



DIAGNOSTIC VALUE OF CYTOPATHOLOGY IN PLEURAL AND ASCITIC FLUIDS

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ABSTRACT

Introduction: Cytological study of body fluids is better than biopsy as focal lesions may be missed by biopsy. **Aim:** To study cytology of aspirated pleural and ascitic fluids and categorise them according to age, gender, gross appearance and neoplastic or non – neoplastic type. **Methods:** Total 190 fluids were studied, of which 137 were pleural fluid and 53 were ascitic fluid. The received fluid was centrifuged and smears were prepared from the sediment and stained with Papanicolaou stain. **Results:** Maximum cases were observed in 41-50 years of age group with male preponderance. Overall male : female ratio was 1.7:1. Most common primary site of malignancy was lung and stomach in pleural and ascitic fluid respectively. **Conclusion:** Arrangement of cells and nuclear characteristics gives clue about ongoing pathology. Cytology should be considered first line of investigation as it is simple and cost effective procedure.

KEYWORDS : Cytology, pleural fluid, ascitic fluid

INTRODUCTION

Abnormal accumulation of fluid in pleural cavity is defined as pleural effusion and accumulation of fluid in peritoneal cavity is known as ascites [1]. Cytological examination of serous effusion is better than biopsy of serous cavity lining for the diagnosis of malignancy as focal lesion on serous surface may be missed by biopsy, thus giving false negative results. But in effusion, malignant cells exfoliate and accumulate from all the surfaces lining that cavity which represents the entire serous cavity [2]. Cytological study of body fluids is a simple and cost effective procedure which helps in making diagnosis, understanding course of disease, monitoring response to therapy and knowledge about inflammatory conditions of serous membranes [3]. This study was conducted to study the cytology of aspirated pleural and ascitic fluids and categorise them according to age, gender, gross appearance and neoplastic or non – neoplastic type.

MATERIAL AND METHODS

The study was carried out in department of Pathology, MGM Medical College and Hospital, Aurangabad, Maharashtra for a period of one year from June 2018 to June 2019. Total 190 fluids were studied, of which 137 were pleural fluid and 53 were ascitic fluid.

The fluids were received in clean, dry, well labelled and closed sterile containers with properly filled requisition forms. Gross appearance of fluids were noted. Freshly aspirated fluid specimens were used for preparing smears without adding any anticoagulant. The received fluid was centrifuged at 2000 revolutions per minute for five minutes. The supernatant part was discarded. The remaining sediment was taken onto clean, dry glass slides by using pipette and was spread evenly. The slides were immediately fixed in 95% alcohol and then stained with Papanicolaou stain.

RESULTS

In this study, total of 190 fluid samples were studied, out of which, 137 were pleural fluid and 53 were ascitic fluid. The maximum number of cases were observed in 41-50 years of age group followed by 51-60 years of age group (Table 1). Male preponderance was seen, with overall male : female ratio 1.7:1 (Table 2).

Out of 137 cases of pleural fluid, 71 were straw coloured, 42 fluids were haemorrhagic, 14 were turbid and 10 fluids were

clear on gross examination. Majority of the patients had right sided pleural effusion (60.8%). Left sided pleural effusion (25.2%) and bilateral pleural effusion (14%) were also noted. Cytological examination revealed 123 non – neoplastic pleural effusions of which 100 fluids were inflammatory effusion and 23 fluids were tuberculous effusion. Amongst the malignant pleural effusions due to adenocarcinoma, lung (09 cases) was the most common primary site, followed by breast (04 cases). Non – Hodgkin's lymphoma comprised 01 case (Table 3). The tuberculous effusion showed predominantly lymphocytes and occasional mesothelial cells. The neoplastic effusions revealed malignant cells arranged in clusters and glandular pattern favouring adenocarcinoma. Plenty of small to medium sized round lymphoid cells having scanty cytoplasm were seen in case of Non – Hodgkin's lymphoma (Figure 1).

Out of 53 cases of ascitic fluid, 33 were straw coloured, 07 fluids were haemorrhagic, 08 were clear and 05 fluids were turbid on gross appearance. Cytological examination revealed 42 cases of inflammatory effusion (non-neoplastic). Amongst the malignant effusions, overall the most common primary site of malignancy in ascitic fluid was from stomach (06 cases), followed by ovary (04 cases). Malignant cells from carcinoma of gall bladder comprised 01 case (Table 4). However, in female patients, ovary was the most frequent predominant site. Adenocarcinoma was the most common type of malignancy noted in ascitic fluid analysis in which neoplastic cells showed raised N:C ratio with hyperchromatic and pleomorphic nuclei arranged in clusters and glandular pattern.

Table - 1: Age wise distribution of cases

Age group (in years)	Pleural Fluid	Ascitic Fluid
0-10	2	0
11-20	14	1
21-30	15	2
31-40	20	9
41-50	36	14
51-60	30	11
61-70	12	10
71-80	5	5
81-90	3	1
Total	137	53

Table - 2: Gender wise distribution of cases

Gender	Pleural Fluid	Ascitic Fluid
Male	91	30
Female	46	23

Table - 3: Cytological examination of pleural fluid

Effusion	Cytological Examination	Number of Cases
Non - neoplastic	Inflammatory effusion	100
	Tuberculous effusion	23
Neoplastic (Malignant)	Carcinoma of lung	09
	Carcinoma of breast	04
	Non - Hodgkin's lymphoma	01
Total		137

Table - 4: Cytological examination of ascitic fluid

Effusion	Cytological Examination	Number of Cases
Non - neoplastic	Inflammatory effusion	42
Neoplastic (Malignant)	Carcinoma of stomach	06
	Carcinoma of ovary	04
	Carcinoma of gall bladder	01
Total		53

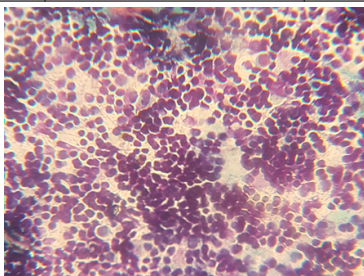


Figure - 1 : Photomicrograph of pleural fluid showing small to medium sized round lymphoid cells having scanty cytoplasm - Non - Hodgkin's Lymphoma (Papanicolaou, x400)

DISCUSSION

The present study was undertaken to study the cytology of aspirated pleural and ascitic fluids. In this study, a total of 190 fluid samples were studied, out of which, 137 were pleural fluid and 53 were ascitic fluid. Overall, we observed that the maximum number of cases were in 41-50 years of age group, which correlates with study done by Rasik Hathila et al^[4].

Pleural effusions can be caused by pulmonary or non - pulmonary diseases and are mostly due to malignancy, congestive heart failure, tuberculosis or infections [5,6,7] . In our study of pleural fluid analysis, male preponderance was seen. Romero et al [8] , Swammy et al [9] and Kushwaha et al [10] reported similar findings in their study. In our study, majority of the patients had right sided pleural effusion, which correlates with the study done by Parikh P et al^[11]

Amongst the malignant pleural effusion, adenocarcinoma lung was the most common finding in our study. Similar findings were reported by Gupta et al [12] . We found a case of Non - Hodgkin's Lymphoma (NHL) in a child. Chakrabarti et al [13] reported case of Non -Hodgkin's Lymphoma in children in their study. Pradhan S B et al [14] also reported cases of Non -Hodgkin's Lymphoma in pleural fluid examination.

Ascites can be caused by various causes which includes decompensation of chronic hepatic cirrhosis, tumors, congestive heart failure and inflammatory conditions. Less

common causes include nephrotic syndrome, exudative enteropathy and chylous ascites^[15]

In ascitic fluid examination, maximum fluids were straw coloured on gross examination. Overall, we found stomach to be the most common primary site of malignancy in ascitic fluid. However, in female patients, ovary was most common site. Jha R et al [15] reported similar findings in their study.

Cytological examination of body fluids has gained acceptance in clinical medicine, to an extent that a positive diagnosis is often considered as definitive diagnosis. It helps in diagnosis of malignant conditions as well as in staging and prognosis of a disease^[16] .

CONCLUSION

To conclude, attempt should always be made to examine the fluid in fresh state without any delay, as it preserves the cellular morphology, thereby arriving at accurate diagnosis becomes easier. The pattern of arrangement of cells and its nuclear characteristics helps to understand whether effusion is non - neoplastic or neoplastic. Correlation with clinical details, biochemical values and radiological findings should be done with special emphasis in cases of malignant effusions. Definite diagnosis can be made in most cases by cytology and clinical correlation, however few cases may require cell block and immunohistochemistry studies. Thus, cytology should be first line of investigation as it is a simple, cost effective procedure which helps us to understand nature and course of disease, thus guiding in treatment plan for patients.

REFERENCES

- Anita B, Ahuja JM (2016) Evaluation of Coelomic Fluids and its Clinical Correlation with Cytologic Diagnosis. J Cytol Histol 7: 397. doi:10.4172/2157-7099.1000397
- Mahajan S, Awasthi S, Dutta S. Cytological Diagnosis of Serous Effusions by Using Comparative Approach of Routine Staining and Cytospin Technique. Ann. Int. Med. Den. Res. 2017; 3(4):PT46-PT51.
- Gupta R, Dewan D, Raina R, Gupta M. Exfoliative cytology of body fluids: a study from provincial hospital of Jammu region, India. Int J Res Med Sci 2016;4:1016-9.
- Hathila RN, Dudhat RB, Saini PK, Italiya SL, Kaptaan KR, Shah MB. Diagnostic importance of serous fluid examination for detection of various pathological conditions- A study of 355 cases. Int J Med Sci Public Health 2013;2:975-979.
- Tetikurt C, Yilmaz Kara B, Tetikurt S, Yilmaz N, Ilknur Yasar Rian Disci. The Value of Cytology in the Diagnosis of Pleural Effusions. British Journal of Medicine & Medical Research 2014;4(11): 2203-11
- Light RW. The undiagnosed pleural effusion. Clin Chest Med. 2006;27(2):309-319.
- Heffner JE. Diagnosis and management of malignant pleural effusions. Respirology. 2008;13(1):5-20.
- Romero S, Candela A, Martin C, Hernandez L, Trigo C, Gil J (1993) Evaluation of different criteria for the separation of pleural transudates from exudates. Chest 104: 399-404.
- Swammy GG, Rao TMV, Sunitha P, Madhuravani S. Role of pleural fluid analysis in establishing the diagnosis of pleural effusion Experience in college of medical sciences - teaching hospital, Bharatpur, Nepal. Journal of College of Medical Sciences - Nepal 2010;6:36-45.
- Kushwaha R, Shashikala P, Hiremath S, Basavraj HG. Cells in pleural fluid and their value in differential diagnosis. J Cytol 2008;25:138-43.
- Parikh P, Odhwani J, Gamagajalia C. Study of 100 cases of pleural effusion with reference to diagnostic approach. Int J Adv Med 2016;3:328-331.
- Gupta S, Sodhani P, Jain S. Cytomorphological profile of neoplastic effusions: An audit of 10 years with emphasis on uncommonly encountered malignancies. J Can Res Ther 2012;8:602-9.
- Chakrabarti PR, Kiyawat P, Varma A, Agrawal P, Dosi S, Dixit M. Cytological evaluation of serous body fluids: A two year experience in tertiary care centre from Central India Int J Cur Res Rev 2015;7(17):1-4.
- Pradhan SB, Pradhan B, Dali S. Cytology of body fluids from different sites: an approach for early diagnosis of malignancy. J Nepal Med assoc. 2006;45:353-6.
- Jha R, Shrestha HG, Sayami G, Pradhan SB. Study of effusion cytology in patients with simultaneous malignancy and ascites. Kathmandu University Medical Journal 2006;4:483-7.
- Shivakumarswamy U, Arakeri SU, Karigowdar MH, Yelikar BR. Diagnostic utility of the cell block method versus the conventional smear study in pleural fluid cytology. J Cytol 2012;29:11-5.