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# Cytological Spectrum of Body Fluids in Tertiary Care Centre

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**Abstract:** ***Introduction: IAC was published in year 2020 for establishing uniform reporting system of serous effusion and to provide a standard format for effusion cytopathology to attain uniformity across all labs. Objective: The present study is carried out to categorize serous effusions and estimate risk of malignancy (ROM) by adhering to IAC guidelines. Method: The study includes 236 body fluids (ascitic fluid, pleural fluid, pericardial, CSF) received in cytology section of Pathology Department in Nair Hospital in year 2022. The samples are centrifuged and sediment is transferred on two glass slides. One stained with May-Grunwald Geimsa stain, other with Papanicolaou stain. The stained smears are studied under microscope and evaluated. Cell blocks and histopathology are referred wherever available. Results: Our study shows a slight female predominance (1.1:1) with maximum cases in age range of 41-60yrs. Pleural fluids comprised majority of cases (52.6%), followed by ascitic fluids (41.2%) and CSF (0.6%). Majority cases had non-malignant etiology (79%). Lymphocytic (72.6%, 47.3%), neutrophilic (19.0%, 40.3%), eosinophilic predominance (1.1%, 1.7%) and mixed cell infiltrate (7.1%, 10.5%) were seen in pleural and ascitic fluid respectively.20 cases each of pleural and ascitic fluids contributed to the 21% of fluids with malignant etiology. Malignant fluids were reported as atypical cells seen (42.5%), positive for adenocarcinoma (25%), suspicious for `malignancy (15%), signet ring cells seen (10%), neoplastic squamous cells seen (5%) and malignant round cells seen (2.5%). Conclusion: Cytological analysis of body fluids is acknowledged as a prompt method to simplify further clinical management of patients.***

**Keywords:** body fluids, malignant, non-malignant

## 1. Introduction

Cytological evaluation of body fluids is proved as a proficient technique in present age owing to its rapid, affordable and accurate results.It is a rapid, simple, cost-effective and relatively patient compliant investigation[1]. It proves to be of great assistance in grading fluids into non-malignant and malignant. It is a Preliminary and minimally invasive method for the diagnosis of body fluids. Effusions are excessive accumulation of fluids in a serous cavity. Mechanism of formation of abnormal fluid in the body cavity works on the principle of 'Starlings Law'[2]. Collection of these effusions is a relatively simple procedure. They have to be drained for therapeutic and diagnostic indications. Cytological examination of the fluids along with physical examination helps the pathologist to identify specific etiologic agent, to follow the natural process of disease and to monitor the response to therapy[3,4]. It provides insight into diagnostic, prognostic and therapeutic aspects. This study was carried out to know the trends of various types of effusions diagnosed in a tertiary care center with an emphasis on malignant effusion[5].

## 2. Aims and Objective

Our study aims at categorizing fluids into non-malignant and malignant based on their cytology. To categorize inflammatory infiltrate into acute (neutrophilic) or chronic (lymphocytic), mixed and eosinophilic infiltrate.To categorize malignant infiltrate into epithelial (adeno/squamous) or non-epithelial (haematolymphoid etc). To help provide an insight into diagnosis, prognosis and therapy.

## 3. Material and Method

The study includes 211 body fluids (ascitic fluid, pleural fluid, CSF) received in cytology section of Pathology Department of our hospital in the year 2021. Inclusion criteria: Pleural fluid, peritoneal fluid, CSF. Exclusion criteria: Urine, Sputum, Saliva, Pus, Blood, Obstetrical and gynaecological fluids, Haemorrhagic sample and FNAC samples. The samples were centrifuged and sediment was transferred on two glass slides. One stained with May-Grunwald Geimsa stain, other with Papanicolaou stain. The stained smears were studied under microscope and evaluated. In case of clear fluids cytocentrifuge was used to prepare smears.

## 4. Observations

A total 211 cases of serous effusions were examined cytologically which included ascitic fluid, pleural fluid and CSF. Our study showed slight female predominance (1.1:1), with maximum cases in age range 41-60 yrs. Most fluids were reddish yellow to yellow in colour, with majority having hazy appearance. Out of 211 cases 192 cases were reported, in 19 cases no opinion was given. Out of 192 cases 52.6% pleural fluid, 41.4% ascitic fluid and 6% CSF.Out of 192 reported cases, 79% (152) were non-

malignant, while 21 % (40) were malignant.No opinion was possible due to scant cellularity, degenerative changes, bacterial contamination, artefacts were given repeat. In our study out of 192 cases we got lymphocytic predominance, followed by neutrophilic, mixed inflammatory and eosinophilic infiltrate. CSF had equal predominance of neutrophilic and lymphocytic infiltrate.9% cases showed eosinophilic predominance. 20 cases each of ascitic and pleural fluid were reported malignant. No malignancy was detected in CSF. Distribution of cases reported as atypical cell seen/suspicious for malignancy/positive for malignancy in Ascitic fluid was as follows: Atypical cell 11 cases, Adenocarcinoma 4 cases, Squamous cell carcinoma 1 case, Round cell type 0 case, Suspicious for malignancy 3, Signet ring cell type 1 case. Distribution of cases reported as atypical cell seen/suspicious for malignancy/positive for malignancy in pleural fluid was as follows: Atypical cell 6 cases, Adenocarcinoma 6 cases, Squamous cell carcinoma 1 case, Round cell type 1 case, Suspicious for malignancy 3 cases, Signet ring cell type 3 cases. Out of 192 samples reported mesothelial cells were reported in 130 cases.65.5% cases showed benign mesothelial cells and florid reactive mesothelial cell proliferation.No mesothelioma was reported.

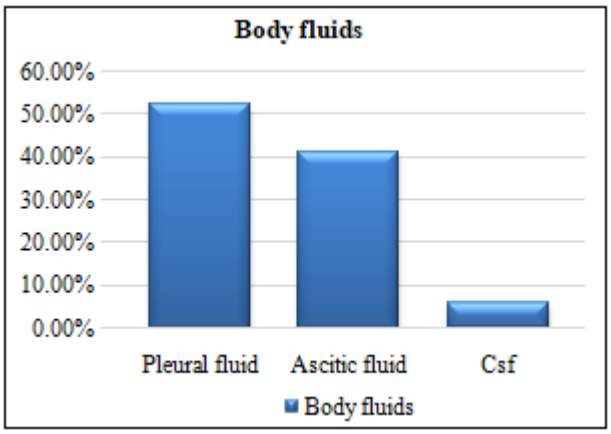


**Chart 1:** Body Fluid Distribution

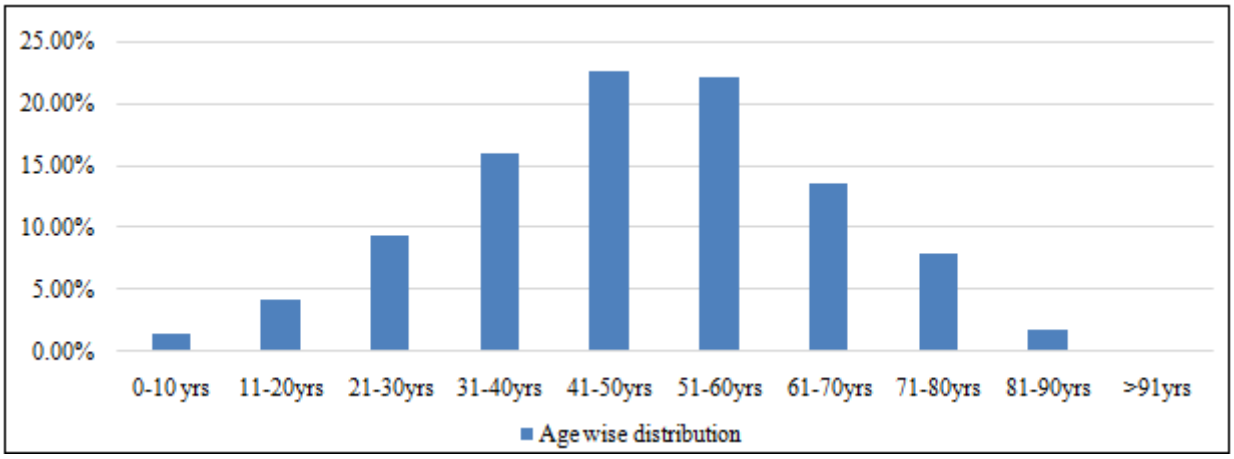


**Chart 2:** Age Wise Distribution

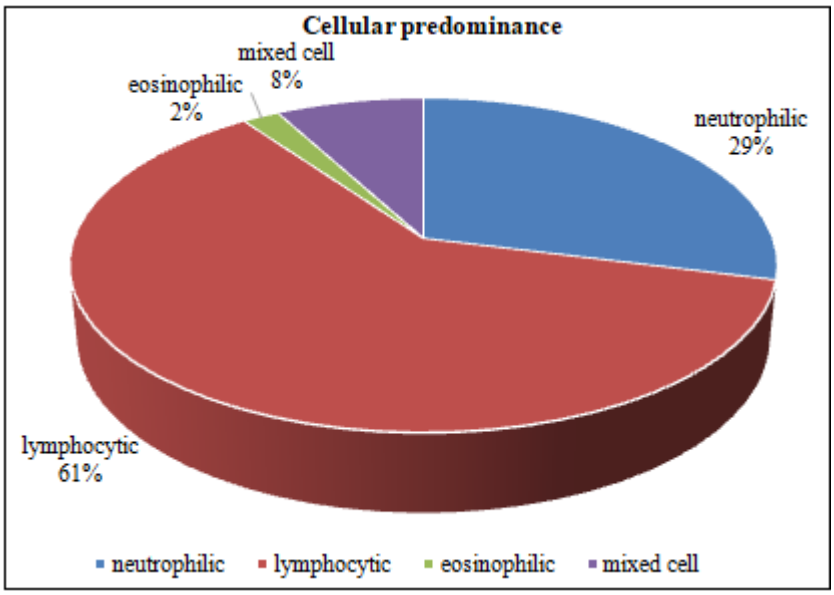


**Chart 3:** Cellular Predominant Fluids

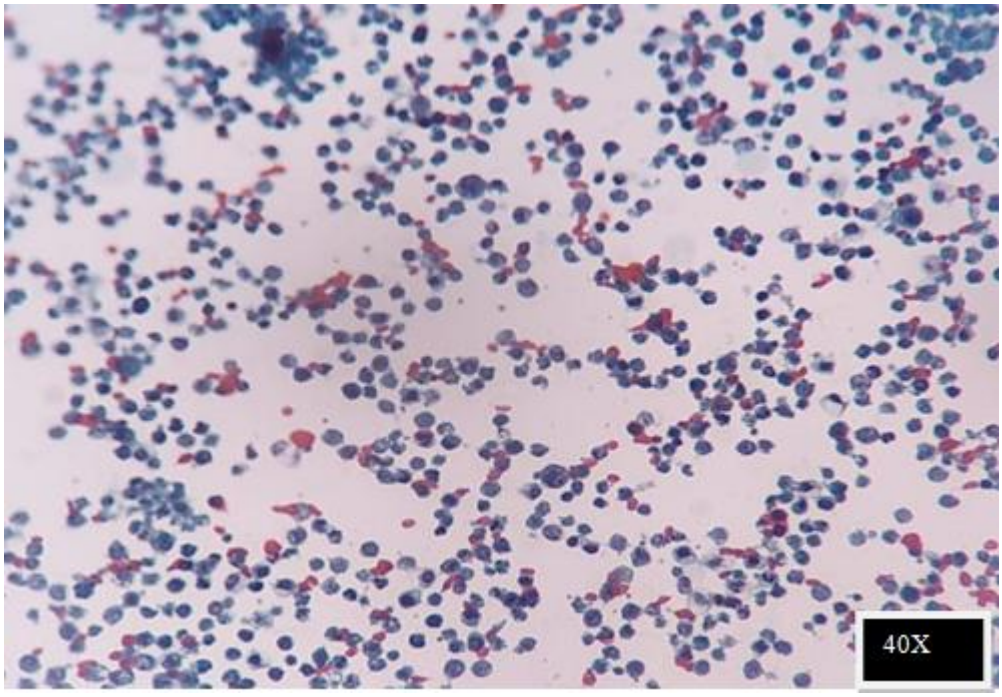


**Figure 1:** Positive for Malignancy-Round Cell Type

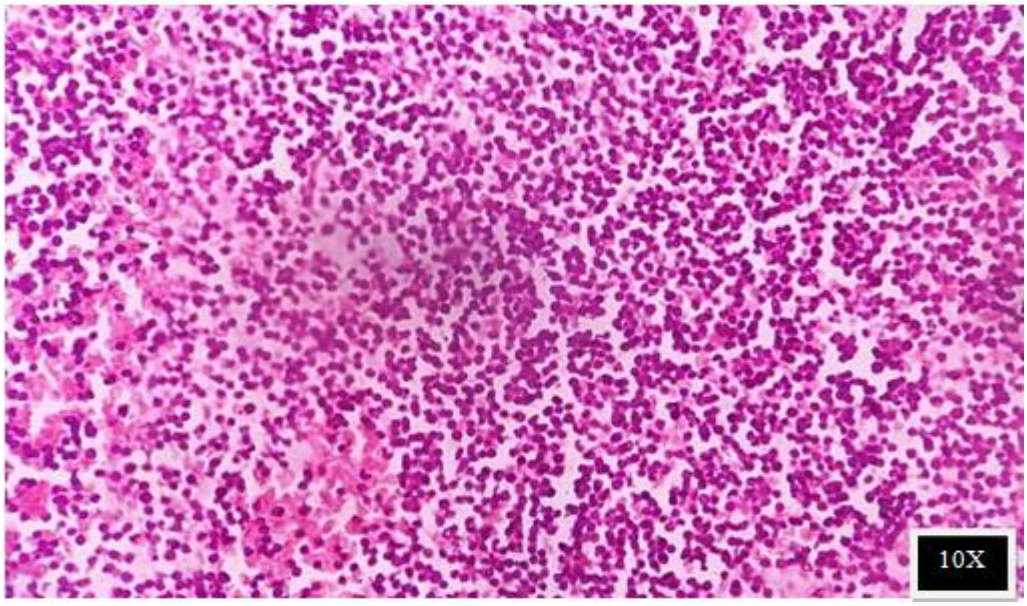


**Figure 2:** Cell Block Confirmed – Positive for Hematolymphoid Malignancy

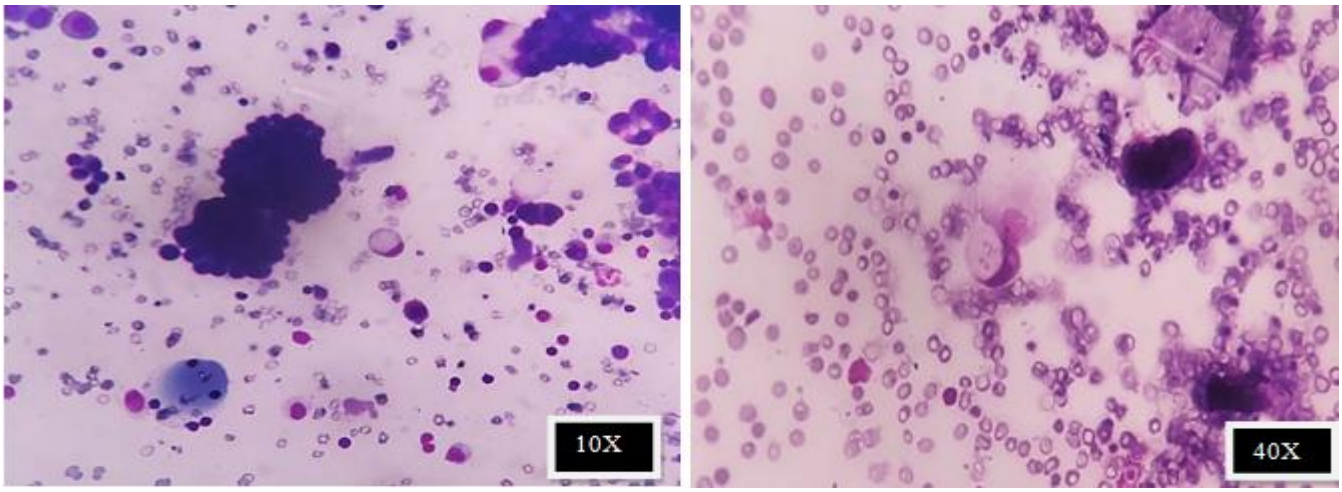


**Figure 3:** Positive for Malignancy -Signet Ring Cell Type

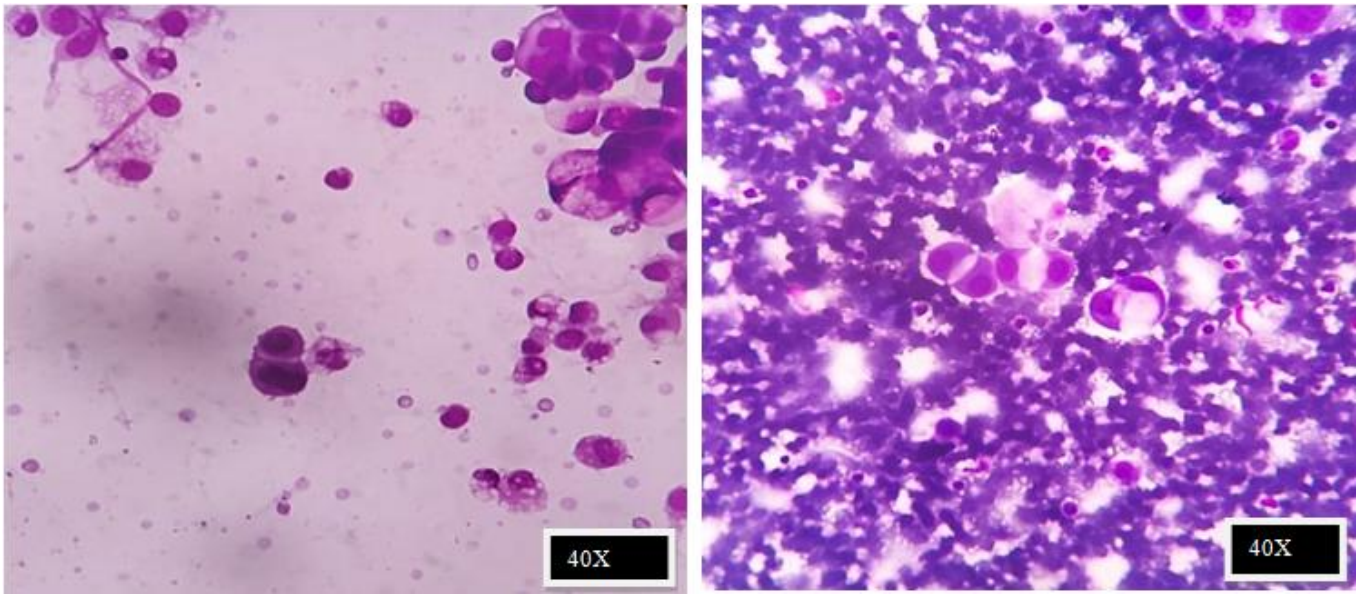


**Figure 4:** Reactive Mesothelial Cells-Window Phenomenon

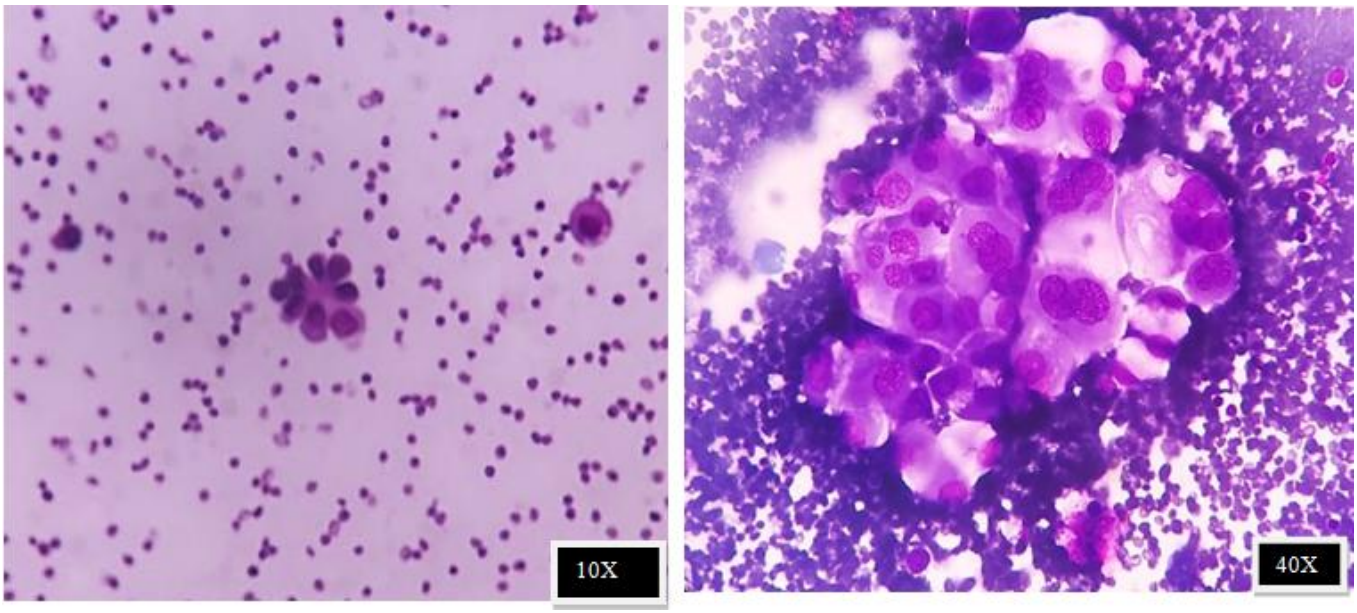


**Figure 5:** Cells arranged in glandular pattern - adenocarcinoma

## 5. Discussion

Serous effusion cytology dates back to 19th century[2]. Locke and Klebs were 1st investigators who acknowledged the presence of malignant cells in ascitic fluid in 1867[2].Quinckes recognized malignancy in pleural effusion in 1882.Over the years different pathologies have come across in the literature, which are potential etiologies for effusions[1]. Owing to these facts it isimperative that exact diagnosis of the underlying disease is known[1]. Cytological evaluation of body fluids is recognized as complete diagnostic modality and it points out etiology of effusions. Cytological examination of cavity fluids may also reveal information about inflammatory conditions of the serous membranes, parasitic infestations, and infection with bacteria, fungi, or viruses[6]. Examination of effusion cytology is tricky as morphology of reactive mesothelial cells and malignant cells closely resembles[6]. Our study shows a slight female predominance (1.1:1) with maximum cases in age range of 41-60yrs. Pleural fluids comprised majority of cases (52.6%), followed by ascitic fluids (41.4%) and CSF (6%). Majority cases had non-malignant etiology (79%). Lymphocytic (72.6%, 47.3%), neutrophilic (19.0%, 40.3%), eosinophilic predominance(1.1%, 1.7%) and mixed cell infiltrate(7.1%, 10.5%) were seen in pleural and ascitic fluid respectively.20 cases each of pleural and ascitic fluids contributed to the 21% of fluids with malignant etiology .Malignant fluids were reported as atypical cells seen (42.5%), positive for adenocarcinoma (25%), suspicious for malignancy(15%), signet ring cells seen(10%), neoplastic squamous cells seen (5%) and malignant round cells seen(2.5%). Shulbha et al study had sample size of 385 cases, with maximum no. of cases in range of 31 to 40 yrs. with male predominance[3].Their study showed majority of peritoneal fluid cases 45 % (174/385) out of which 170 were non neoplastic and 4 neoplastic. Out of 170 non neoplastic peritoneal effusions 154 cases were lymphocytic predominant and 16 neutrophilic predominant. Pleural fluid comprised of 24% of all effusions (94/385). Out of which 88 were non neoplastic (our study-84) and 6

neoplastic (our study 20). Out of 88 non neoplastic pleural effusions 82 were non suppurative and 6 suppurative. CSF accounted for 25.9%cases (100/385). Tiwari et al study consisted 418 cases, which showed male preponderance with age range from 5-82 yrs., majority in 41-50yrs[2].Out of 418 cases most common fluid received was peritoneal fluid (52.9%) 221, followed by pleural fluid (41.1%) 172 and CSF (4.8%)20.Out of 221 peritoneal cases, 124 (56%) transudate and 97 (44%) exudativein nature. Out of 97 exudative cases 61 were malignant in nature. Pleural fluid 2nd most common effusion having 172 cases (41.1%), out of them 94 case transudative and 78 were (45.4) exudate in nature. CSF was the 3rd most common fluid (4.8%).

## 6. Result

Our study shows a slight female predominance (1.1:1) with maximum cases in age range of 41-60yrs. Pleural fluids comprised majority of cases (52.6%), followed by ascitic fluids (41.2%) and CSF (0.6%). Majority cases had non-malignant etiology (79%). Lymphocytic (72.6%, 47.3%), neutrophilic (19.0%, 40.3%), eosinophilic predominance (1.1%, 1.7%) and mixed cell infiltrate (7.1%, 10.5%) were seen in pleural and ascitic fluid respectively.20 cases each of pleural and ascitic fluids contributed to the 21% of fluids with malignant etiology. Malignant fluids were reported as atypical cells seen (42.5%), positive for adenocarcinoma (25%), suspicious for malignancy (15%), signet ring cells seen (10%), neoplastic squamous cells seen (5%) and malignant round cells seen (2.5%).

## 7. Summary and Conclusion

Cytological analysis is acknowledged as a prompt method to simplify further clinical management of patients. It remains simple, convenient, cost effective, first line method in arriving at diagnosis and thus helps in further clinical management. It has a better diagnostic performance .and is helpful in evaluating and staging malignancies. Because of relative complexities in the cytopathologic evaluation of effusion fluids, application of appropriately standardized protocol is critical for achieving optimum results. There is a need to apply standardized steps from handling of specimens during the initial stages of collection to the final interpretation phase. Hence, to standardize practices the international system for reporting serous fluid cytology (TIS) is developed and needs to be applied.

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