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Analytical and Cytological Study of Effusions

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Abstract
Background: *Cytological analyses of effusions or body fluids play an important role in the diagnosis of various lesions. Most importantly it gives a significant contribution in cancer research and staging of various tumors. Most commonly analysed fluids are pleural, ascitic, pericardial and occasionally peritoneal fluid/wash.*
Materials and Methods: *A retrospective study for one year duration from August 2014 to August 2015 was conducted in the Department of Pathology, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu. All the body fluids which came for cytological analysis are included in the study. These fluids were analysed for physical properties like the volume of fluid received, colour and odour. Smears made from these fluids were stained with Papanicolaou stain and Hematoxylin and Eosin Stains and evaluated.*
Results: *Cytological analysis was done on 60 cases. Non neoplastic lesions were the predominant diagnosis given in both pleural fluid analysis (93%) and ascitic fluid analysis (83%). Neoplastic lesions were reported only in 7% of cases in pleural fluid and in 17% of cases in ascitic fluid analysis. Tuberculous inflammatory lesions with caseation necrosis, lymphocytic infiltrate and occasional epitheloid granulomas was reported in 3 cases (10%).*
Conclusion:*This study showed that meticulous evaluation of the body fluids for their cytological, properties will help the clinicians in clinching the diagnosis as well as staging of tumors.*
Keywords: *body fluids, reactive mesothelial cells, tuberculous peritonitis*

I. Introduction

Cytological analyses of effusions or body fluids play an important role in the diagnosis of various lesions. Most importantly it gives a significant contribution in cancer research and staging of various tumors. Most commonly analysed fluids are pleural, ascitic, pericardial and occasionally peritoneal fluid/wash. Other than these, bronchial wash/aspirates are also used as methods of early diagnosis as well as staging of lung tumors.

II. Materials And Methods

The study was conducted in the Department of Pathology, Sree Balaji Medical College and Hospital, Chennai. It was a retrospective study for one year duration from August 2014 to August 2015. All the body fluids which came for cytological analysis are included in the study. These fluids were analysed for physical properties like the volume of fluid received, colour and odour. Later, these fluids are centrifuged at 2000rpm for five minutes and the sediment is made into a smear and stained with Papanicolaou stain and Hematoxylin and Eosin stains. Routinely cell blocks are also made from the sediments and stained with Hematoxylin and Eosin stains.

III. Results

Cytological analysis was done on 60 cases of body fluids. The male to female ratio of these fluid specimens was 2:1***CHART 1***. The most common specimen was pleural fluid with 30 cases (50%). The second most common fluid which was sent for pathological analysis was ascitic fluid with 13 cases (22%). The other fluids which were analysed in this study are synovial fluid (8%), peritoneal fluid / wash (3%), pericardial fluid (2%) and ovarian cyst aspirates (3%). The other samples which were less frequently received are urine, sputum, nipple discharges and endometrial aspirates***CHART 2***.

Non neoplastic lesions were the predominant diagnosis given in both pleural fluid analysis (93%)and ascitic fluid analysis (83%). Neoplastic lesions were reported only in 7% of cases in pleural fluid and in 17% of cases in ascitic fluid analysis.

The most common pathology reported in pleural fluid analysis was chronic inflammation [***FIG 1***] (53%) which had predominantly a chronic inflammatory infiltrate composed of lymphocytes and macrophages. The next common lesion which was reported was acute suppurative inflammation (17%). Tuberculous inflammatory lesions with caseation necrosis, lymphocytic infiltrate and occasional epitheloid granulomas [***FIG 2***] was reported in 3 cases (10%). Reactive mesothelial cells with no pathology was seen in 2 cases [***FIG 3,4***]

(7%). Malignancy of adenocarcinoma type was reported in 2 cases (7%) [***FIG 5,6A,6B,6C*]*CHART 3 AND CHART 4.*** Immunohistochemical analysis using Pan Cytokeratin was done in the fluids positive for malignant cells. This showed that CK is strongly positive in a membranous pattern in the adenocarcinomatous tumor cells. [***FIG 7A & 7B*]**

Ascitic fluid cytological analysis also revealed that chronic inflammation as the most common pathology in 46% of cases. 23% of cases showed only reactive mesothelial cells with no pathology. Adenocarcinoma was reported in 2 (15%) cases. One of the cases showed only cyst macrophages***CHART 5 AND CHART 6.***

IV. Discussion

Effusion fluid analysis is a relatively simple and easy method of diagnosing various clinical conditions like tuberculosis and in staging of malignancies[1,2](Archana Josh et al 2014). Non- neoplastic analytical reports were the most common compared to the neoplastic reports. Most common non- neoplastic lesion is chronic inflammation both in the pleural fluid and ascitic fluid. These lesions had a predominantly lymphocytic infitrate in 90% of cases with 10% having a combination of both lymphocytes and histiocytic infiltrate. These chronic inflammatory exudates are caused by mostly infection of the organs enclosed by the serosal membranes or occasionally by tumors of these organs. Hence, those cases reported as chronic inflammation need a repeat sample analysis atleast for three consecutive times to exclude a suspicion of malignancy[3](Jha R et al 2006).

Reactive mesothelial cells were seen in two cases of pleural fluid and three cases of ascitic fluid. These were close mimickers of malignancy.

Distinction was made on the basis of the cytological features of monolayered and two dimensional clusters and singles of mesothelial cells in contrast to the large, papillary three dimensional clusters of adenocarcinomas4,5 (Karoo RS et al 2003, Koss L.G 2006). Also, small groups of mesothelial cells exhibit the typical "window" between two mesothelial cells due to the brush border villi seen in them. Also, abnormal mitosis in these cells warrants a careful study to rule out an underlying malignancy5 (Koss L.G 2006).

Studies have shown that special stains can be used to distinguish reactive mesothelial cells from adenocarcinoma deposits. Periodic acid Schiff stain can be used to demonstrate the PAS positive granules in the cytoplasm of the mesothelial cells and a diffuse red blush only occasionally in the malignant cells. Another stain which is useful for diagnosis is the mucin stain mucicarmine, which shows positivity only in adenocarcinoma and never in mesothelial cells[5](Koss L.G 2006).

Immunohistochemistry can also be used to distinguish the reactive mesothelial cells and adenocarcinoma. The panel of markers used are desmin, cytokeratin and calretinin. Desmin and calretinin are positive in mesothelial cells and cytokeratin is positive in adenocarcinoma cells.

In a study conducted by Kumavat et al[6]on 550 cases observed that pleural fluid is the most common fluid sent for analysis (57.27%) similar to this study which showed that 50% of cases are pleural fluids.

In the same study, malignancy was reported in 38 cases out of 550 cases analysed (41.3%)[2]. In this study, malignancy was detected in 17% of cases in pleural fluid and in 7% of cases in ascitic fluid totally amounting to 24% of malignancies detected.

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 2013[6]. They reported 57% of cases to be of tuberculous origin. In this study, it is observed that, tuberculous effusions are less commonly detected only in 10% of pleural fluids. Hence, ancillary studies like cell counts, acid fast stain help in clinching the diagnosis[7,8,9] (Kushwaha R 2008, Moreno MJ et al 2000, Sherwani R et al 2006).

References

[1]. Archana Josh, Nidhi Mahajan, Karmarkar J, S.D.Mahore. Diagnostic utility of various techniques used in body fluid cytology. IOSR Journal of Dental and Medical Sciences. 2014; 13: 2279-0861

[2]. James W Reagan. Exfoliative cytology of pleural, peritoneal and pericardial fluids. Cytology series. 153-160

[3]. Jha R, Shrestha HG, Sayami G, Pradhan SB. Study of effusion cytology in patients with simultaneous malignancy and ascites. Kathmandu University Medical Journal 2006; 4 (16): 483-487

[4]. Karoo RS, Llyod TDR, Garcea G, Redway HD, Robertson GSR. How valuable is ascitic fluid cytology in detection and management of malignancy. Post graduate medical journal. 2003; 79: 292-299

[5]. Koss L.G. — Diagnostic Cytology and its Histological Basis.5th ed. Philadelphia:JB Lippincot; 2006.

[6]. Kumavat PV, Kulkarni MP, Sulhyan KR et al. Cytological study of effusions: Indian Medical Gazette. 2013:306

[7]. Kushwaha R., Shasikala P., Hiremanath S., BasavrajH.G.. Cells in pleural fluid and their value in differential and diagnosis. Journal of Cytology. 2008; 24(4):138-143

[8]. Moreno MJ, Clayburne G, Schumacher HR. Processing of noninflammatory synovial fluids with hyaluronidase for cytospin preparations improves the accuracy of differential counts. Diagn Cytopathol. 2000; 22:256-58.

[9]. Sherwani R, Akhtar K, Abrari A, Hajra S. Pleural effusion cytology as an aid in the diagnosis of pulmonary tuberculosis. J Cytol. 2006; 23:123-27.

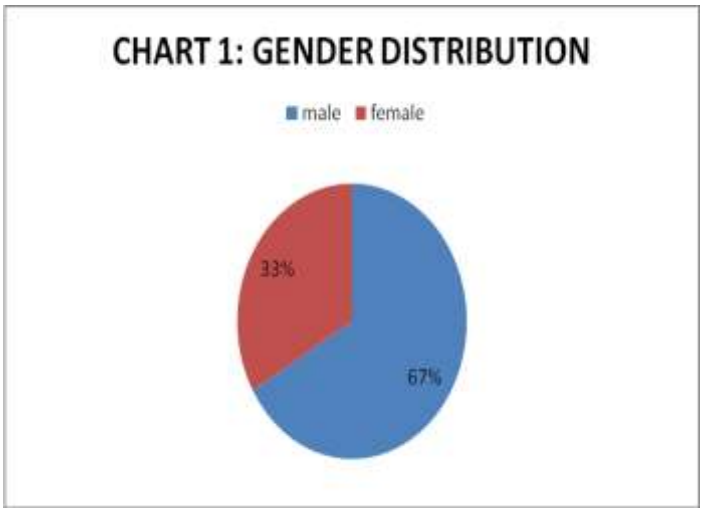
CHART 1: GENDER DISTRIBUTION
male
female
33%
67%

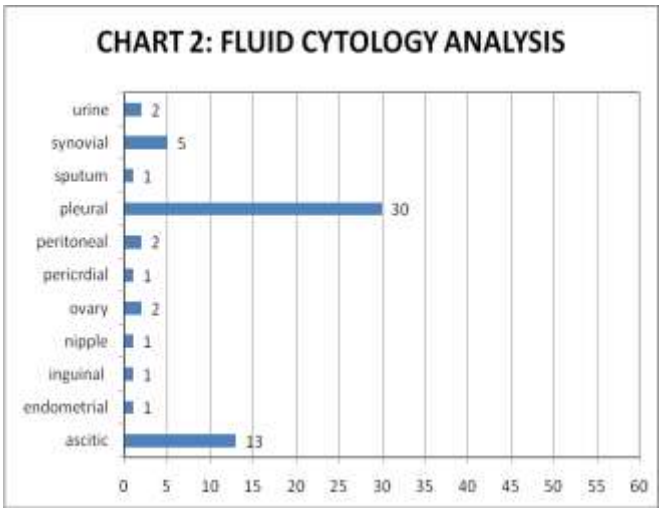
CHART 2: FLUID CYTOLOGY ANALYSIS
urine 2
synovial 5
sputum 1
pleural 30
peritoneal 2
pericrdial 1
ovary 2
nipple 1
inguinal 1
endometrial 1
ascitic 13
0 5 10 15 20 25 30 35 40 45 50 55 60

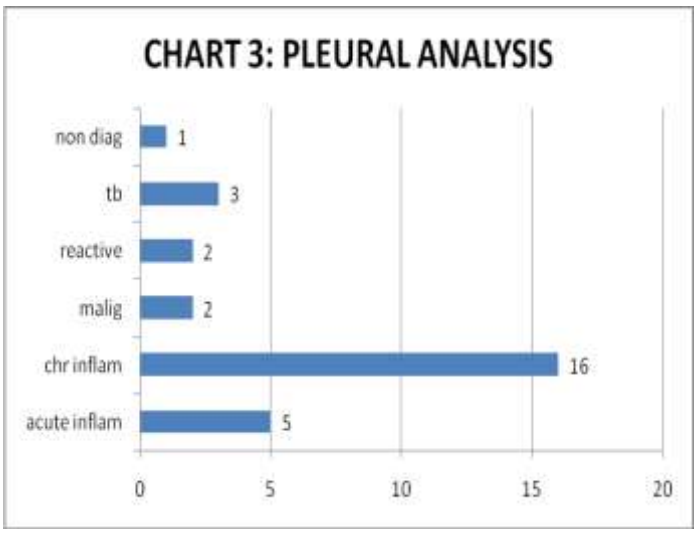
CHART 3: PLEURAL ANALYSIS
non diag 1
tb 3
reactive 2
malig 2
chr inflam 16
acute inflam 5
0 5 10 15 20

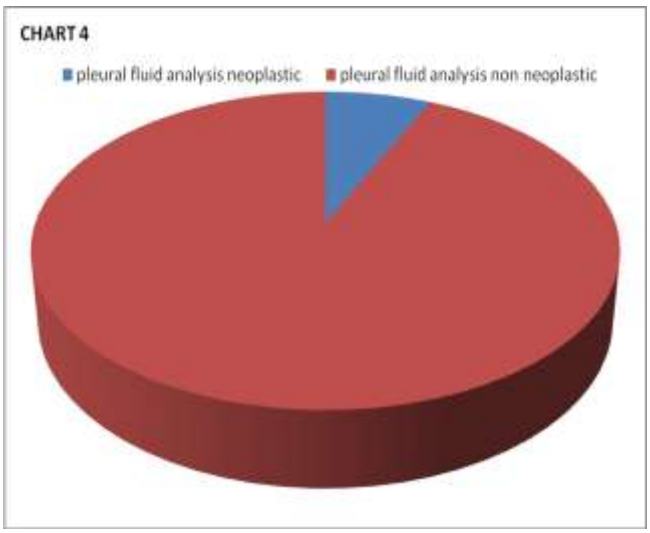
CHART 4
pleural fluid analysis neoplastic
pleural fluid analysis non neoplastic

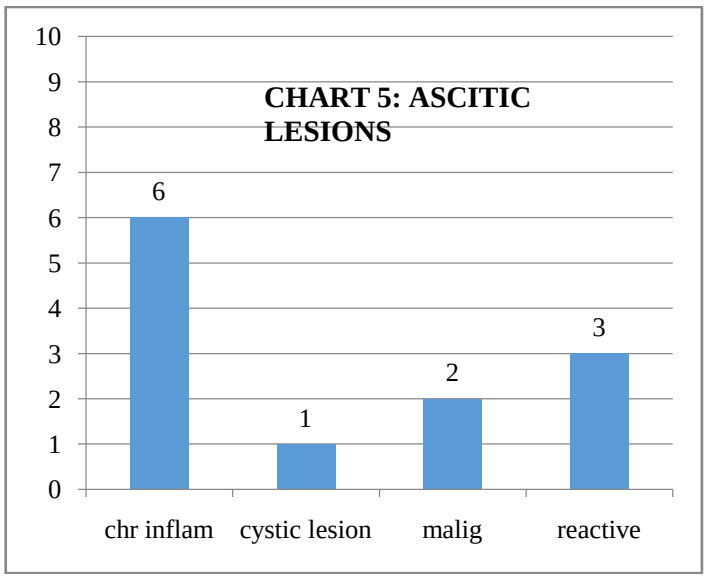
CHART 5: ASCITIC LESIONS
10 9 8 7 6 5 4 3 2 1 0
6
1
2
3
chr inflam
cystic lesion
malig
reactive

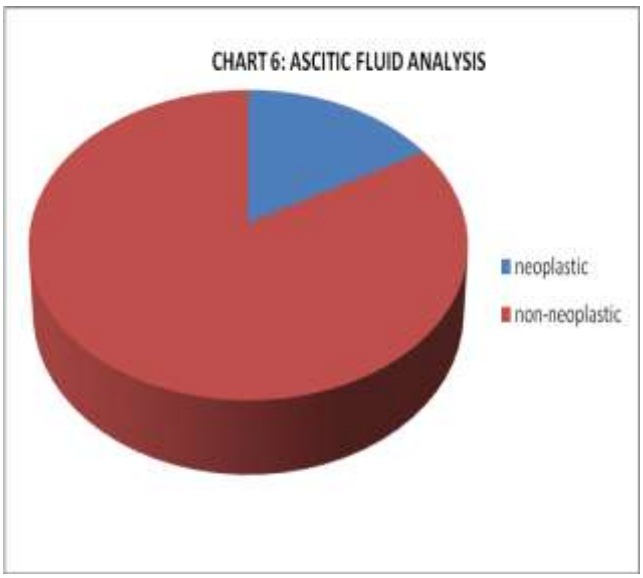
CHART 6: ASCITIC FLUID ANALYSIS
neoplastic
non-neoplastic

FIG 1

Fig 1: High Power View 400x of Acute On Chronic Inflammatory Lesion with Neutrophils And Lymphocytes in a Serofibrinous Background

FIG 2

Fig 2: High Power View 400x of Tuberculous Effusion with A Degenerated Epitheloid Granuloma

FIG 3

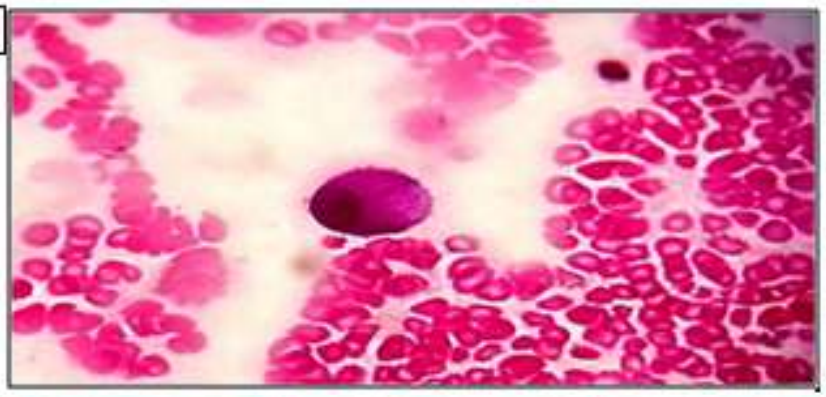

FIG 4

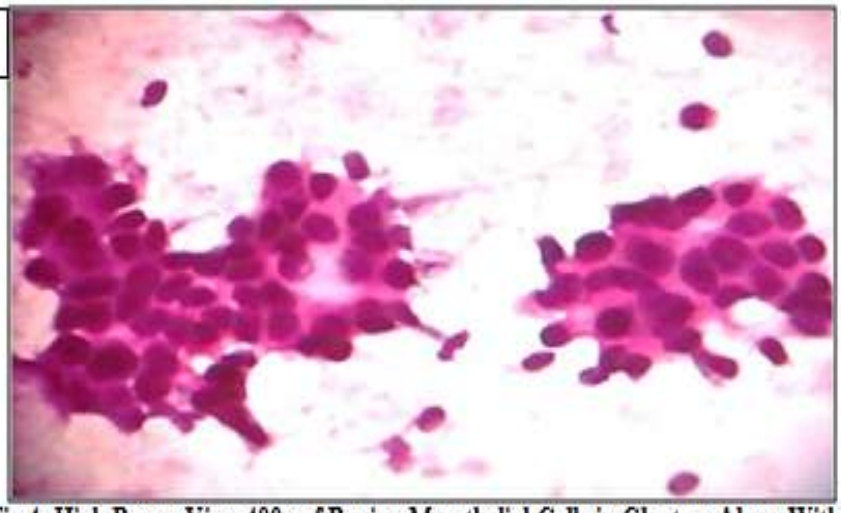

Fig 3 and Fig 4: High Power View 400x of Benign Mesothelial Cells in Clusters Along With Histiocytes

FIG 5

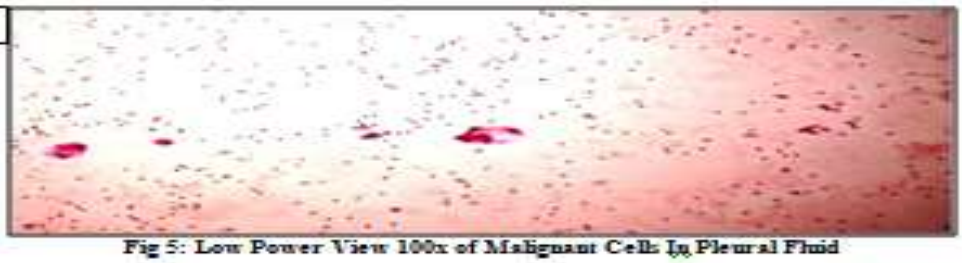

Fig 5: Low Power View 100x of Malignant Cells In Pleural Fluid

FIG 6A

FIG 6B

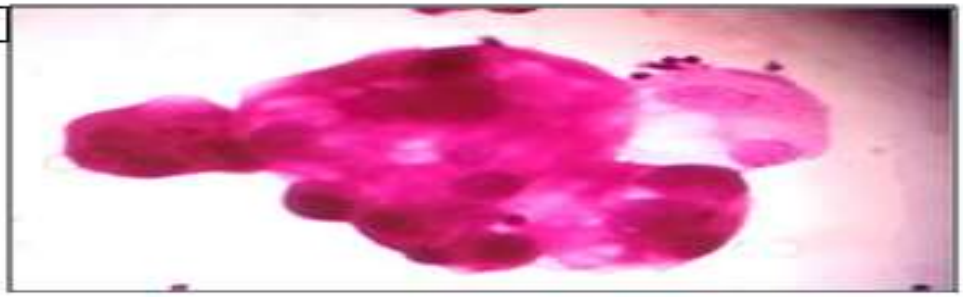

FIG 6C

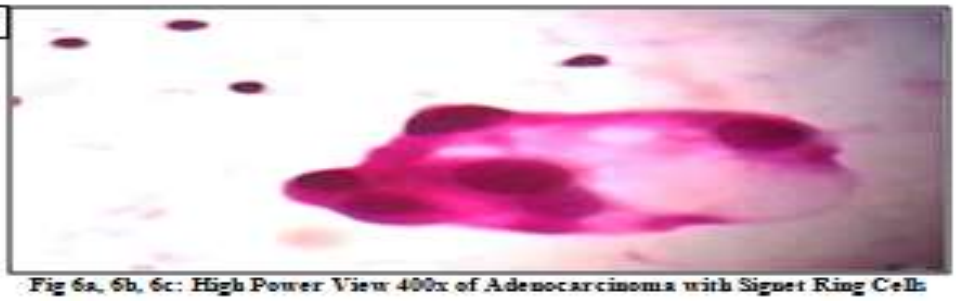

Fig 6a, 6b, 6c: High Power View 400x of Adenocarcinoma with Signet Ring Cells

FIG 7A

FIG 7B

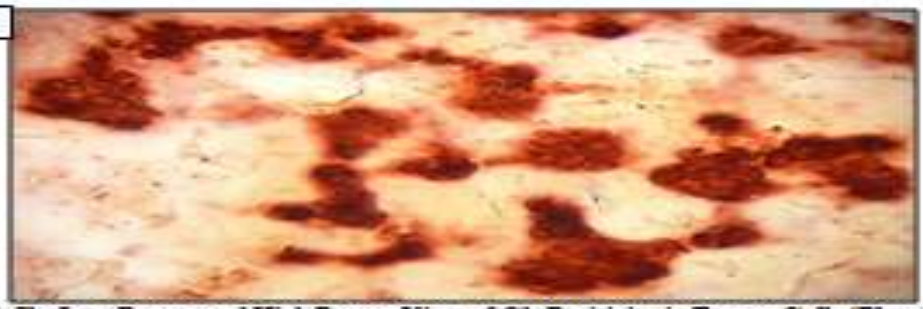

Fig 7a & 7b: Low Power and High Power View of Ck Positivity in Tumor Cells (Pleural Fluid)