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CYTOLOGICAL AND ANALYTICAL STUDY OF PLEURAL, ASCITIC & PERICARDIAL EFFUSIONS : ONE YEAR STUDY AT RIMS ,RANCHI

Pathology

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ABSTRACT

Background : Cytological analyses of body effusions plays an important role in the diagnosis of various lesions.

Material & Methods : The present work is a analytical and retrospective type of study, undertaken in the department of Pathology of a tertiary care hospital in rims ranchi over a period of one year from January 2017 to December 2017. It includes all samples of pleural, ascitic & pericardial fluid received in cytology section of pathology department.

Results : Cytological analysis was done on all 208 cases of effusion fluids. Pleural fluid was the most common type of fluid received followed by ascitic & pericardial fluids. 196 cases were non neoplastic & 11 were neoplastic. Adenocarcinoma was the most common morphological pattern. Maximum number of cases were transudates in nature (124 cases transudate and 84 cases were exudates)

Conclusion : Body fluid cytology is a rapid and simple diagnostic modality employed primarily for disease diagnosis in malignant and non-malignant cases. Meticulous examination with proper clinical correlation will go a long way in improving patient treatment and care.

KEYWORDS

Introduction : The information provided by body fluid analysis serves several functions. First, it assists the clinician in formulating and pointing out the etiology of effusion and list of differential diagnosis. Second, it allows one to follow the results of therapy and prognosis. pleural, ascitic , pericardial and CSF comprise the major chunk of body fluids [1]. Normally, all the body cavities are lined by single layered epithelial cells and have minimal free fluid in them, for lubrication and protection of underlying viscera . Any imbalance between fluid formation and removal leads to effusion, as stated by Starling's law [2]. Various disease processes which include infectious, inflammatory and neoplastic entities give rise to effusion . The most important goal of body fluid cytology is the detection of malignant cells. Distinguishing benign from malignant cellular changes may require meticulous screening, careful scrutiny of cellular features and an understanding of the range of reactive changes. 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 ascitic, pleural & pericardial effusions.

Material & Methods : The present study is an analytical and retrospective study between January 2017 to December 2017, carried out in the Department of Pathology, Rajendra institute of medical sciences Ranchi. 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 centrifuged at 2500 rpm for 15 minutes, supernatants were discarded and sediments were smeared and stained. Two slides were air dried and stained with Leishman while other two were fixed with methanol and stained with Haematoxylin & Eosin stains. Individual cells were studied under light microscope for cellular characteristics and classified in malignant and non-malignant entities. Improved Neubaur's chamber was used for the cell counts. Patient's history and clinical findings were collected from cytological requisition forms. All the data was then summarized and analyzed. 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.

Results : - Cytological analysis was done on 208 cases of effusion fluids. The male to female ratio of these fluid specimens was 1.42 :1 . Maximum number of samples received were between 41 – 50 yrs of age group.

Table No. 1 : Genderwise distribution of body effusions

Sex	No of cases
Female	86
Male	122
Total	208

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

Age group	No of cases
0-10	3
11-20	12
21-30	26
31-40	31
41-50	56
51-60	44
61-70	28
71-80	8
81-90	0
>90	0
Total	208

Pleural fluid was the most common type of fluid received (139 cases 66.82%) followed by ascitic fluid (68 cases (32.69%), & then pericardial fluid (1 cases-0.49%). Most i.e. 131 (94.24%) cases of pleural fluid and 65 (95.59%)cases of ascitic had non neoplastic etiology. Out of total 208 cases of effusions only 11 cases(5.28%) had neoplastic etiology. Out of 208 cases of body fluids ,total 125 cases (60.09%) were transudates in nature and 83 cases (39.90%) were exudates in nature

Table No. 3 : Distribution of various types of effusions

Type of effusion	No of cases
Pleural fluid	139(66.82%)
Ascitic fluid	68(32.69)
Pericardial fluid	1(0.48%)
Total	208

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

Type of effusion	Pleural	ascitic	Pericardial
Non neoplastic	135(97.12%)	61(89.70%)	1(100%)
Neoplastic	4(2.87)	7(10.29%)	0
Total	139	68	1

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

Type of effusion	Transudate (%)	Exudates(%)	Total(%)
Pleural fluid	75(53.96%)	64(46.04)	139(66.82%)
Ascitic fluid	48(70.59%)	20(29.41%)	68(32.69%)

Pericardial fluid	1(100%)		
Total	124(59.62%)	84(40.38%)	208(100%)

Table No. 6: Distribution of cases according to diagnosis

Types	Pleural fluid		Ascitic fluid		Pericardial fluid
Non neoplastic	Chronic nonspecific inflammation	127	Chronic nonspecific inflammation	57	1
	Acute inflammation	6	Acute inflammation	4	
	Tuberculosis	2	Tuberculosis	0	
	Total	135		61	
Neoplastic		4		7	0
Total		139		68	1

Out of total 139 cases of pleural fluid chronic nonspecific inflammation was accounted for 127 cases (91.36%) which showed predominantly a chronic inflammatory infiltrate composed of lymphocytes and macrophages. This was followed by acute suppurative inflammation (6 cases-4.31%). Tuberculous inflammatory lesions with caseous necrosis, lymphocytic infiltrate and occasional epitheloid granulomas was reported in only 2 cases (1.434%). Out of 139 cases of pleural fluid 75 were transudates & 64 were exudates in nature. Neoplastic etiology was reported only in 4 cases (2.87%) out of 139 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 57 of cases (83.82%) followed by acute suppurative inflammation (4 cases-5.88%) . It includes 48 cases of transudates & 20 cases of exudates. 7cases (10.29%) out of 68 ascitic fluids were positive for malignancy. All of them were microscopically adenocarcinomas. (Fig 1).

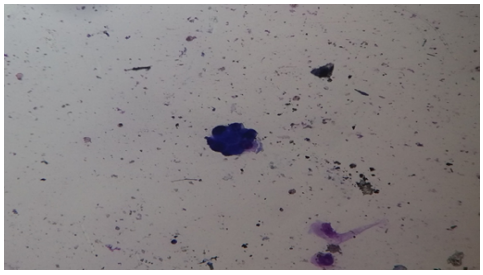

Fig 1 : Micrograph showing adenocarcinoma in ascitic fluid.

4 cases (2.87%) out of 139 pleural fluids were positive for malignancy. All of them were also microscopically adenocarcinomas.

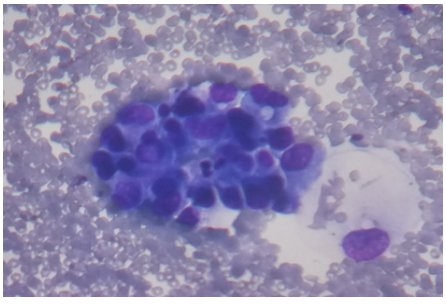

Fig 2 : Micrograph showing metastatic deposits of an adenocarcinoma in pleural fluid(400x)

The majority of cases received were chronic nonspecific inflammation fig 3

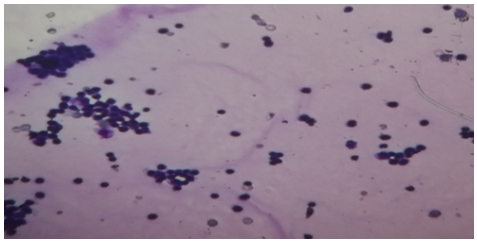

Fig 3 : microphotograph showing chronic nonspecific inflammation in pleural fluid

Cytological examination of benign effusions showed singly scattered as well as sheets of reactive mesothelial cells with clear spaces in between them and scattered among macrophages and inflammatory cells. In malignant effusions aggregates forming acini like structures with lumen .

Discussion :

Lucke and Kiebs (1867), were among the pioneers of effusion cytology. [1] They are credited with the description of atypical or malignant cells in the ascitic fluid. Malignancy in pleural effusion was first described by Quincke in 1882. Over the years different pathologies have come across in the literature, which are potential etiologies for effusions. Owing to these facts it is imperative that exact diagnosis of the underlying disease is known. Aspiration of body fluid is a simple, economical, quick and patient compliant procedure. In addition to cytological evaluation, biochemical and microbiological analysis of these fluids is also important.In our study, male population was more predominant and comprised of 122 cases (58.65%) than females 86 (41.35%) cases. Majority of the cases were in 41-50 age group followed by 51-60yrs . Our study was in concordance with studies done by, Pradhan et al and Joshi et al. [3,4,] pleural fluid was the most frequently encountered effusion with 139(66.82%) cases followed by ascitic fluid with 68 (32.69%) cases. A total of 11 (5.28%) cases were malignant and 197 (95.72%) cases were non-malignant in our study. Our findings were in concordance with other studies. [3, 4, 5] Maximum cases were transudates in our study with 124 (59.62%) cases whereas exudates constituted of 84 (40.28%) cases. Kumavat PV et al stated similar findings. [2]. Tuberculous serous effusions have been reported to be the most common cause of exudates in pleural fluid analysis in a study conducted by Kumavat PV et al[2].They reported 57% of cases to be of tuberculous origin. However , in this study tuberculous effusion were detected only in 1.43% of pleural fluids. In our study, majority of the malignancies were found in the ascitic fluid with maximum cases being adenocarcinoma. In a study done by Wong JW et al, pleural fluid was found to have the highest positivity for malignant cells amongst all fluid [6]. However Jha R et al, found adenocarcinoma as the most common finding among all fluids. [7] Our study was in agreement with other studies.Hemorrhagic fluid raises suspicion of malignancy as was found in our study with majority of malignancies presenting as haemorrhagic fluid. Presence of malignant cells in the effusion worsens the prognosis.

Conclusion

Cytological evaluation of body fluids is a definite aid to the treating physician. It is a simple and safe investigation which helps in understanding disease progression. Furthermore, studies such as tumor markers can be done of fluid, which can help in accurate diagnosis and alleviate patient's morbidity and mortality.

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