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Original Research Article

Ascitic Fluid Cytology in Establishing Diagnosis: A Prospective

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Abstract

Introduction: Ascitic fluid cytology is the most efficient as well as reliable mode for the diagnosis of cause of ascites. Malignancy could be ruled out by ascitic fluid cytology with consideration to the clinical presentation and previous history. This study is conducted aiming to study cytology of ascetic fluid in various diseases to establish clinic-cytological correlation for better management of patients.

Material and Methods: A total of 115 samples were collected and was subjected to various physical as well as biochemical and cytological examination done in the department of pathology.

Result: From the samples collected and analysed, 81.74% were cytologically non malignat and the remaining 18.26% were malignant. Moreover 62.61% were females and 37.39% were males. Transudative and exudative effusion accounted for 66.95% and 33.04% respectively. Most of the malignant effusions were exudative.

Conclusion: This study concludes that most useful tests used in establishing the diagnosis of peritoneal effusion are peritoneal fluid cytology and peritoneal fluid cell count. It 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. Non-malignant causes are more common causes of peritoneal effusion.

Keywords: Ascitic fluid cytology, effusion, malignancy.

Introduction

Ascites Is The Accumulation Of Excess Fluid In The Peritoneal Cavity. Ascites Usually Becomes Clinically Detectable When At Least 500 Ml Of Fluid Is Accumulated. [1] Ascitic Fluid Examination Provides Important Clue To The Etiological Diagnosis In Cases Where The Clinical Picture Is Not Clear. There Are Many Causes Of Ascites Out Of Which, Decompensation Of Chronic Hepatic Cirrhosis Accounts For 80% Cases, Followed By Tumours Which Account For About 10% Of Cases, Congestive Heart Failure And Inflammatory Conditions Account For 3% Of Cases Each However Other Causes Such As Exudative Enteropathy, Nephritic Syndrome, And Chylous Ascites Are Less Common. [2,3]

Cytologic Study Of Body Fluid Is Done To Determine The Cause Of Fluid Accumulation In Body Cavities, Such As Pericardium (Effusions), Pleura And The Abdominal Cavity. The Cytologic Diagnosis, Which Is More Difficult Than Histologic Diagnosis, Should Be Based On A Synthesis Of The Entire Evidence Available, Rather Than Changes In Individual Cells. If The Cytologic Material Is Sufficient Enough And The Evidence Is Complete, A Provisional Diagnosis Should Be Given. This Research Aimed To Study The Cytology Of The Peritoneal Fluid In Various Diseases To Establish Clinic-Cytological Correlation, For Proper Management Of The Patients.

Materials And Methods

This Study On Peritoneal Fluid Cytology Was Conducted In The Department Of Pathology, ACPM Medical College, Dhule, Maharasthra over A Period of Two Years From May 2020 To May 2022. Peritoneal Washing Samples Were Used In The Study. In This Prospective Study, The Peritoneal Fluid Specimens Were Used As Expeditiously As Possible, Majority Of Them Was Processed Immediately But In Small Number. The Fluid Was Divided Into 2 Parts, First Part Was Used For The Cell Count And The Other Part Was Centrifuged At A Rate Of 2000 Rpm For 10minutes. Sediment Part Was Transferred To A Clean Glass Slide And Mixed With A Drop Of 1% Toluidine Blue. After Placing The Coverslip, Slide Was Observed Under The Microscope To Immediately Identify The Cell Morphology. The Remaining Sediment Was Transferred With The Help Of A Pasteur Pipette To Three Slides. One Was Air Dried And Stain Used Wasgiemsa, The Other Two Were Fixed In 95% Alcohol For 15 Minutes And Stained With Haematoxylinand Eosin, Papanicolaou Stains. The Remaining Cell Sediment Was Fixed In 10% Formalin Processed And Embedded In Paraffin As A Cell Block. For All Cases Biochemical Analysis Of Protein, Sugar And Chloride Was Done. Culture Of Peritoneal Fluid Was Also Done To Rule Out For Bacteriological Interference If Any.

Results

A Total Sample Size Of 115 Was Received For Cytological Examination. Out Of Which 94 Samples (81.74%) Were Cytologically nonmalignant and 21 samples (18.26%) Were Malignant. Out of 115 Samples, 72 Samples (62.61%) Were From Females And 43 Samples (37.39%) Were From Males. 77 Samples Were Transudative And 38 Samples Were Exudative Effusions (Table -1) Transudative Effusion Was Seen In 31.30%. In Cirrhosis, 10.43%In CCF, 8.70%. In Case Of Negative For Malignant Cells In Known Malignancy, 4.35%In Portal Hypertension And Intestinal Obstruction, 2.61%. In Malignancy And 0.87%. In Intestinal Perforation, Chronic Pancreatitis, Blunt Trauma And In Meig's Syndrome. Exudative Effusion Was Seen In 6.09% Of Tuberculosis, 15.65%. In Malignancy, 4.35% In Cirrhosis, 0.87%. In Chylous And Intestinal Obstruction And 1.74% In PMP. (Table 2) 53.91% Had TLC Less Than 500 Cells/Cu. Mm And 24.21% Had TLC Between 500- 1000 Cells/Cu. Mm. In 20.86% TLC Was Greater Than 1000 Cells/Cu. Mm. 82.60% Had Predominantly Lymphocytes. 6.08% Had Predominantly Polymorphonuclear Leukocytes. 6.95% Had Predominantly Malignant Cells. 2.60% Had Reactive Mesothelial Cells And 1.73% Had Macrophages As Predominant Cells. 66.95% Had Peritoneal Fluid Protein Level Of Less Than 3 Gm% And 33.0% Had Peritoneal Fluid Protein Of Greater Than 3 Gm%. (Table 3).

Table 1 : Effusions and the underlying Causative Factors.

Nature of Fluid	Causative factor	No. of Samples	Percentage
Transudative	Cirrhosis	36	31.30
	Portal hypertension	5	4.35
	Chronic kidney disease	2	1.74
	CCF	12	10.43
	Chronic pancreatitis	1	0.87
	Intestinal obstruction	5	4.35
	Blunt trauma	1	0.87
	Intestinal perforation	1	0.87
	Malignancy	3	2.61
	Meig's syndrome	1	0.87
	Cytologically negative for malignant cells in known malignancy	10	8.70
Exudative `	Tuberculosis	7	6.09
	Malignancy	18	15.65
	Cirrhosis+TB	5	4.35
	Chylous ascites	1	0.87
	PMP	2	1.74
	Intestinal obstruction	1	0.87
	CCF+TB	1	0.87
	Cytologically negative for malignant cells in known malignancy	3	2.61
	Total	115	100.0

Table 2 : Causative factors of peritoneal effusion, total and differential cell count and biochemical features

Causative factors	No. of samples	TLC Cells/ cu.mm			Predominant cells						Protein (gm%)	
		0-500	500-1000	>1000	Polymorphs	lymphocytes	Eosinophils	macrophages	mesoithelial	Malignant cells	<3	>3
Cirrhosis	36	32	3	1	-	36	-	-	-	-	36	-
Cirrhosis +TB	5	-	2	3	-	5	-	-	-	-	-	5
Portal HTN	5	4	1	-	-	5					5	-
CCF	12	10	2	-	-	12	-	-	-	-	12	-
CCF+TB	1	-	1	-	-	1	-	-	-	-	-	-
Tuberculosis	7	2	4	1	-	6	-	1	-	-	-	7
Chronic pancreatitis	1	1	-	-	-	1	-	-	-	-	1	-
CKD	2	2	-	-	-	2	-	-	-	-	2	-
Intestinal obstruction	6	1	2	3	1	3	-	-	2	-	5	1
Appendicular perforation and pelvic abscess	1	-	1	-	1	-	-	-	-	-	1	-
Blunt trauma	1	-	1	-	1	-	-	-	-	-	1	-
Chylous ascites	1	1	-	-	-	1	-	-	-	-	1	-
Cytologically negative for malignant cells in known malignancy	13	7	6	-	3	9	-	-	1	-	10	3

Meig's syndrome	1	1	-	-	-	1	-	-	-	-	1	-
PMP	2	1	1	-	-	1	-	1	-	-	-	2
malignant	21	-	5	16	1	12	-	-	-	8	3	18

Table 3 : Site of origin of primary malignancy and effusion cytology findings in males and females

Primary site (Number)	Cytology Positive		Cytology Negative	
	Male	Female	Male	Female
Ovary	-	9	-	7
Breast	-	-	-	1
Liver	-	-	-	3
Cervix	-	-	-	1
GIT	1	-	-	-
Lymph node	2	-	-	-
Unknown primay	-	9	-	1
	3	18	-	13
	21		13	

Discussion

Diagnostic cytology is an important criterion for interpretation of cells from the human body that are removed from their physiologic milieu. The primary purpose of cytology in this study is for the detection of cancer. In patients without knowing malignancy, cytological evaluation is not only helpful in detecting the presence of tumor cells but also be able to classify them according to its type. In patients with known malignancy, presence of tumor cells in a serous effusion has important prognostic implication and often affects treatment. [4] In present study, out of 21 samples diagnosed clinically malignant, primary site could be confirmed on cytology in 12 (57.14%) cases, however primary site could not be determined in 9 (42.86%) of cases. Most common primary sites were ovary (42.86%) followed by 2 (9.52) samples were lymphoma and 1 sample was from (4.76%) GIT. Runyon reported that parenchyma liver disease were the commonest cause in about 80% and then malignancy 10%, heart failure 5%, tuberculosis 2%, and other causes in the rest of 3% cases. [6] These findings are similar to our study. Gurubacharya also reported that peritoneal effusion is caused by hepatic disease 68.75%, cardiac 9.3%, tuberculosis 12.5% and malignancy 10% of cases. [7] Sears showed in his study that out of 1165, 742 cases were non-malignant and 423 cases were malignant, ratio of malignant and non-malignant cases was 1 : 1.7. [8] Junaid's study showed 208 malignant cases out of 859 cases, ratio of malignant and non-malignant cases was 1 : 3.1. [9] Karoo study revealed that out of 276 cases, 48 cases were malignant and ratio between malignant and non-malignant was 1:4.75. [5] Pradhan in his study showed 61 malignant cases out of 324 cases, ratio between malignant and non-malignant was 1:4.3.[4] In this study, out of total 115 cases 21 were malignant and 94 were non-malignant. The ratio between them was 1 : 4.4. Thus our study was in correlation with all the studies mentioned above. [10]

Conclusion

The present study demonstrates that most useful tests used in establishing the diagnosis of peritoneal effusion are peritoneal fluid cytology and peritoneal fluid cell count. Cytological examination of body effusions is a complete diagnostic mode which aims at pointing out the etiology of effusion as well as means of prognostication of the disease process. In patients without known malignancy, cytological evaluation may not only be

able to identify the presence of tumor cells but also may be able to classify them as to type. In patients with known malignancy the presence of tumor cells in serous effusions may have important prognostic implication. The value of cytological examination of serous effusions is well documented and widely recognized. The primary role of cytology in this study is detection of malignancy. Peritoneal fluid analysis is cost effective as well as rapid method of diagnosing the cause of peritoneal effusion. Negative cytology interpretation is of little value while a positive report is important in the differential diagnosis of the etiology of the effusion and also in determining the treatment of the patient. Thus peritoneal fluid analysis should be done on a routine procedure in patients with peritoneal effusion.

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