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CYTOLOGICAL AND ANALYTICAL STUDY OF PLEURAL, ASCITIC & PERICARDIAL EFFUSIONS : ONE YEAR STUDY AT TERTIARY CARE HOSPITAL IN WESTERN MAHARASHTRA.

Pathology

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ABSTRACT

Background : Cytological analyses of body effusions plays an important role in the diagnosis of various lesions.
Material & Methods : A retrospective study for one year duration from Jan 2016 to Dec 2016 was undertaken in the Department of Pathology. It includes all samples of pleural, ascitic & pericardial fluid received in cytology section.
Results : Cytological analysis was done on all 284 cases of effusion fluids. Pleural fluid was the most common type of fluid received followed by ascitic & pericardial fluids. Maximum number of cases were transudates in nature. 257 cases were non neoplastic & 27 were neoplastic. Adenocarcinoma was the most common morphological pattern.
Conclusion : Cytological study of body fluids is an inexpensive & simple procedure, useful in studying the etiology, course of disease and also to monitor the response to the therapy

KEYWORDS

Pleural fluid , Ascitic fluid, Pericardial fluid

Introduction :
Cytological analyses of effusions or body fluids play an important role in the diagnosis of various lesions. It gives a significant contribution in cancer research and staging of various tumors.[1] Most commonly analysed fluids are pleural, ascitic, rarely pericardial and synovial. The differentiation of transudates and exudates is the first step in the analysis of effusions as it often gives an indication of the underlying pathophysiological process, the differential diagnosis and the need for further investigation. The most important goal of body fluid cytology is the detection of malignant cells. Apart from this, fluid examination may also reveal information about inflammatory conditions of serous membranes, adjacent viscera, infections with bacteria, fungi or viruses and parasitic infestation.[2] Although the tumors often shed abundant malignant cells, singly and in clusters, the interpretation of malignancy is much more difficult in body fluid than in any other cytologic media because of the exuberant proliferation of cells within the fluids.[3]

The present study aims to categorize effusions into non neoplastic and neoplastic type and to understand cytology of pleural , ascitic fluid & pericardial effusions.

Material & Methods :
The present study is a retrospective study between January 2016 to December 2016, carried out in the Department of Pathology, Smt Kashibai Navale Medical college & General Hospital Pune Maharashtra .The study includes all samples of pleural, Ascitic & pericardial fluids received in cytology section of pathology department. These fluids were analysed for physical properties like the volume, colour and viscosity. Later, these fluids were cytocentrifuged at 3000rpm for five minutes by using Thermo Scientific SHANDON Cytospin 4. Effusions having protein level less than 3 gm% were classified as Transudates and effusions having protein level more than 3 gm% were classified as exudates. Smears were prepared from sediment and stained with Hematoxylin and Eosin as well as Leishman stains and analysed.

Results : -
Cytological analysis was done on 284 cases of effusion fluids. The male to female ratio of these fluid specimens was 1.4:1 . Maximum number of samples received were between 41 – 50 yrs of age group.

Table No. 1 : Gender wise distribution of body effusions

Sex	No of cases
Female	116 (40.84%)
Male	168 (59.16%)
TOTAL	**284 (100%)**

Table No. 2 : Distribution of cases according to age groups

Age group	No. of cases
0-10	0
11-20	7
21-30	41
31-40	44
41-50	**64**
51-60	55
61-70	54
71-80	17
81-90	2
>90	0
Total	**284**

Pleural fluid was the most common type of fluid received (172 cases-60.56%) followed by ascitic fluid (110 cases (38.73%), & then pericardial fluid (2 cases-0.70%). Most i.e. 165 (94.1%) cases of pleural fluid and 89 (80.90%)cases of ascitic fluid had non neoplastic etiology. Out of total 284 cases of effusions only 27 cases(9.50%) had neoplastic etiology. Out of 284 cases of body fluids ,total 179 cases (63.03%) were transudates in nature and 105 cases (36.97%) were exudates in nature.

Table No. 3 : Distribution of various types of effusions

Type of effusion	No of cases
Pleural fluid	172(60.56%)
Ascitic fluid	110 (38.73%)
Pericardial fluid	2(0.70%)
Total	**284 (100%)**

Table No.4 : Distribution of cases into Nonneoplastic and Neoplastic effusions

Type of effusion	Pleural	Ascitic	Pericardial
Non-neoplastic	165 (95.93%)	91 (82.73%)	1 (50%)
Neoplastic	7 (4.07%)	19 (17.27%)	1 (50%)
Total	**172 (100%)**	**110 (100%)**	**2 (100%)**

Table No.5: Distribution of cases according to biochemical properties

Type of effusion	Transudate (%)	Exudate (%)	Total (%)
Pleural fluid	94 (54.65%)	78 (45.35%)	172(60.56%)
Ascitic fluid	85 (77.27%)	25 (22.73%)	110(38.73%)
Pericardial fluid	0	2 (100%)	2 (0.70%)
Total	**179 (63.03 %)**	**105 (36.97 %)**	**284 (100 %)**

Out of total 172 pleural effusions chronic nonspecific inflammation was accounted for 160 cases (93.02%) which showed predominantly a chronic inflammatory infiltrate composed of lymphocytes and macrophages. This was followed by acute suppurative inflammation (3 cases-1.74%). Tuberculous inflammatory lesions with caseous necrosis, lymphocytic infiltrate and occasional epitheloid granulomas was reported in only 2 cases (1.16%). Out of 172 cases of pleural fluid 94 were transudates & 78 were exudates in nature. Neoplastic etiology was reported only in 7cases (4.06%) out of 172 pleural fluid samples. All of these were microscopically reported as adenocarcinoma. Ascitic fluid cytological analysis also revealed that chronic inflammation as the most common pathology in 91 of cases (82.72%). It includes 85 cases of transudates & 25 cases of exudates. 19 cases (17.27%) out of 110 ascitic fluids were positive for malignancy. All of them were microscopically adenocarcinomas. (Fig 1).

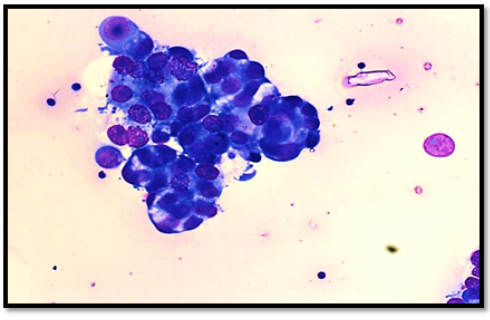

Fig 1 : Microphotograph showing metastatic deposits of a signet ring adenocarcinoma in Ascitic fluid (400x).

Only 2 pericardial effusion fluids were received during this study period. In both cases the fluid was exudative nature. One of this was reported as positive for malignancy & it showed features of poorly differentiated carcinoma. (Fig 2)

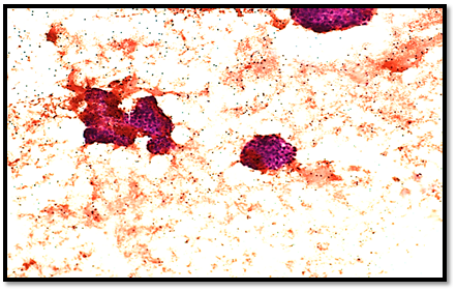

Fig 2 : Microphotograph showing poorly differentiated carcinoma in pericardial fluid (400x)

Cytological examination of benign effusions showed singly scattered as well as sheets of reactive mesothelial cells with clear spaces or windows in between them, scattered among macrophages and inflammatory cells. In malignant effusions, three dimensional balls, aggregates forming gland like structures with lumen, and papillary structures were commonly observed .

Table No. 6: Distribution of cases according to diagnosis

Types	Pleural fluid		Ascitic fluid		Pericardial fluid
Nonneoplastic	Chronic nonspecific inflammation	160	Chronic nonspecific inflammation	91	1 Case
	Acute Inflammation	3	Acute Inflammation	**0**	
	TB	2	TB	**0**	
	Total	**165**	**Total**	**91**	
Neoplastic	**7**		**19**		**1 Case**
Total	**172**		**110**		**2**

Discussion :

Cytological examination of serous effusions have been done for nearly a century in the diagnosis of malignancy and eventually in the detection of primary lesions. It has helped for staging and prognosis of the malignant tumors and also gave information regarding various inflammatory lesions of serous membranes.[4] It has gained increased acceptance to such an extent that a positive diagnosis was often considered as a definitive diagnosis. [5]

Cytological study of body effusions is a complete diagnostic modality which aims at pointing out the etiology of effusion as well as in certain cases a means of prognostication of the disease process. The diagnostic performance of the cytologic study of the fluid may be attributable to the fact that the cell population present in sediment is representative of a much larger surface area than that obtained by needle biopsy. [6,7]

Non- neoplastic effusions were more common than neoplastic effusions. Priavadhana et al[1] & Shulbha et al [8] also showed similar findings.Chronic inflammation was most common cause of non-neoplastic effusions both in the pleural fluid and ascitic fluid. These lesions had predominantly lymphocytic infiltrate in 90% of cases with 10% having a combination of both lymphocytes, mesothelial cells and histiocytic infiltrate.In the present study pleural effusion was the most common effusion sent for analysis i.e. 60.56% which is similar to study conducted by Kumavat et al[2] & Priavadhana et al[1] (57.27% & 50% respectively) In the present study of effusion analysis, male population was more predominant & comprised of 59.15% than females (40.85%). This is similar to the study done by Priavadhana et al [1] , Shulbha et al [8] & Chakrabarti et al [9] In our study maximum number of cases were in the range of 41-50yrs , followed by 51-60yrs. However Shulbha et al [8] reported 31-40 years as the most common age group followed by 41-50 years. In this study more number of cases were transudate 179 (63.03 %) in nature & 105 (36.97 %) cases were exudate, which was in concordance with the finding of Shulbha et al[8] & Chakrabarti et. al.[9]Tuberculous serous effusions have been reported to be the most common cause of exudates in pleural fluid analysis in a study conducted by Kumavat et al [2]. They reported 57% of cases to be of tuberculous origin. However , in this study, tuberculous effusions were detected only in 1.16% of pleural fluids. According to Kushwaha et al [10], Moreno et al [11], Sherwani et al [12] methods like cell counts, acid fast stain help in clinching the diagnosis . We also diagnosed tuberculous effusions on 20% ZN staining which showed beaded slender acid fast bacilli .

Conclusion :

Cytological study of body fluids is an inexpensive and simple procedure useful in finding the etiology and understanding course of disease.

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