

**Clinical and cytomorphological study of body effusion - An observational cross sectional study**

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**Abstract**

**Introduction:** Cytological study of body effusions is a commonly advised investigation which is done for the diagnosis of various non-neoplastic and neoplastic conditions which often helps in the detection of primary lesions. It is also a helpful tool used for staging and prognosis of the malignant tumours. It is a complete diagnostic modality and considered as a highly reliable technique that guides towards a positive and a definitive diagnosis.

Categorising an effusion by its cytological properties is an important step in diagnosing the cause of the effusion and its management. It also helps to plan treatment and prognosis for the patient. This study emphasizes on importance of cytological examination of body effusion fluids which provide important

information for both diagnostic and therapeutic purposes.

**Method:** It was an observational cross-sectional study conducted in Department of Pathology of a tertiary care centre. Patients of all age group diagnosed to have body effusion (pericardial, pleural, peritoneal & CSF) and cystic fluids, sent for cytological examination in the department of Pathology. A total of 142 samples were studied.

**Results:** Among 142 cases studied, the most common age group affected were in age group of 40-50 yrs (26.8%) followed by 25 (17.6%) in the range of 50 to 60 years, 24 (16.9%) in the range of 30 to 40 years, 21 (14.8%) in the range of 20 to 30 years. 69 (48.6%) were females and 73 (51.4%) were males included in the study. Out of 142 patients, 100 (70.4%) patients had transudate type of fluid, while 42 (29.6%) had exudate

fluid type. There were 49 (34.5%) cases with pleural effusion, followed by 45 (31.7%) with peritoneal effusion, 17 (12%) with CSF, 2 (1.4%) with pericardial effusion.

Out of 97 patients, 50 (51.5%) had chronic inflammation, followed by 16 (16.5%) with mixed, 14 (14.4%) with acute inflammation and 13 (13.4%) with reactive effusion. Out of 45 neoplastic cases, majorly i.e. 18 (40%) cases were suspected for malignancy, while 14 (31.1%) were benign and 13 (28.9%) were malignant. Out of 97 non-neoplastic cases, 84 (86.6%) were inflammatory, while 13 (13.4%) were reactive.

**Conclusion:** Cytological examination of body fluids is a simple, relatively non-invasive, therapeutic and prognostic technique. It is a cost effective, quick and painless procedure with minimal side-effects that yields diagnostically significant results. Though histopathology, cell block and immunohistochemistry (IHC) are more efficient techniques, Fluid Cytology will still remain a routine investigation because it is cost-effectiveness, safety and rapid technique that yields quick results.

**Keywords:** Body Effusions, Cytology

### Introduction

Cytological study of body effusions is a complete diagnostic modality and it is considered as a highly reliable technique that guides towards a positive and a definitive diagnosis. <sup>(1)</sup> It is a commonly advised investigation which is done for the diagnosis of various non-neoplastic and neoplastic conditions and often helps in the detection of primary lesions. Besides this, it is also helpful tool used for staging and prognosis of the malignant tumours. <sup>(2)</sup> It aims at pointing out the cause of effusion as well as for prognostication of the disease process in certain cases. The cell population present in

the sediment represents a much larger surface area than that obtained by needle biopsy or aspiration <sup>(3)</sup>

The purpose of present study is to evaluate the significance of fluid cytology for various pathological conditions. The study and interference of body fluid analysis serves several functions by helping the clinician in formulating out the cause of effusion and to set differential diagnosis. Categorising an effusion by its cytological properties is an important step in diagnosing the cause of the effusion and its management. This study emphasizes on importance of cytological examination of body effusion fluids which provide important information for both diagnostic and therapeutic purposes. Additionally it an safe techniques which encounter minimal risk and side effects also results are obtained in lesser time.

Effusions are the presence of excess amount of fluid in the body cavities. It most commonly involves the pleural, peritoneal, and pericardial cavity and can occur in a variety of clinical settings. Normally minimal amount of fluid is present in the various body cavities which lubricate the mesothelial surfaces, thus facilitating movement of the heart, lungs, and intestines. Rapid accumulation of fluid in cavities can result in acute symptoms secondary to functional restrictions of the involved organs <sup>(4)</sup>

**Aims and Objectives:** To study the clinical and cytomorphological findings in various Body Effusions.

### Material and Methods

An Observational cross sectional study was conducted on Fluid Cytology to observe and study various types of Body Effusion which were referred to department of pathology of a tertiary care hospital in Maharashtra. The data collected was of two years from September 2018 to September 2020. The study was started after

the approval of the Institutional Ethics Committee of our institute. The study included 142 cases of body effusions including pleural, peritoneal, pericardial cavities, csf and cystic fluids from patients of all age group and both the sexes. Data was collected in predesigned case record form which included demographic details like age, sex, Clinical findings and details of cytological findings. The fluid samples were received with requisition forms and cytological numbers were assigned. Radiological guidance was taken for aspiration of fluid whenever required. The gross details which were noted. Samples were processed by routine conventional smear technique and cytopspin technique in case of lesser cellularity. Fluids were processed routinely, smears were stained with hematoxylin and eosin. Biochemical findings were retrieved. Cytological examination was done on all cases and histopathological confirmation was done in suspicious and malignant cases.

**Inclusion Criteria:** All cases of Body effusions of pleural, peritoneal and pericardial cavities diagnosed and sent for cytological examination and from patients of all age group and both the sexes received for cytological examination. Various Cystic fluids are also included.

**Exclusion Criteria:** Insufficient material with inadequate cellularity and synovial fluid will be excluded.

**Statistical Analysis:** The demographic parameter age was categorised and summarized in terms of numbers and percentages. The other demographic parameter sex was also expressed in terms of frequencies and percentages. The associated were tested using Chi-square test. Also, the cross-tabs were obtained for age and type of effusion, as well as sex and effusion and the

association were tested using Chi-square test. The cross-tab was also obtained for clinical diagnosis and type of effusion. The distribution of patients according to age and site of aspiration, as well as sex and site of aspiration were obtained. The descriptive statistics like mean, standard deviation and median were obtained for blood parameters. Also the distribution of patients was obtained as per cytological diagnosis and expressed as numbers and percentage. All the analyses were performed using SPSS ver 20.0 (IBM Corp) software and the statistical significance was tested at 5% level.

### Results

We included 142 cases of Body effusion in our study.

Table 1: Distribution of patients as per age categories

Age category (years)	No.	%
<= 10	5	3.5
10 to 20	7	4.9
20 to 30	21	14.8
30 to 40	24	16.9
40 to 50	38	26.8
50 to 60	25	17.6
60 to 70	15	10.6
70 to 80	7	4.9
Total	142	100.0

Table 1 provides the distribution of patients according to age categories. The majority i.e. 38 (26.8%) patients were in the age range of 40 to 50 years, followed by 25 (17.6%) in the range of 50 to 60 years, 24 (16.9%) in the range of 30 to 40 years, 21 (14.8%) in the range of 20 to 30 years. The remaining age categories had less than 10% cases.

Table 2: Distribution of patients as per sex

Sex	No.	%
Female	69	48.60
Male	73	51.40
Total	142	100

Table 2 gives the distribution of patients according to sex. There were 69 (48.6%) females and 73 (51.4%) males included in the study.

Table 3: Distribution of patients as per nature of fluid

Type of fluid	No.	%
Exudate	42	29.6
Transudate	100	70.4
Total	142	100

Out of 142 patients, 100 (70.4%) patients had transudate type of fluid, while 42 (29.6%) had exudate fluid type.

Table 5: Distribution of patients as per type of effusion and age

Age categories (years)	Type of effusion [No. (%)]				Others
	Pleural effusion	Peritoneal effusion	Pericardial effusion	CSF	
<= 10	2 (4.08)	0 (0)	0 (0)	3 (17.65)	0 (0)
10 to 20	1 (2.04)	0 (0)	0 (0)	5 (29.41)	1 (3.45)
20 to 30	6 (12.24)	3 (6.67)	0 (0)	4 (23.53)	8 (27.59)
30 to 40	6 (12.24)	9 (20)	0 (0)	3 (17.65)	6 (20.69)
40 to 50	10 (20.41)	14 (31.11)	2 (100)	1 (5.88)	11 (37.93)
50 to 60	11 (22.45)	12 (26.67)	0 (0)	0 (0)	2 (6.9)
60 to 70	8 (16.33)	5 (11.11)	0 (0)	1 (5.88)	1 (3.45)
70 to 80	5 (10.2)	2 (4.44)	0 (0)	0 (0)	0 (0)
Total	49	45	2	17	29

Table 5 gives the distribution of patients as per type of effusion and age categories. In patient category with pleural effusion, maximum i.e. 11 (22.45%) cases were in the age range of 50-60 years, followed by 10 (20.41%) in the range of 40-50 years, 8 patients in the age range 60-70 years. In the peritoneal effusion category, 14 (31.11%) patients were in the age range of

Table 4: Distribution of patients as per type of effusion

Type of effusion	No (%)
Pleural effusion	49 (34.5)
Peritoneal effusion	45 (31.7)
Others	29 (20.4)
CSF	17 (12)
Pericardial effusion	2 (1.4)
Total	142

Table 4 gives the number of patients according to type of effusion. There were 49 (34.5%) cases with pleural effusion, followed by 45 (31.7%) with peritoneal effusion, 17 (12%) with CSF, 2 (1.4%) with pericardial effusion.

40-50 years, 12 (26.67%) in the range 50-60 years, while 9 (20%) were in the range of 30-40 years. Two cases of pericardial effusion were in the age range of 40-50 years. In the CSF category, 5 (29.41%) patients were in the range 10-20 years, 4 (23.53%) in the range of 20-30 years, while 3 (17.65%) were in the range of 30-40 years and <=10 years.

Table 6: Distribution of cases as per neoplastic and Non-neoplastic category

Cytological diagnosis				
Neoplastic (n=45)			Non - Neoplastic (n=97)	
Benign	Malignant	Suspicious of Malignancy	Inflammatory	Reactive
14 (31.1)	13 (28.9)	18 (40)	84 (86.6)	13 (13.4)

Table 6 gives the distribution of patients as per cytological diagnosis. Out of 45 neoplastic cases, majorly i.e. 18 (40%) cases were suspected for malignancy, while 14 (31.1%) were benign and 13

(28.9%) were malignant. Out of 97 non-neoplastic cases, 84 (86.6%) were inflammatory, while 13 (13.4%) were reactive

Table 7: Distribution of all cases as per cytological diagnosis

Cytological diagnosis	No. (%)
Chronic inflammation	50 (35.2)
Atypical cell seen - Highly suspicious of epithelial	18 (12.7)
Mixed Inflammation	16 (11.3)
Acute Inflammation	14 (9.9)
Reactive effusion	13 (9.2)
Adenocarcinoma	10 (7.0)
Benign cystic lesion	10 (7.0)
Mucinous cystadenoma	3 (2.1)
Eosinophilic effusion	3 (2.1)
Squamous cell carcinoma	2 (1.4)
Benign serous cystadenoma	1 (0.7)
Candida	1 (0.7)
Metastatic malignant melanoma	1 (0.7)
Total	142 (100)

Table 7 Distribution of all the cases as per cytological diagnosis.

The majority i.e 50 (35.2%) patients had chronic inflammation, followed by 18 (12.7%) patients showing atypical cell, 15 (10.6%) showing mixed inflammation, 14 (9.9%) with acute inflammation, 13 (9.2%) with reactive effusion, 10 (7%) with adenocarcinoma and benign cystic lesion, and 8 (5.6%) with acellular diagnosis. The remaining diagnosis types were observed in less than 5% of the cases.

### Discussion

Body fluid cytology is an important and a commonly performed diagnostic test for various malignant and benign conditions. Effusions can be caused by inflammatory, benign; malignant and primary or metastatic diseases. Depending on the etiology, various types of cells such as inflammatory cells, mesothelial cells and malignant cells accumulate in serous effusions. Such conditions in effusions may show similar and overlapping features which mimic one

another both cytomorphologically and clinically. Such cases are diagnostic challenge for a cytopathologist in evaluating body cavity fluids is to distinguish reactive mesothelial cells from malignant cells. Cytological evaluation of fluids is a relatively simple, less invasive, rapid and inexpensive tool having a high accuracy with low incidence of false positive diagnosis.

A total of 142 effusions of pleural, peritoneal, pericardial, csf and cystic fluids were included in our study. The purpose of this study was to evaluate the significance of fluid cytology for various pathological conditions for malignancy and other pathological condition. Also to observe the common clinical presentation and compare it with fluid cytological findings and cytological diagnosis. We have included cases with good cellularity and cellular morphology. Apart from various body effusions few cystic fluids are also included in the present study. Cystic lesions like hepatic cyst, pancreatic cyst, ovarian cyst are also included in the study.

Pleural effusion was found to be the most common type of effusion followed by peritoneal effusion. There were 49 (34.5%) cases with pleural effusion, followed by 45 (31.7%) with peritoneal effusion, 17 (12%) with CSF, 2 (1.4%) with pericardial effusion. Out of 142 cases 29 were included in others which comprise cystic fluid from ovarian cystic fluid, hepatic cyst fluid, pancreatic cyst fluid etc. Among which ovarian cystic fluid was the common fluid.

#### **Distribution of Study Subjects According to Type of Fluid and Age**

Out of total 142 study subjects, pleural effusion, maximum i.e. 11 (22.45%) cases were in the age range of 50-60 years, followed by 10 (20.41%) in the range of 40-50 years, 8 patients in the age range 60-70 years. In

the peritoneal effusion category, 14 (31.11%) patients were in the age range of 40-50 years, 12 (26.67%) in the range 50-60 years, while 9 (20%) were in the range of 30-40 years. Two cases of pericardial effusion were in the age range of 40-50 years. In the CSF category, 5 (29.41%) patients were in the range 10-20 years, 4 (23.53%) in the range of 20-30 years, while 3 (17.65%) were in the range of 30-40 years and  $\leq 10$  years. Pleural effusion was found to be the most common type of effusion followed by peritoneal effusion. There were 49 (34.5%) cases with pleural effusion, followed by 45 (31.7%) with peritoneal effusion, 17 (12%) with CSF, 2 (1.4%) with pericardial effusion. Out of 142 cases 29 were included in others which comprises cystic fluid from ovarian cystic fluid, hepatic cyst fluid, pancreatic cyst fluid etc. Among which ovarian cystic fluid was the common fluid

The findings of our study were similar to findings of - **Mahajan S et al (2017)** <sup>(5)</sup> - Peritoneal fluid samples maximum numbers (41-50 years). Pleural fluid (61-70 years) **Shulbha VS et al (2015)** <sup>(6)</sup> - 31-40 years & 41-50 years. **Jadhav AB et al (2018)** <sup>(7)</sup> -Pleural fluid- (172 cases - 60.56%) followed by ascitic fluid (110 cases (38.73%), & then pericardial fluid (2 cases - 0.70%).

#### **Distribution of Study Subjects According to Sex**

Out of 142 total subjects there were 69 (48.6%) females and 73 (51.4%) males included in the study. Proportion of pleural effusion was more among males. This finding was similar to **Gojiya P et al (2017)** <sup>(8)</sup> found that 295 cases of pleural effusion evaluated in which 29% are female and 71% are male. While peritoneal effusion were found maximum 25 (55.6%) in females. In the CSF category, 10 (58.8%) were males. There was only 2 cases of pericardial effusion.

### Distribution of study subjects according to cytological finding and age

Out of 142 study subjects 97 (68.3%) cases with non-neoplastic finding on cytology, followed by 18 (12.7%) with suspicious malignancy, Neoplastic –(Benign-14 (9.9%) and Malignant - 13 (9.2%).

Non – neoplastic cases: Out of 97 non-neoplastic cases, 50 (51.5%) was chronic inflammation, followed by 16 (16.5%) with mixed inflammation, 14 (14.4%) with acute inflammation and 13 (13.4%) with reactive effusion. Eosinophilic effusion was found to be 3 (3.1). Only one case of candida was seen. The maximum cases found were of chronic inflammation in which tuberculosis was found in 4 cases of pleural effusion. Similar findings seen in **Biswas B et al (2016)** <sup>(9)</sup> revealed that chronic nonspecific pleuritis comprising 60% and 33.3% of the nonneoplastic cases respectively. Similarly **Jadhav AB et al** <sup>(7)</sup> found that Non-neoplastic etiology was reported in 165 (95.93%) cases and neoplastic etiology was reported only in 7 cases (4.06%). Similar findings were also seen in a study by **Gojiya P et al** <sup>(8)</sup> found that on cytological examination, 95% of pleural fluids were non-malignant, out of them 13% were acute inflammations and 11% effusions had reactive mesothelial cells.

Most common inflammation was found to be chronic inflammation consisting of 43 cases. All cases showed more than 80% lymphocytes. The lymphoid population showed heterogeneous mixture showing small or intermediate-sized lymphocytes and plasma cells mixed with other inflammatory cells. 4 cases showed epitheloid like cells and giant cells with a necrotic background. AFB was also positive. All 14 cases of neutrophilic effusion showed more than 85% of neutrophils. Few cases showed mixture of intact and

degenerated polymorphs. There were 3 cases of eosinophilic effusion all of which showed more than 20-30% of eosinophils in addition to other inflammatory cells. Similar finding were also seen in study done by **Rose E. Raskin** <sup>(10)</sup> et al 2010 who studied different type of inflammation.

### Cytomorphological features of effusion in Neoplastic cases:

Out of total 142 cases, 13 were diagnosed as malignant effusions. Among these 13 cases 10 were diagnosed as adenocarcinoma, 3 were diagnosed to be squamous cell carcinoma. 10 cases of adenocarcinoma revealed tumour cells organized predominantly in large three dimensional clusters. The cells were round to oval showing high N/C ratio. The nuclei were enlarged hyperchromatic with irregular border and prominent nucleoli. There was moderate to marked anisonucleosis. The cytoplasm was moderate to scanty and showed vacuolated cytoplasm. Few cases showed signet ring tumour cells against mucinous background. Occasionally tumour cells were arranged in acinar and papillary pattern. All the 13 cases who were diagnosed with malignant effusion were confirmed with histopathology.

There were three cases of Squamous cell lungs found in males in age group 45-60 in the present study. Study done by **Froudarakis** <sup>(11)</sup> explained that squamous cell carcinoma is the second most common type of lung malignancy causing malignant pleural effusion after adenocarcinoma. Out of total 142 cases, 18 cases were diagnosed as suspicious of malignancy. Histopathological correlation was done in 16 cases. Among those 16 cases commonest was malignant pleural effusion. 5 cases showed singly scattered cells and few cell clusters of round to oval with

hyperchromatic nuclei with inconspicuous nucleoli and regular nuclear contour. There was mild to moderate pleomorphism. Cytoplasm was moderate and showed vacuolation. N: C ratio was increased. These were highly suspicious of epithelial malignancy which further was confirmed with histopathology. Diagnosis of adenocarcinoma lungs was given with histopathological confirmation. 1 case of 54 yrs old female who was an operated case of MRM Rt breast presented with pleural effusion. The cytological examination of pleural fluid revealed sheets and clusters of monomorphic cells with irregular hyperchromatic nuclei with prominent nucleoli and moderate cytoplasm. Occasional mitosis was also seen. Previous breast biopsy was given as ductal malignancy. 1 case of pleural effusion showed discrete small clusters of round to polygonal cells, moderate to abundant cytoplasm having hyperchromatic nuclei with prominent nucleoli. There was high suspicious for malignancy. Diagnosis of squamous cell carcinoma lung was given after histopathological confirmation. In this study 1 case among malignant pleural effusion showed large clusters of atypical cells with knobby edges, low N/C ratio, Binucleation and multinucleation seen in few cells, hyperchromatic nuclei, large prominent nucleoli, condensed cytoplasm. Features were suggestive of epithelial malignancy. Diagnosis of malignant mesothelioma was given after histopathological confirmation.

Out of 18 suspicious cases 3 were of peritoneal cavity, which showed Clusters of round to oval cells with moderate cytoplasm having hyperchromatic nuclei with prominent nucleoli. There was anisonucleosis and pleomorphism. Features were highly suspicious of epithelial malignancy. Diagnosis of adenocarcinoma

was given on histopathology. On histopathology omental biopsy and gastric biopsy of the 2 cases also showed tumour deposits.

1 case of CSF showed large round Lymphoid cells with scanty deep blue cytoplasm, round nuclei having large prominent nucleoli. Patient was a 7 yrs male who was already a diagnosed case of acute lymphoblastic leukaemia on bone marrow biopsy. 2 cases out of 18 cases were ovarian cystic fluids which revealed Cluster of atypical glandular cells with hyperchromatic nuclei showing mild to moderate dysplasia, background showed mucinous material, features were highly suspicious of benign cystic lesion. On histopathology diagnosis of Benign cystadenoma was confirmed.

In our study, 4 cases of females between 40-60 years with clinical suspicion of endometrial cancer presented with malignant ascites. The peritoneal fluid showed clusters of tumor cells arranged in acinar pattern. On histopathology, diagnosis of adenocarcinoma was made. **Paul Ret al** <sup>(12)</sup> reported a similar case in a 51 years old female with malignant peritoneal effusion due to endometrial carcinoma. **M. MORRIS et al** <sup>(13)</sup> has presented three examples of non-invasive carcinoma of the endometrium initially displaying advanced intraperitoneal disease manifested by ascites.

Metastatic adenocarcinoma of stomach was diagnosed in 2 cases with peritoneal effusion. Both were female age ranging between 55-60 yrs. One case showed small clusters and scattered cells with large hyperchromatic nuclei, prominent nucleoli and mucin deposits in cytoplasm. Few cells showed single large cytoplasmic vacuole giving signet ring appearance. Cell block showed dysplastic cells. However on histopathology, it was diagnosed as mucinous adenocarcinoma stomach signet ring cell type. **Deirdre R. et al** <sup>(14)</sup> reported a



similar case of adenocarcinoma stomach with malignant peritoneal and pleural effusion. **Celina Ang et al**<sup>(15)</sup> reported a case of advanced gastric cancer in 42 yrs old male who developed abdominal discomfort, anorexia, and weight loss. Cytology of peritoneal washing revealed tumour cells. Gastric carcinoma was confirmed on histopathology.

One case of ovarian mass in a 53 year old female with peritoneal effusion showed clusters of round to oval tumor cells arranged in clusters, few seen in acinar pattern. The nuclei were hyperchromatic and cytoplasm and scanty. Some cells showed pleomorphic nuclei with cytoplasmic vacuoles. The background showed mucinous material. On cytology features were highly suggestive on malignancy. Cell block revealed dysplastic cells. It was diagnosed as seromucinous carcinoma on histopathology. Two cases of peritoneal effusion showed Clusters of atypical cells showing high N/C ratio with hyperchromatic nuclei showing prominent nucleoli & Vacuolated cytoplasm. few signet ring like cells also seen, Background revealed mucinous material. After histopathological confirmation diagnosis of mucinous adenocarcinoma was given. IHC was advised for further management and confirmation

In the present study, the commonest site of primary malignancy in malignant pleural effusion was lung and in malignant peritoneal effusion was ovary. The similar finding was seen in studies done by **Mahajan et al**<sup>5</sup>, **Gupta et al**<sup>(16)</sup>

#### **Most Common Morphological Pattern seen in Malignant Effusions**

In the present study, Out of 22 cases of malignant effusion the most common type of morphological pattern diagnosed on cytology was adenocarcinoma.

These findings was consistent with studies done **Jadhav et al**<sup>(7)</sup>, **Gupta et al**<sup>(16)</sup>

#### **Distribution of Cases According to Clinical Presentation**

##### **Pleural Effusion**

Breathlessness was the most common clinical presentation which was seen in majority of cases 53 (37.32%) with pleural effusion. Pleural effusion, 14 (28.57%) were diagnosed as malignant, followed by 12 (24.49%) as LRTI, 11 (22.45%) as congestive cardiac failure. The other diagnoses were in less than 10% cases. Patients of pleural effusion also presented with cough with or without expectoration 27 (19.01%) along with fever which was seen in 48(33.80%) cases Chest pain was also found in 8 (5.63%) cases. Similar clinical findings were observed by **Vinaya S et al 2012**<sup>(17)</sup> who also found that the common clinical presentation of pleural effusion were breathlessness, dry cough, chest pain.

##### **Peritoneal Effusion**

Most common clinical presentation observed in peritoneal effusion was distention of abdomen seen 20 (14.08%) cases. breathlessness, pain in abdomen, nausea, vomiting were also seen. Similar findings observed in study by **Maria Chiejina et al 2020**<sup>(18)</sup> 17 (37.78%) were diagnosed as liver cirrhosis, followed by 7 (15.56%) each with ascites and ovarian cystic mass, and 6 (13.33%) with malignancy.

##### **Cystic Fluids**

##### **Ovarian Cystic Fluids**

Patients who were clinically and radiologically diagnosed with ovarian cystic mass showed dysmenorrhea as a common clinical presentation with history of weight gain in 7(4.93%) cases. few cases also had oligomenorrhea and polymenorrhea. In post-

menopausal age group post-menopausal vaginal bleeding was found.

2 cases of hepatic cyst presented with pain in abdomen and generalised weakness and case of pancreatic cyst also appeared with pain in abdomen radiating to back with associated nausea and vomiting.

### **Malignant Effusion**

All the cases of malignant effusion showed similar clinical presentation. They presented with history of lethargy, loss of appetite and weight loss. Cases with malignant pleural effusion also complained of breathlessness and chest pain. Cases with malignant peritoneal effusion presented with abdominal pain.

### **Conclusion**

Cytological examination of body fluids is a commonly advised investigation performed both in cases of various neoplastic and non-neoplastic conditions. It is a simple, relatively non-invasive, therapeutic and prognostic technique.

It is a cost effective, quick and painless procedure with minimal side-effects that yields diagnostically significant results. Though histopathology, cell block and immunohistochemistry (IHC) are more efficient techniques, Fluid Cytology will still remain a routine investigation because it is cost-effectiveness, safety and rapid technique that yields quick results

It has few limitations like, at times it is difficult to differentiate reactive mesothelial cell from malignancy, in such cases histopathological studies are to be done.

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### Legend Figure

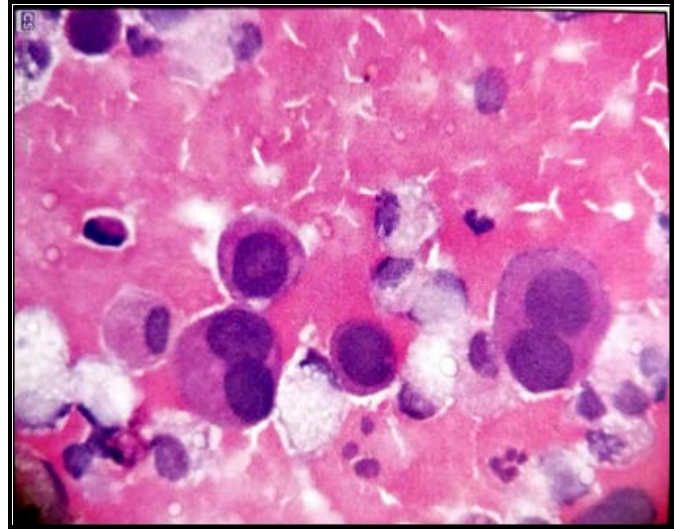


Figure 1: Photomicrograph of cytospin smear showing binucleated reactive mesothelial cell – Peritoneal fluid (H&E, 40X)

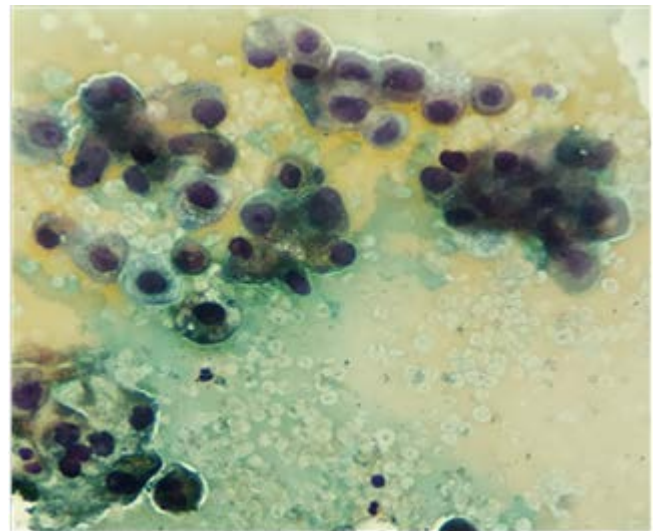


Figure 2: Photomicrograph showing clusters of tumour cells and few reactive mesothelial cells on cytospin – Pleural fluid (Pap stain, 40X)

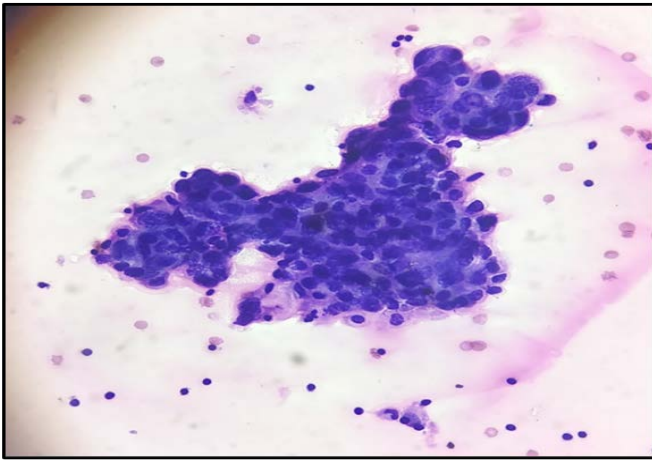


Figure 3: Photomicrograph showing malignant cells arranged in irregular sheets - Cyto-centrifuged smear of Pleural fluid (H&E, 40X)

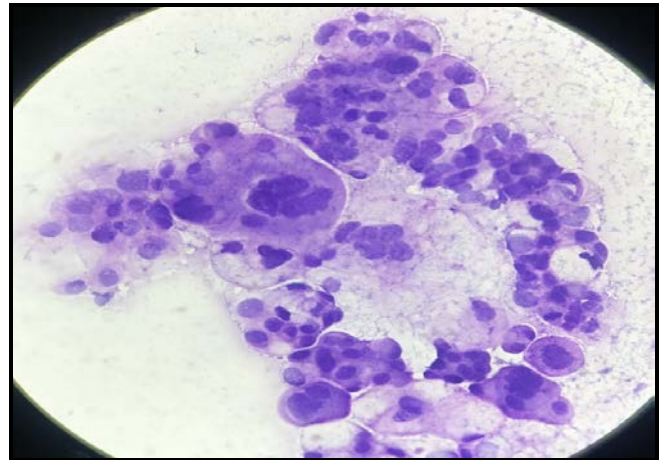


Figure 6: Photomicrograph showing deposits of Gastric adenocarcinoma carcinoma- Peritoneal fluid (H&E) 40X

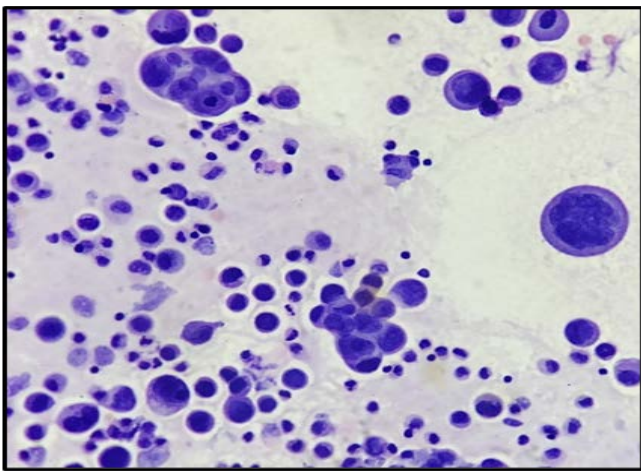


Figure 4: Photomicrograph showing deposits of adenocarcinoma carcinoma- Pleural fluid (H&E, 40X)

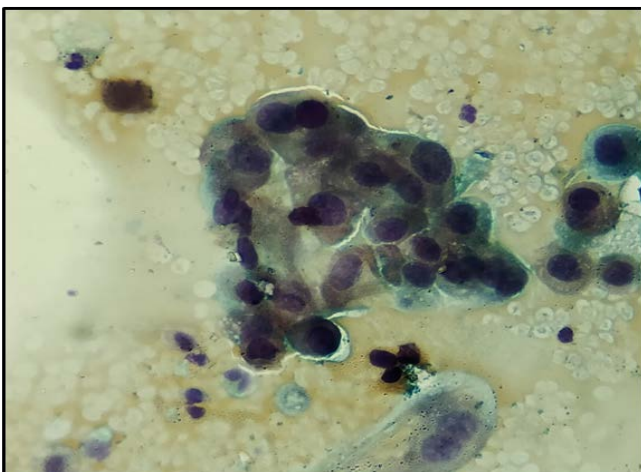


Figure 5: Photomicrograph showing clusters of tumour cells- Peritoneal fluid on cytopsin (Pap stain, 40X)