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Original Article

A Prospective Study on Cytological Analysis of Pleural, Ascitic & Pericardial Effusions in a Tertiary Care Teaching Hospital

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ABSTRACT

Background: *In the diagnosis of various lesions, cytological analyses of effusions play an important role. It contributes in cancer research and staging of various tumors.1 Pleural, ascitic, pericardial and synovial are some of the most commonly analyzed fluids. In the analysis of effusions, the differentiation of transudates and exudates is the first step as it often provides an indication of the underlying pathophysiological process, the differential diagnosis and the need for further investigation. The major purpose of body fluid cytology is the detection of malignant cells.*

Methods: *The present study was conducted in the dept. of Pathology, Krishna Mohan Medical College & Hospital, Mathura, U.P, India. 284 total numbers of cases were included in this study. The duration of study was over a period of one year.*

Results: *In this study, 284 cases were included in this study. Among all 168 cases were male rest were female. In our study, most of the people were belongs to 41-50 (64%) age group followed by other age group. In this present study, 60.56% were collected pleural fluid followed by 38.73% Ascitic fluid & 0.70% pericardial fluid.*

Conclusions*: This study suggested that, cytological study of body fluids is an inexpensive and simple procedure. It is also useful in finding the etiology and in understanding the course of disease.*

Keywords: *Cytological Analysis, Pleural Fluid, Ascitic Fluid & Pericardial Fluid*

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INTRODUCTION

Pleural effusions develop due to excessive fluid formation and its accumulation in the pleural space. Heart failure, malignancy, pneumonia, tuberculosis and pulmonary embolism are some of the most common conditions causing pleural effusions. It is essential to find out the cause of pleural effusion so that appropriate treatment can be started.[1,2] Though, in the evaluation of PF, fluid appearance is a nonspecific tool, it can provide useful information about the etiology of pleural effusion.

Most transudates and exudates are clear, straw-colored, odorless and non-viscous fluids.[3] With PF hematocrit of 1 – 20% of peripheral, a homogeneous bloody appearance constricts the differential diagnosis to malignancy, embolism or trauma. The exceeding half of the peripheral hematocrit is symptomatic of hemothorax. Turbidity of PF can be produced by either the presence of cells and debris or by a high lipid concentration in PF. After centrifugation of turbid PFs, a clear supernatant show that turbidity is caused by cells and debris which might indicate the presence of empyema.

Pericardial effusions are caused by accumulation of fluid in the pericardial space due to injury of the pericardium.[3] Transudative pericardial effusions are generally linked with heart failure, hypoalbuminemia, post-radiation therapy and renal insufficiency, whereas exudative effusions result

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secondary to pericardial inflammatory, infectious, malignant or auto-immune processes.[3,4] Although, echocardiography is usually used to diagnose the presence of pericardial effusions yet cannot be used to clearly determine their etiology. For diagnostic and therapeutic purposes, pericardiocentesis (the removal of pericardial fluid) is used.[3] Pericardial fluid is clear and pale yellow. Turbid fluid shows infection or malignancy. Bloody fluid is indicative of malignant or tuberculous etiology. A milky appearance caused due to the presence of chylopericardium.[3]

In the diagnosis of various lesions, cytological analyses of effusions play an important role. It contributes in cancer research and staging of various tumors.[5] Pleural, ascitic, pericardial and synovial are some of the most commonly analyzed fluids. In the analysis of effusions, the differentiation of transudates and exudates is the first step as it often provides an indication of the underlying pathophysiological process, the differential diagnosis and the need for further investigation. The major purpose of body fluid cytology is the detection of malignant cells. Besides this, examination of fluid may also reveal information about inflammatory conditions of serous membranes, adjacent viscera, infections with bacteria, fungi or viruses and parasitic infestation.[6] Though, the tumors often shed abundant malignant cells, singly and in clusters. The interpretation of malignancy is much difficult in body fluid than in any other cytologic media because of the exuberant proliferation of cells within the fluids.[7]

METHODS

Study Area:-The present study was conducted in the dept. of Pathology, Krishna Mohan Medical College & Hospital, Mathura, U.P, India.

Study Population: - 284 total numbers of cases were included in this study.

Study Duration: - The duration of study was over a period of one year.

Data collection: - The study includes all samples of pleural, Ascitic & pericardial fluids received in pathology department. These fluids were analysed for physical properties like the volume, colour and viscosity. Later, these fluids were centrifuged at 3000rpm for five minutes. 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.

Data analysis: - Data were analysed by using Microsoft excel

RESULTS

In this study, 284 cases were included in this study. Among all 168 cases were male rest were female. In our study, most of the people were belongs to 41-50 (64%) age group followed by other age group. In this present study, 60.56% were collected pleural fluid followed by 38.73% Ascitic fluid & 0.70% pericardial fluid. 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 were 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 7 cases (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.

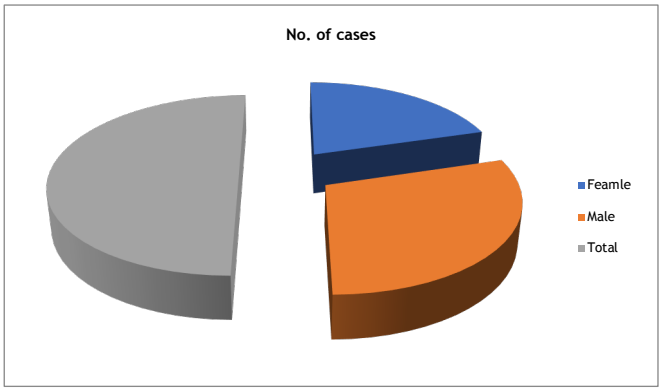

Chart: 1 Distribution of cases according to gender

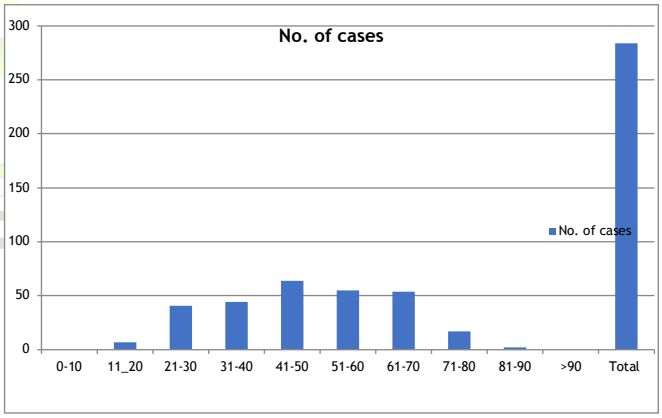

Chart:-2 Distribution of cases according to gender

Table 1: Cytological Analysis of Pleural, Ascitic & Pericardial Effusions with respect of tumours

Type of effusion	Non-neoplastic	Neoplastic	Total
Pleural fluid	165	7	172
Ascitic fluid	91	19	110
Pericardial fluid	1	1	2
Total			

Table 2: Cytological Analysis of Pleural, Ascitic & Pericardial Effusions

Type of effusion	Transudate	Exudate	Total
Pleural fluid	94	78	172
Ascitic fluid	85	25	110
Pericardial fluid	0	2	2
Total	179	105	284

DISCUSSION

For nearly a century, cytological examination of serous effusions has been done in the diagnosis of malignancy and finally in the detection of primary lesions. Besides this, it also helped for staging and prognosis of the malignant tumors and about the various inflammatory lesions of serous membranes.[8] It is so reliable that a positive diagnosis was often considered as a definitive diagnosis.[9] Cytological study of body effusions is a complete diagnostic modality. It aims at pointing out the etiology of effusion as well as in certain cases a means of prognostication of the disease process. Its diagnostic performance of 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.[10,11] Non- neoplastic effusions were more common than neoplastic effusions. Similar findings were observed by Priavadhana et al[1] & Shulbha et al[12] also. Both in the pleural fluid and ascitic fluid, the most common cause of nonneoplastic effusions was chronic inflammation. These lesions had mostly lymphocytic infiltrate in 90% of cases with 10% having a combination of both lymphocytes, mesothelial cells and histiocytic infiltrate. The findings of the present study showed that pleural effusion was the most common effusion sent for analysis i.e. 60.56%. these findings are supported by the study conducted by Kumavat et al[2] & Priavadhana et al.[1] They found 57.27% & 50% respectively. Our study also revealed that effusion analysis of male patients was more predominant & comprised of 59.15% than females (40.85%). Priavadhana et al,[5] Shulbha et al[8] & Chakrabarti et al[13] studies found the similar results. Maximum number of cases were in the range of 41-50 years, followed by 51-60yrs in this study. In contrast Shulbha et al.[12] reported 31-40 years as the most common age group followed by 41-50 years. In this study 179 cases were transudate 179 (63.03 %) in nature and 105 (36.97 %) cases were exudate, which was in concordance with the finding of Shulbha et al8 & Chakrabarti et. al.[13] Kumavat et al found in a study that tuberculous serous effusions has been the most common cause of exudates in pleural fluid analysis.[6] They observed 57% of cases to be of tuberculous origin. Though, tuberculous effusions were found only in 1.16% of pleural fluids in this study.

Kushwaha et al,[14] Moreno et al,[15] Sherwani et al[16] found that methods like cell counts, acid fast stain help in clinching the diagnosis. This study also diagnosed tuberculous effusions on 20% ZN staining which showed beaded slender acid-fast bacilli.

CONCLUSION

This study concludes that, cytological study of body fluids is an inexpensive and simple procedure. It is also useful in finding the etiology and in understanding the course of disease.

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