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RESEARCH ARTICLE

EXFOLIATIVE CYTOLOGY OF SEROUS FLUIDS- AN IMPORTANT AID TO PRIMARY DIAGNOSIS

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Abstract

Introduction: Body fluid cytology is an important diagnostic test for various malignant and benign conditions. Effusions can be caused by inflammatory, infectious, and benign; neoplastic or malignant; and primary or metastatic diseases. Such conditions in effusions may often have overlapping features and mimic one another both cytomorphologically and clinically, presenting diagnostic challenges.1

Aims and Objectives: To study tha age and gender wise distribution of cases.

To the study the incidence of neoplastic and non-neoplastic lesions.

To study the cytomorphology of neoplastic and non-neoplastic lesions.

Material and Methods: This prospective study was carried out at B.J Medical College,Ahmedabad during the period of 1st April 2024 to 31st May 2024 for a period of 2 months. Fluids were received in the department of cytopathology.After receiving the fluid sample, details like type of fluid, clinical diagnosis, age and gender of the patient were noted. Gross description of fluid including volume, colour, turbidity, were noted and fluid and fluid was taken up for processing in which immediately the sample was centrifuged and the sediment smear were made.Sediment smear were stained by Hematoxylene and Eosin,Pap stain and May grunwald giemsa (MGG) stains.After staining slides were mounted with DPX, screened and reported by pathologist according to The International system (TIS) for reporting serous fluid cytology 2020.

Results: Total 100 serous fluids were received in 2 months.Out of which peritoneal fluid were 65 and pleural fluid were 35. M:F ratio was 1.12. 2 % fluids were inadequate for reporting87% fluid were negative for malignancy(NFM).6% fluid were given as atypia of undetermined significance(AUS).Malignant for secondary (MAL-S) were 5%.

Conclusion: We conclude in our study that cytology is a valuable tool in evaluation of serous cavity fluids. It is relatively painless, simple, cost effective, rapid technique that yields quick and reliable results.

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Introduction:-

Body fluid cytology is an important diagnostic test for various malignant and benign conditions. Effusions can be caused by inflammatory, infectious, and benign; neoplastic or malignant; and primary or metastatic diseases. Such conditions in effusions may often have overlapping features and mimic one another both cytomorphologically and clinically, presenting diagnostic challenges.[1]

Effusion cytopathologic evaluation can be challenging due to multiple, different processes affecting serous cavities, ranging from benign (infectious, autoimmune) to malignant processes (primary or metastatic neoplasms).The international system standardized the way to report cytopathology diagnoses of serous fluids, which includes 5 different categories: nondiagnostic (ND), negative for malignancy (NFM), atypia of undetermined significance (AUS), suspicious for malignancy (SFM) and malignant (MAL).Cytology specimens must be interpreted in concert with clinical and radiologic information.Ancillary studies can be utilized for further characterization (immunostains, flow cytometry, molecular).

The main serosal body cavity comprises pleural, peritoneal, pericardial, synovial and cerebrospinal fluids. The fluid cavities are lined by single layer of epithelium. Normally these cavities contain minimal fluid that is required for lubrication and protecting the underlying viscera. The dynamics of fluid accumulation is governed by starling's law, which states that fluid is accumulated when there is a decrease in the plasma colloidal pressure and increased capillary hydrostatic pressure. An effusion results in imbalance between fluid formation and removal.[2]

Cytological study of body fluid is a complete diagnostic modality. First, it assists the clinician in formulating and pointing out the etiology of effusion and list of differential diagnoses, Secondly it allows one to follow the results of therapy and prognosis.[3]

Aims and Objectives:-

- To study tha age and gender wise distribution of cases.
- To the study the incidence of neoplastic and non-neoplastic lesions.
- To study the cytomorphology of neoplastic and non-neoplastic lesions.

Material and Methods:-

This prospective study was carried out at B.J Medical College,Ahmedabad during the period of March 2024 to April 2024 for a period of 2 months. Fluid were received in the department of cytopathology.After receiving the fluid sample, details like type of fluid, clinical diagnosis, age and gender of the patient were noted. Gross description of fluid including volume, colour, turbidity, were noted and fluid and fluid was taken up for processing in which immediately the sample was centrifuged and the sediment smear were made.Sediment smear were stained by Hematoxylene and Eosin,Pap stain and May grunwald giemsa (MGG) stains.After staining slides were mounted with DPX, screened and reported by pathologist according to The International system for reporting serous fluid cytopathology 2020.

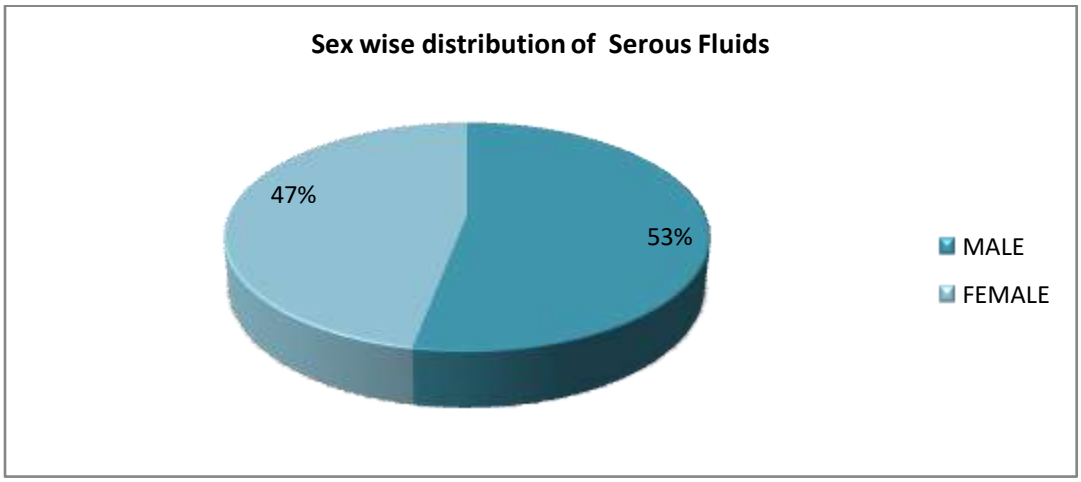
Results:-

Table I:- Distribution of Serous Fluids.

Type of fluid	Number of samples	Percentage(%)
Pleural fluid	35	35%
Peritoneal fluid	65	65%
Total	100	100%

Peritoneal fluid received were 65 % whereas only 35 % pleural fluid were received.

Chart I:- Sex wise distribution of Serous Fluids.



Male predominance was seen in the present study with M:F ratio 1.12.

Table II:- Age wise distribution of Serous Fluids.

Age group(years)	Number of cases	Percentage(%)
11-20	3	3%
21-30	17	17 %
31-40	13	13 %
41-50	19	19 %
51-60	24	24 %
61-70	14	14 %
71-80	05	5 %
>80	05	5 %

In the present study maximum number of patients were in the age group of 51-60 years followed by patients in the age group of 41-50.

Table III:- Categorization of serous fluid according to The International system for reporting serous fluid cytopathology 2020.

Category	No of cases	Percentage(%)
Nondiagnostic(ND)	2	2%
Negative for malignancy (NFM)	87	87%
Atypia of undetermined significance (AUS)	6	6%
Suspicious for malignancy (SFM)	NIL	NIL
Malignant-Secondary(MAL-S)	5	5%

In present study maximum cases were Negative for malignancy (NFM) which 87 % followed by cases of AUS which were 6 %

Table IV:- Distribution of serous fluid on cytomorphological examination.

Type of fluid	Neutrophil rich effusion	Lymphocyte rich effusion	Atypical cells in predominance	Mesothelial cells in predominance	Total
Peritoneal fluid	11	44	9	00	64
Pleural fluid	4	27	2	01	34

In the present study both fluids have lymphocyte rich effusions.

Table V:- Correlation of serous fluids according to category.

Category	Type of fluid		Gross appearance		Sex	
	Peritoneal fluid	Pleural fluid	Yellowish	Reddish	Male	Female

Atypia of undetermined significance (AUS)	05	01	03	03	02	04
Malignant-Secondary(MAL-S)	04	01	04	01	01	04

Table VI:- Correlation of serous fluids according to category with age parameters.

Category	**AGE**						**Total**
	21-30	**31-40**	**41-50**	**51-60**	**61-70**	**71-80**	
Atypia of undetermined significance (AUS)	1	1	1	1	1	1	05
Malignant-Secondary(MAL-S)	0	1	0	3	1	0	06

Discussion:-

The history of serous effusion cytology can be traced back to the 19th century. Lucke and Klebs were apparently the first investigators who recognized the presence of malignant cells in an ascitic fluid in 1867.

Main body fluids like pleural, peritoneal, pericardial, cerebrospinal fluid (CSF) and synovial fluid are normally present within respective body cavities in minimal quantities with their constituents in specific proportions. These fluids during a disease process undergo qualitative and quantitative changes.[9]Cytological examination of body fluid is of distinct value in confirming or disapproving malignant metastatic tumors to the cavities. Since mesothelial and synovial tumors are rare, this method is useful to detect metastatic malignant cells to the body cavities. The method is more of prognostic value rather than for the early detection or prevention of further tumor growth[10]

Cytological examination of these fluids helps in diagnosing of both non-neoplastic and neoplastic conditions. Most important is the recognition of a malignant pathology. But many other conditions such as inflammatory diseases, parasitic infestations, bacteria, fungi and viruses can also be identified.[11] The advantages of this method are that it is a relatively simple, rapid, inexpensive and less invasive tool having a high accuracy with low incidence of false positive diagnosis.[12]The present study was an attempt to highlight the frequency of malignant cells in various body fluids.[12]

Most common fluid received was peritoneal fluid (65%), followed by pleural fluid (35%). The present study correlated with the findings of Chakrabarti et al[4],Shulbha et al[5]Bhagat et al[6.]

Male preponderance was found with M:F (1.2:1) was found in the present study which correlated with the study of Chakrabarti et al[4]and Mahajan S. et al[7]

In the present study maximum number of cases were in the 4th to 6th decadewhich is similar to the study of Chakrabartiet al[4.]

In the present study with regard to fluid characteristics, most of the fluid specimen (58%) of had straw colour,rest (42%) fluids had reddish color . Majority of the fluids (69%) had lymphocytes as a predominant cell type followed by neutrophils (15%) and majority of the patients had single cellular arrangement in fluid. However these findings cannot be compared with other studies due to lack of similar data in the literature.

In this study majority of the fluid specimens that is 87% of the specimens were diagnosed as Negative for malignancy(NFM) while diagnosis of malignant lesions was noted in 5% of the fluid specimens and 6% of the fluid specimens were diagnosed as Atypia of undetermined significance(AUS). Hence the frequency of malignancy in this study was 5%.This can be compared with the studies of Gupta R. et al[8]andSharma M. et al[9]

In the present study out of 5 malignant lesions, maximum malignant lesions were noted in peritoneal fluid samples (80%) followed by pleural fluid samples (20%).These findings are in agreement with the study of Sharma M. et al[9]

Conclusion:-

We conclude in our study that cytology is a valuable tool in evaluation of serous cavity fluids. It is relatively painless, simple, cost effective, rapid technique that yields quick and reliable results. It is an asset to both pathologist and clinician to study the pathophysiology and plan further treatment in a cost effective manner.Some cases may present major interpretative challenges to the pathologist. Ancillary studies such as cell count, biochemical, microbiologic evaluation, cell block and IHC study help in accurate identification of diagnosis.

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