ORIGINAL RESEARCH PAPER

Pathology

APPLICATION OF THE INTERNATIONAL SYSTEM FOR REPORTING SEROUS FLUID CYTOPATHOLOGY IN A TERTIARY CARE CENTER

KEY WORDS: Tis-The International System, Cytopathology, Serous Effusion, Malignant.

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ABSTRACT

Background: Serous effusion, both in the pleural and peritoneal cavities, results from an imbalance between the production and reabsorption of serous fluid. Their presence is always considered a pathologic condition. Cytological examination of effusion samples is a preliminary and minimally invasive method for the diagnosis of body fluids. **Aims and Objectives:** The International system for reporting serous fluid cytopathology (TIS) was recently proposed. The main aim of the present study to analyze and classify the serous fluids according to TIS guideline. **Material and Methods:** Cases of effusions presenting in cytology from January 2020 to December 2022 were retrieved from Department of pathology, GRMC Gwalior and reclassified into a five –tiered classification scheme as per the international system for reporting of serous fluids (TIS) guideline. **Result:** In the study, 1504 cases were included during the 3 years. There were 864(57.5%) cases of ascitic fluid, 637(42.3%) cases of pleural fluid and 03(0.2%) cases of pericardial fluid retrieved. Out of these cases, 121(8.0%) were non diagnostic (ND), 1294(86%) were negative for malignancy (NFM), 17(1.1%) were atypia of uncertain significance (AUS), 18(1.3%) were suspicious for malignancy (SFM) and 54(3.6%) were malignant (MAL). Out of these, 640(42.5%) were female and 864(57.5%) were male. Patient's age ranged between 02-95years with the mean age of 45.3 years. **Conclusion:** Our result underline the utility of the current classification. The use of TIS guideline is feasible for the standardized reporting of effusion samples, thus avoiding the subjective variation of reporting.

INTRODUCTION:

Cytological examination of effusion samples is a cost effective, preliminary & minimally invasive and simple method for the diagnosis of body fluids that can help categorize fluids. [1,2] There were no uniform guidelines for diagnostic categorization of fluid samples. Many of the centers are following their reporting system, thus creating a discrepancy in the diagnosis and causing difficulties in reaching a definitive management plan. The International system for reporting serous fluid cytopathology (TIS) was recently proposed, which was endorsed by the International Academy of cytology (IAC) and American society of cytopathology (ASC). [1,3,4,6] In 2020, the IAC executive board approved the proposal of outlining the clinical need for terminology system for reporting the serous fluid sample. After approval, collaboration the ASC agreed. [3]

AIMS AND OBJECTIVES:

The main aim of the present study to analyze and classify the serous fluids according to recently proposed TIS guideline. The aims to formulate evidence based standardized reporting system for the diagnosis of effusion fluids to enhance professional communication and further patient management.

MATERIAL AND METHODS:

In this study the cases of effusions presenting in cytology from January 1st , 2020 to December 31st , 2022 (3 years) were retrieved from Department of pathology, GRMC Gwalior (MP). The patient's demographic profile, cytological report, radiological diagnosis, ancillary studies and medical history were collected and analyzed each case. The TIS and IAC guidelines were applied and classified into 5 diagnostic categories- Category-1: Non-diagnostic (ND), category-2: Negative for malignancy (NFM), category-3: Atypia of uncertain significance (AUS), category 4: Suspicious for malignancy (SFM) and category-5: Malignant (MAL). [3,4,6,7] The cellular component of each category was recorded. Each case was categorized into these five recommended diagnostic categories.

Table-1, The international system (TIS) for reporting of serous fluids- diagnostic category and definition-

	Diagnostic category	Definition
1.	Non-Diagnostic (ND)	• Specimen with insufficient cellular elements for a cytological interpretation. • Minimum volume- 50-75 ml • Acellular, highly degenerated or hemorrhagic samples.
2.	Negative for malignancy (NFM)	• Specimen with cellular changes completely lacking evidence of mesothelial or non- mesothelial malignancy
3.	Atypia of uncertain significance (AUS)	• Specimen showing limited cellular (nuclear) and/or architectural atypia (e.g. papillary clusters or pseudo-glandular formation)
4.	Suspicious for malignancy (SFM)	Specimen showing features of suspicious but not definitively diagnostic for malignancy • Atypical cytology limited by artifact • Monomorphic, atypical lymphoid cells • Suspicious mesothelial proliferation
5.	Malignant (MAL)	Specimen include those with definitive findings and /or supportive studies indicating mesothelial or non-mesothelial malignancies

RESULT:

In the study, 1504 cases were included during the 3 years. There were 864(57.5%) cases of ascitic fluid, 637(42.3%)

cases of pleural fluid and 03(0.2%) cases of pericardial fluid retrieved. The majority of the samples were from ascitic fluid followed by pleural and pericardial fluids. Out of these cases, 121(8.0%) were non diagnostic (ND), 1294(86%) were negative for malignancy (NFM), 17(1.1%) were atypia of uncertain significance (AUS), 18(1.3%) were suspicious for malignancy (SFM) and 54(3.6%) were malignant (MAL). In our study, 864(57.5%) were male and 640(42.5%) were female. Patient's age ranged between 02-95years with the mean age of 45.3 years. Lung cancer followed by breast cancer was most common cause of the pleural effusion and ovarian cancer was most common cause of peritoneal effusion.

Table-2: A comparison of cases, their percentage and categorization into types of effusion.

Sr. No.	Category	Total	%	Pleural	%	Ascitic	%	Pericardial	%
1	ND	121	8.0%	35	30.00%	86	70.00%	0	0%
2	NFM	1294	86.0%	561	43.30%	731	56.50%	2	0.20%
3	AUS	17	1.1%	7	41.20%	9	52.90%	1	5.90%
4	SFM	18	1.3%	7	38.90%	11	61.10%	0	0%
5	MAL	54	3.6%	27	50.00%	27	50.00%	0	0%
		1504	100%	637	42.3%	864	57.5%	3	0.2%

The maximum cases were from ascitic fluids, followed by pleural and pericardial fluids. In this overall series of fluids, maximum cases were in category-2, i.e. 86.0% and minimum cases in category-3, i.e.1.1%. In category-2, maximum cases were from ascitic fluid (56.5%), followed by pleural (43.3%) and pericardial fluids (0.2%), Were as in malignancy (i.e. Category-5) equal no. of cases from pleural and ascitic fluids were present.

Table-3, Gender distribution-

	Category	Total	Female	%	male	%
1	ND	121	62	51.20%	59	48.80%
2	NFM	1294	531	41.00%	763	59.00%
3	AUS	17	5	29.40%	12	70.60%
4	SFM	18	13	72.20%	5	27.80%
5	MAL	54	29	53.7%	25	46.3%
		1504	640	42.5%	864	57.5%

In our study, 864(57.5%) were male and 640(42.5%) were female, i.e. male cases were predominant here. Male: female ratio was 1.35:1. In cat-2&3, males (59.0%, 70.6%) were more than females (41.0%,29.4%). Were as, in cat 4&5 i.e. suspicious and malignancy cases females (72.2%, 53.7%) predominance was seen.

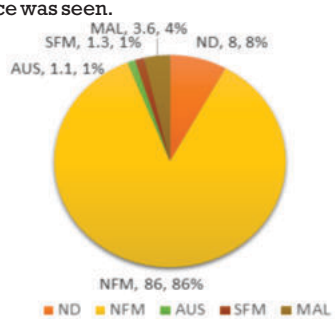

Chart-1: A comparison of cases, their diagnostic categories and percentage. There were 8.0% cases of ND, 86%cases of NFM, 1.1% cases of AUS, 1.3% cases of SFM and 3.6% cases of MAL. Here NFM case was most common.

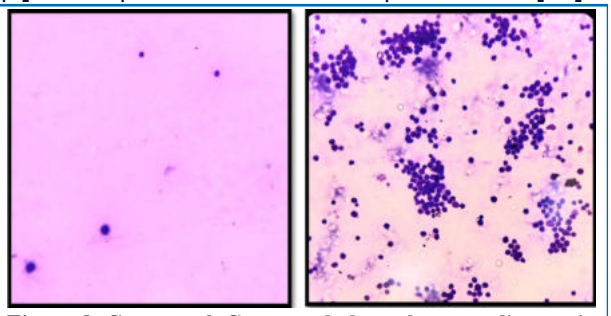

Figure 1: Category 1, Cytomorphology shows no diagnostic cells ,400x (A). Category 2, cytomorphology shows chronic inflammatory cells, Giemsa, 400x (B)

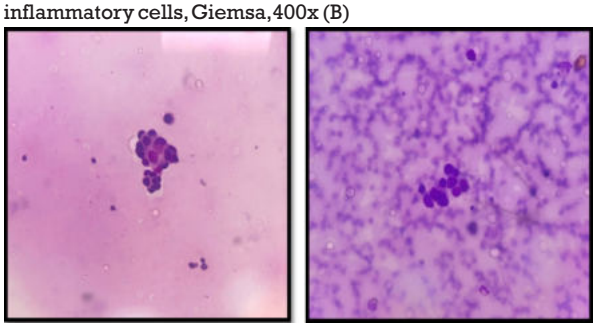

Figure 2: Category-3, shows occasional cluster of atypical cells, Giemsa, 400x (A), Category-4, Shows cluster of atypical cells with high N:C ratio but quantitively less to categorized malignant, Giemsa, 400x (B)

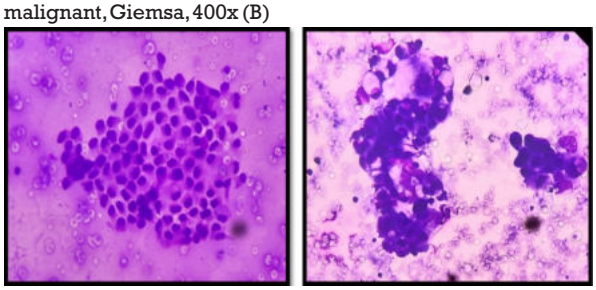

Figure: 3- Category-5, cytomorphology shows clusters of atypical cells having large hyperchromatic nuclei with high N:C ratio, nuclear pleomorphism and irregular nuclear membrane, Giemsa, 400x (A) & (B)

DISCUSSION:

We evaluated our application of the recently proposed TIS for reporting on serous effusion cytopathology. In our study, total 1504 cases were included, categorized them into 121(8.0%) ND, 1294(86%) NFM, 17(1.1%) AUS, 18(1.3%) SFM and 54(3.6%) MAL.

Kundu et al. included 1340 cases in their study, categorized into 35(2.6%), 954(71.2%), 17(1.3%), 59 (4.4%) and 275(20.0%) and Farhani et al. included 34,941 samples, categorized them into 52 (0.2%), 22,202 (72.7%), 194 (0.6%), 711 (2.3%), and 6507 (21.3%) as ND, NFM, AUS, SFM, and MAL category. Erika et al. included 299 cases, out of these 84.4% were NFM and 10.0% were malignant. In our study maximum no. of cases in cat-2, 86.0%, that is similar to studies of Erika et al., Kundu et al, Farhani et al. Here 3.6% case were malignancy, but in other studies cases were higher.

Table-4: A comparison of cases and their percentage in different studies-

Diagnostic Category		Kundu et al.		Farhani et al.		Erika et al.		Sachin et al.		Our study	
		Case	%	Case	%	Case	%	Case	%	Case	%
Category 1	Non diagnostic	35	2.60%	52	0.20%	0	0%	13	2.00%	121	8.00%
Category 2	Negative for malignancy	954	71.20%	22202	72.20%	252	84.40%	464	71.60%	1294	86.00%
Category 3	Atypia of uncertain significance	17	1.30%	194	0.60%	13	4.30%	16	2.40%	17	1.10%
Category 4	Suspicious of malignancy	59	4.40%	711	2.30%	4	1.30%	31	4.70%	18	1.30%
Category 5	Malignant	275	20.50%	6507	21.30%	30	10.00%	128	19.30%	55	3.60%
	Total number of Cases	1340	100%	34941	100%	299	100%	652	100%	1504	100%

CONCLUSION:

Our result underline the utility of the current classification. Effusion cytology is an important diagnostic tool in the evaluation of benign and malignant fluids. Standardization of reporting terminologies with negligible inter-observer variation ensures an accurate cytological diagnosis needed for proper patient management. In this research, we conclude that this reporting system is a user-friendly reporting system that can be easily applied on effusion fluid for better patient management and effective communication with clinicians.

Conflict Of Interest And Funding:

In this study/research no conflict of interest and not received external funding.

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