

Diagnostic Utility of Fluid Cytology in a Tertiary Care Hospital

Sonali Smita Xess¹, Vaishali Anand², Hansa M. Goswami³

¹Post-graduate Resident, ²Assistant Professor, ³Professor & Head, Department of Pathology, B. J. Medical College and Civil Hospital, Asarwa, Ahmedabad, Gujarat, India

Abstract

Introduction: Cytological examination of body fluids is an inexpensive and useful tool to assist in diagnosis of neoplastic and non-neoplastic lesions in the body, understanding course of a disease or monitoring response to therapy. The present study aims at studying the morphological spectrum of various body fluids received and processed at the Department of Cytopathology, B.J. Medical College, Ahmedabad, Gujarat. The study period is March 1, 2018 to February 28, 2019.

Material and Method: The fluid samples were received at the Department of Cytopathology. Cerebrospinal fluid and urine samples were processed by cytospin method and all other body fluids were centrifuged. The sediment separated from the above procedure was used in preparation of smears on glass slides with frosted ends and stained with Papanicolaou's, Hematoxylin and Eosin and May Grunwald Giemsa stains. The stained slides were then examined under binocular microscope and reported.

Result: The total number of body fluids received during the above mentioned study period was 491, out of which the most common aspirated fluid was Peritoneal fluid (51.73%), followed by Pleural fluid (34.22%), Broncho-alveolar lavage fluid (3.87%), Cerebrospinal fluid (3.46%), Nipple discharge fluid (3.26%), Urine (2.04%) and Ovarian cyst fluid (1.43%). Out of the total, 13 (2.65%) were reported as 'positive for malignancy' and 14 (2.85%) were reported as 'suspicious for malignancy', maximum being reported in peritoneal fluid. Adenocarcinoma was the most common malignancy in our study.

Conclusion: Fluid cytology is a rapid, effective and inexpensive method of diagnosis and evaluation, and it further helps in making clinical decision regarding management of the underlying pathology.

Key words: Neoplastic, Malignancy, Adenocarcinoma

Introduction

The history of serous effusion cytology can be tracked back to 19th century. Lucke and Klebs were apparently the first investigators who recognized the presence of malignant cells in an ascitic fluid in 1867. In 1882 Quinke was credited for detailed descriptions of ovarian and lung cancer cells in serous effusions.

Since that time reports on effusion cytology has started to appear in the medical literature, and serous effusion cytology now is a diagnostic procedure worldwide. ^[1]

The incidence of patients with effusion has increased in past few years. It has thus become mandatory to study the cytological features of the effusions and provide reliable results for the future treatment. ^[2,3,7] Cytological study of body fluids is an inexpensive and simple procedure useful in making diagnosis regarding etiology, understanding course of disease and to monitor the response to therapy. ^[4] It has helped in staging and prognosis of the malignant tumours and also gave information regarding various inflammatory lesions of serous membranes. ^[4] Thus, the number of samples

Corresponding author:

Dr. Sonali Smita Xess,

Postgraduate Resident of Pathology, B. J. Medical College and Civil Hospital, Asarwa, Ahmedabad 380016, Gujarat, India. E-mail: sonalimitaxess@gmail.com
Phone number: +917978994272, +919583778358

received in pathology lab is increasing. [5]

Body fluids are considered diagnostic rather than screening-type specimens in cytology. [6] The diagnostic pursuance of effusion cytology may be traceable to the fact that the cell population present is representative of large surface area. [5,7] The present study aims at looking into the cytology of various body fluids and classify into neoplastic and non-neoplastic types.

Material and Method

The fluid samples were received at the Department of Cytopathology and studied over the period of 1 year, March 1, 2018 to February 28, 2019. The age, sex, date and time of collection, relevant clinical history, volume, colour and clarity of the received fluid were documented. Cerebrospinal fluid and urine samples were processed by cytospin method (at 2500 rpm for 5 minutes) and all other body fluids were centrifuged (2000 rpm for 10 minutes). The sediment separated from the above procedure was used in preparation of smears on glass slides with frosted ends. The smears were fixed in alcohol which is followed by staining with Papanicolaou’s and Hematoxylin and Eosin stains. Air dried smears were stained with May Grunwald Giemsa stain. The stained slides were then examined under binocular microscope and reported.

Observation and Result

A total of 491 body fluids were studied in the given time period.

The most common aspirated fluid was Peritoneal fluid-254 (51.73%), followed by Pleural fluid-168 (34.22%), Broncho-alveolar lavage fluid-19 (3.87%), Cerebrospinal fluid-17 (3.46%), Nipple discharge fluid-16 (3.26%), Urine-10 (2.04%) and Ovarian cyst fluid-7 (1.43%) (Figure-1).

The number of males were 336 and the number of females were 155 (Table-1). Overall male to female ratio was 2.2:1. The maximum number of cases in male population were in the age group 41-50 (Table-2) and the maximum number of cases in female population were in the age group 51-60 (Table-3). The most common aspirated fluid in both male and female population was peritoneal fluid (Table-2, Table-3).

Out of the total, 13 (2.65%) body fluids were reported as ‘Positive for malignancy’ and 14 (2.85%) were reported as ‘Suspicious for malignancy’. The maximum number of malignancies was reported in peritoneal fluid (Table-4).

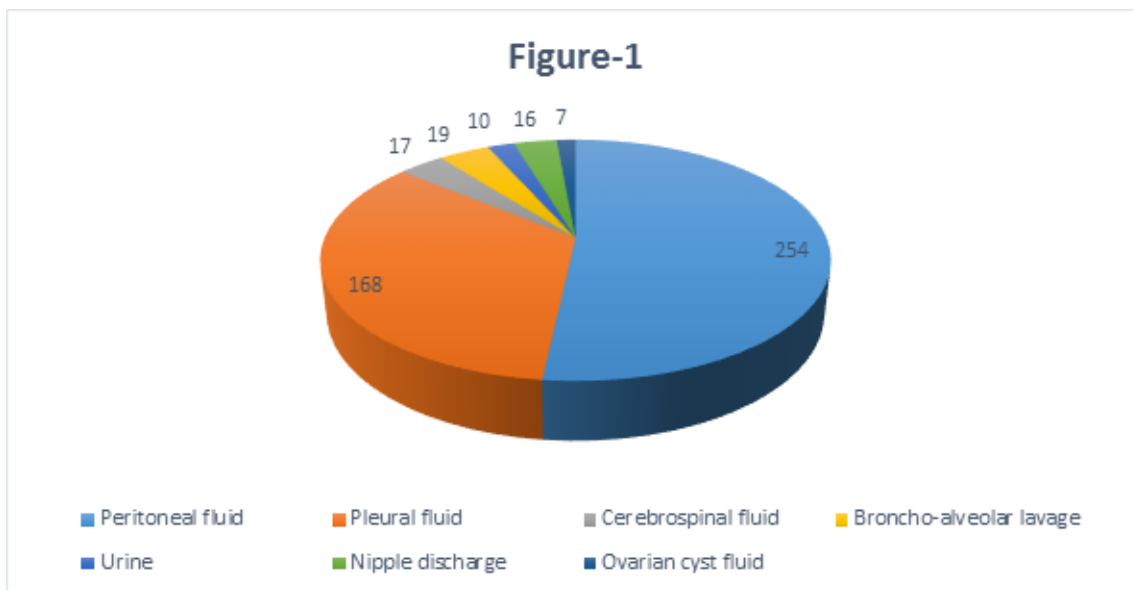


Figure 1: Distribution of cases according to the type of fluid

Table-1: Distribution of cases according to gender

Sex	Pleural	Peritoneal	Cerebrospinal fluid	Broncho-alveolar lavage fluid	Urine	Nipple discharge	Ovarian cyst	Total
Male	120	183	11	15	7	0	-	336
Female	48	71	6	4	3	16	7	155

Table-2: Distribution of cases according to age in male population.

Age	Pleural	Peritoneal	Cerebrospinal fluid	Broncho-alveolar lavage fluid	Urine	Nipple discharge	Total
0-10	0	1	2	0	1	0	4
11-20	2	4	3	0	0	0	9
21-30	9	8	2	0	0	0	19
31-40	23	50	0	2	0	0	75
41-50	30	52	0	2	0	0	84
51-60	33	38	2	7	3	0	83
61-70	14	18	2	3	2	0	39
71-80	7	12	0	1	1	0	21
81-90	2	0	0	0	0	0	2
Total	120	183	11	15	7	0	336

Table-3: Distribution of cases according to age in female population

Age	Pleural	Peritoneal	Cerebrospinal fluid	Broncho-alveolar lavage fluid	Urine	Nipple discharge	Ovarian cyst	Total
0-10	0	0	2	0	0	0	0	2
11-20	4	5	0	0	0	0	0	9
21-30	9	7	3	0	0	3	2	24
31-40	2	11	0	2	2	6	1	24
41-50	6	17	0	0	0	4	3	30
51-60	14	14	1	2	1	1	0	33
61-70	8	10	0	0	0	2	1	21
71-80	3	7	0	0	0	0	0	10
81-90	2	0	0	0	0	0	0	2
Total	48	71	6	4	3	16	7	155

Table-4: Number of cases reported as ‘positive for malignancy’ and ‘suspicious for malignancy’

	Pleural	Peritoneal	Cerebrospinal fluid	Broncho-alveolar lavage fluid	Urine	Nipple discharge	Ovarian cyst	Total
Positive for malignancy	3	5	0	2	1	2	0	13
Suspicious for malignancy	3	7	1	1	1	1	0	14
Total	6	12	1	3	2	3	0	27

Discussion

In our study out of the total of 491 maximum cases were of peritoneal fluid followed by pleural fluid. Males were more as compared to females. Similar findings were observed in other studies. [4,7-9] Maximum number of cases in males were found in the age group of 41-50 years and in females were found in the age group of 51-60 years. Overall, maximum number of cases were observed in the age group of 51-60 years followed by 41-50 years. This finding is dissimilar to other studies. [4,7-9]

Majority of fluids in our study were found to be non suppurative. Similar pattern was observed by other authors. [2,4,7] Majority of non neoplastic fluids including pleural, peritoneal and cerebrospinal fluid showed lymphocytic predominance. Gupta et al [4] reported a similar finding in their study. Most of the fluids obtained through nipple discharge which were reported as non-neoplastic, showed presence of cystic macrophages over proteinaceous background. Similar finding was observed by Shirish Chandanwale et al and Paulo Mendoza et al in their studies. [10,11]

No atypical or malignant cells were observed in smears prepared from ovarian cyst fluids. In another study, out of total 459, Zhou AG et al reported 90.6% of all ovarian cyst fluids as benign, 7% as atypical, 0.9% as suspicious and 7% as malignant. [12] The neoplastic or non-neoplastic nature for each of the ovarian cyst, undertaken in our study, was confirmed by histopathological examination. Out of the total 7, on histopathology, 4(57.1%) were reported as Benign serous cystadenoma of ovary, 1(14.3%) was reported as Mature cystic teratoma of ovary, 1(14.3%) was reported as Mucinous cystadenoma of ovary and 1(14.3%) was reported as Simple hemorrhagic cyst of ovary. Thus, 6(85.7%) out of total 7 were found to be neoplastic

(benign) and 1(14.3%) was found to be non-neoplastic on histopathologic examination, Benign serous cystadenoma being the most common benign ovarian neoplasm. It was found to be the most common benign ovarian neoplasm in another study also. [13]

Reactive mesothelial cells were observed in 26 (5.2%) fluid samples. Gupta R et al. in their study reported 4% of non neoplastic effusions demonstrating reactive changes in mesothelial cells. [4] In 1 out of the 26 fluid samples mentioned above, reactive mesothelial cells was recorded as a finding besides presence of malignant cells. In 2 out of the 26 fluid samples mentioned above, reactive mesothelial cells was recorded as a finding besides presence of cells suspicious of malignancy.

13 out of total 491 fluid samples were reported as positive for malignancy. 14 out of the total 491 fluid samples were reported as suspicious for malignancy (Table 4). Most common malignancy observed in our study was adenocarcinoma which is in concordance with other studies. [7,8,14] Adenocarcinoma was the most common malignancy in both peritoneal and pleural fluids. Findings from other studies [3,7] show pleural fluid to be having the highest proportion of positivity for malignant cells. This is in contrast to the finding in our study which shows peritoneal fluid to be having the highest proportion of positivity for malignant cells (Table 4). Majority of the malignant effusions (positive as well as suspicious for malignancy) were haemorrhagic effusion. Similar finding is found in other studies [4,15]

Conclusion

Cytological examination of body fluids is a simple, safe, effective and inexpensive diagnostic procedure. It is an asset to both pathologists and clinicians to study the underlying pathology of a disease and hence, helps in further management of the disease in a cost effective

manner.

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