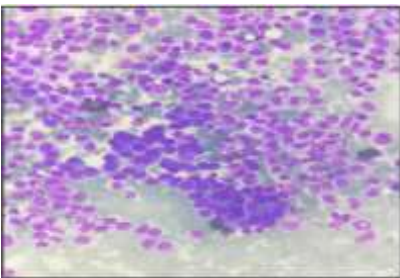
Cytosmear showing benign mesothelial cellular changes on H & E (CATEGORY II)

Figure 4: Leishman X40



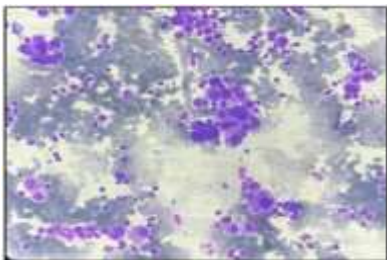
Cytosmears showing discretely scattered lymphocytes and few degenerated cells (CATEGORY II)

Figure 5: Leishman X40



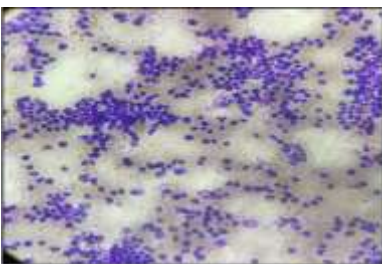
Cytosmear showing benign mesothelial cells on Leishman stain (CATEGORY II)

Figure 6: Leishman X40



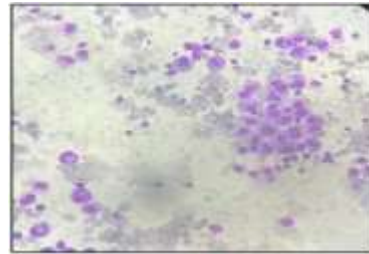
Cytosmears showing mesothelial cell hyperplasia (CATEGORY II)

Figure 7: Leishman X40



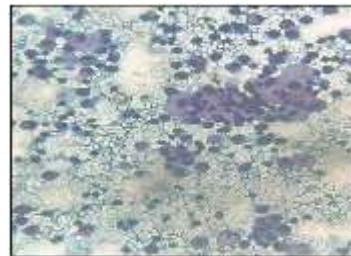
Cytosmears showing predominantly neutrophils and lymphocytes along with few mesothelial cells (CATEGORY II)

Figure 8: Leishman stain X40



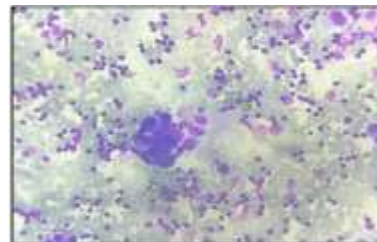
Cytosmears showing atypical cells arranged in sheets having high N/C ratio (CATEGORY III)

Figure 9: Pap stain X40



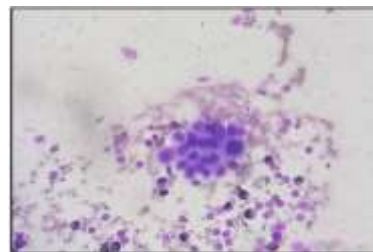
Cytosmears showing atypical cells with hyperchromatic nuclei (CATEGORY IV)

Figure 10: Leishman X40



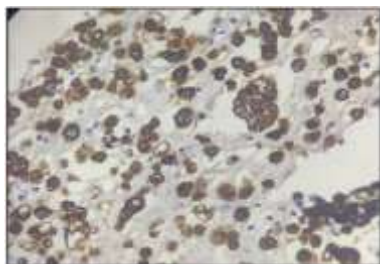
Cytosmears show 3D ball structure with pleomorphism, hyper chromatic nuclei and scant cytoplasm (CATEGORY V)

Figure 11: Leishman X40



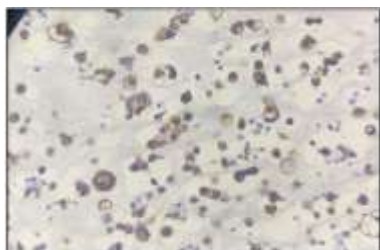
Cytosmears show malignant cells with pleomorphism, high N/C ratio and scant cytoplasm (CATEGORY V)

Figure 12: X40



Immunohistochemistry on cell block showing EMA positivity

Figure 13: X40



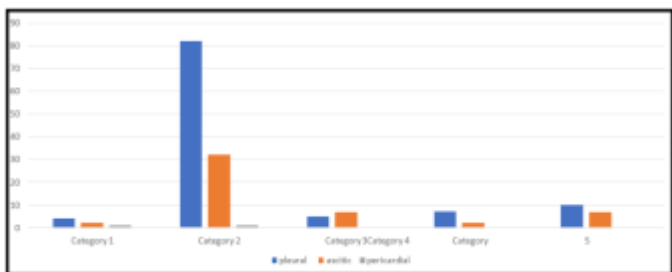
Immunohistochemistry on cell block showing CK positivity

Table 2: Frequency of cases categorized into various reporting categories in accordance with IAC

PLEURAL FLUID	ASCITIC FLUID	PERICARDIAL FLUID	TOTAL	IAC CATEGORY
04	02	01	07	CATEGORY I
82	32	01	115	CATEGORY II
05	07	-	12	EATEGORY III
07	02	-	09	CATEGORY IV
10	07	-	17	CATEGORY V
108	50	02	160	

In the present study majority of serous effusions are categorized into category II

Graph 4: Bar graph showing distribution of serous effusions from various sites according to IACGRSE



Discussion

Serous effusions account for a considerable share of the annual caseload in cytopathology laboratories.⁵ Healthcare professionals turn to cytology for the purpose of ruling out malignancy and also for valuable insights into the cellular characteristics of the sample.

The present study aimed at categorizing the received serous effusions into 5 categories. The most common effusion was pleural fluid followed by peritoneal fluid and pericardial fluids respectively. The present study had female preponderance with a male : female ratio of 1:1.9. In this study, out of 160 total samples, the majority were from pleural fluid 108 (67.5%) followed by ascitic fluid 50 (31.2%), and pericardial fluid 2 (1.25%) respectively. Table 3: Comparison according to the most common fluid received

STUDY	MOST COMMON FLUID
Kundu et al	Pleural fluid
Nagose et al	Ascitic fluid
Pergaris et al	Pleural fluid
Present study	Pleural fluid

Table 4: Comparison according to IAC classification

Category	Kundu et al	Nagose et al	Present study
CATEGORY I	2.6%	1.67%	4.4%
CATEGORY II	71.2%	8.33%	71.6%
CATEGORY III	1.3%	3.33%	7.4%
CATEGORY IV	4.4%	15%	5.9%
CATEGORY V	20.5%	71.67%	10.4%

Conclusion

The IAC guidelines for reception, preparation and reporting of serous effusion cytology samples are ideal and in consonance with other reporting systems like The Bethesda System for gynecological cytology and if followed by all laboratories, ensures uniformity in reporting and quality in laboratory cytopathology practice throughout the country which in turn will have

an impact on patient care and management. The sample is small and period of study is less and hence a continued research and evaluation with larger samples over a longer period will be useful to assess the long term impact and effectiveness of the IAC guidelines.

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