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DIAGNOSTIC SIGNIFICANCE OF SERUM ASCITES CHOLESTEROL IN MALIGNANT AND NON MALIGNANT ASCITES

Gastroenterology

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ABSTRACT

INTRODUCTION: Ascites is a very common clinical problem. However, the ability to distinguish malignant from non-malignant and tubercular causes of ascites using various biochemical techniques would obviate the need of many expensive and time-consuming diagnostic studies on patients presenting with ascites of unknown etiology. Therefore, this study was planned to evaluate usefulness of ascitic fluid albumin, protein, SAAG and ascitic fluid cholesterol level in diagnosis of malignant, non-malignant and tubercular ascites.

MATERIALS AND METHODS: We conducted a prospective observational study in Department of medical gastroenterology, Madras Medical College from time period of January 2018 to December 2018. All cases of ascites of unknown etiology were evaluated and were grouped into malignant and benign ones. Patient having peritonitis were excluded from the study. In this groups, serum albumin,ascitic fluid albumin, cholesterol were done. The data was processed in MS Excel and analysis was carried out using SPSS Ver. 23.

RESULTS: Out of 80 patients, 30 were malignant (37.5%) and 50 were benign (62.5%).Cirrhosis was the most common cause of benign ascites and carcinoma stomach was the most common cause of malignant ascites. Ascitic fluid cholesterol above the level of 100mg/dl has a specificity of 100% in detecting malignant ascites.

CONCLUSION: SAAG, ascitic fluid cholesterol having high specificity, can be used for differentiating between non-malignant and malignant ascites. It can also be used to differentiate tubercular ascites from malignant ascites.

KEYWORDS

ascitic fluid cholesterol, malignancy

INTRODUCTION

Ascites is the pathological accumulation of fluid within peritoneal cavity, which can present a challenging diagnostic problem[1]. Ascitic fluid forms slowly as a result of blockade of proximal vascular systems (Venous, lymphatic). It may also form directly in response to disease affecting the peritoneum. The commonest cause of ascites is liver cirrhosis (81%) followed by malignancy (9%), tuberculous peritonitis (2%), congestive cardiac failure, nephrotic syndrome, and others (3%).[2,3]

Various parameters like ascitic fluid physical examination, total cell count, protein concentration, Serum Ascitic Fluid Albumin Gradient [SAAG], cytology, cholesterol, amylase, lactic acid dehydrogenase, adenosine deaminase, and fibronectin levels can be used to differentiate exudative (ascitic fluid total protein>2.5 gm %) and transudative (ascitic fluid total protein ≤ 2.5 gm %) ascites of different etiologies.[4]

Cytodiagnostic evaluation of ascitic fluid is characterized by a high specificity but a low sensitivity in detecting malignant disease because only a few neoplastic cells are present in the fluid[5] or processing of specimens is suboptimal with lysis of tumour cells[6]. The physiologically based approach to classify ascites by Serum Ascites Albumin Gradient (SAAG) has completely replaced the traditional way of classification as transudate and exudates[7]. The serum-ascites albumin gradient (SAAG), based on oncotic-hydrostatic balance, is the subtraction of ascitic fluid concentration from the serum albumin concentration. However, albumin gradient does not explain the etiology of ascites, if SAAG is more>1.1, the patient is diagnosed to be having portal hypertension[8].

Papers about the detection of ascitic cholesterol have been published a lot and they have shown a relatively high diagnostic efficiency in differential diagnosis of malignant ascites. Therefore, we performed this study to establish the usefulness of ascitic fluid cholesterol level in differential diagnosis of malignant, non-malignant ascites.

Table 1

Gender	Malignant Ascites N (%)	Benign Ascites N (%)	Total N (%)	Chi-square test (df)	P value
Male	12 (40)	41 (82)	53 (66.3)	14.8 (1)	<0.001*
Female	18 (60)	9 (18)	27 (33.8)		
Total	30 (100)	50 (100)	80 (100)		

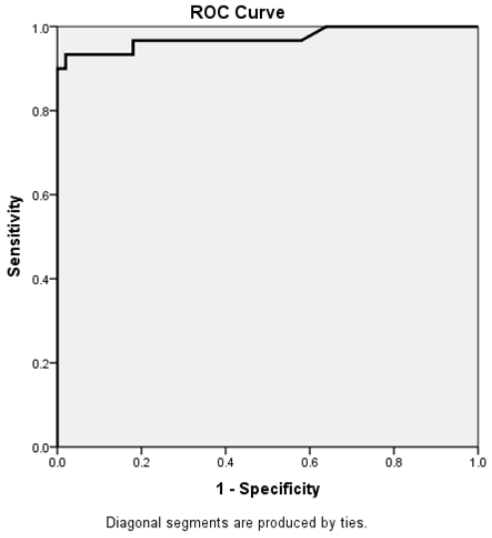
Ascitic fluid cholesterol (mg/dl) has p value of 0.001 in distinguishing between benign and malignant diseases.

Table 2

Variable	Malignant Ascites		Benign Ascites		t Test	P value
	Mean	SD	Mean	SD		
Ascitic fluid cholesterol (mg/dl)	106.1	29.9	27.1	14.7	15.797	0.001*

Ascitic fluid cholesterol median value was around 107.88mg/dl in malignant ascites and 24 mg/gl in benign ascites. (p value 0.001) . Most common cause of ascites was cirrhosis in benign etiology (57.5%), carcinoma ovary (15%) and carcinoma stomach (8.8%) in malignant etiology. Ascitic fluid protein mean value was 3.73gm/dl in malignant ascites and 1.5 gm/dl in benign cause (p value of 0.001). SAAG mean value in malignant ascites was 0.7 and 1.88 in benign etiology (p value <0.001)

Ascitic fluid cholesterol above 100mg/dl had a specificity of 100% in detecting malignant ascites. When the level is above 50 mg/dl, it had sensitivity of 93.3% and specificity of 92% in detecting malignant ascites. Ascitic fluid protein above 2.5 gm/dl had a sensitivity of 90% and specificity of 92% in detecting malignant ascites. SAAG less than 1 had sensitivity of 93% and specificity of 94% in detecting malignant ascites.



Ascitic fluid CholestrolROC

Table 3

Varaiable	AUC	Level ≥50		Level ≥100	
		Sensitivity	Specificity	Sensitivity	Specificity
Ascitic Fluid Cholestrol	0.973	93.3%	92%	67%	100%

DISCUSSION

One of the most common challenges in the treatment of ascites patients is to reveal the cause of the disease as rapidly as possible for appropriate management.

In our study, we included 80 patients of ascites. Out of 80 patients, 50 belonged to benign causes and 30 belonged to malignant causes. The ascitic fluid cholesterol was compared in malignant and non-malignant (excluding tubercular cases) group. The mean cholesterol level was found to be 106.15 mg/dl in malignant group and 27.1 mg/dl in non-malignant group with a P-value of 0.001. With a cut off value of ascitic fluid cholesterol 100 mg/dl, the specificity was 100% and sensitivity 67%. Rana SV et al. also reported that the mean ascitic cholesterol level was significantly higher in malignant ascites than in non-malignant ascites, with a cut off level of 70 mg/dl for ascitic fluid cholesterol[9].

The specificity (100%) and diagnostic efficiency (93.3%) of ascitic fluid cholesterol is better than the 94% specificity and 93% diagnostic efficiency of serum ascitic albumin gradient. The specificity is found to be similar as Rana SV et al. and sensitivity is lower than their study because the cut off value of ascitic fluid cholesterol used in our study was higher (100 mg/dl vs 70 mg/dl). Almost similar results were reported by Sastry AS et al [10]the ascitic fluid cholesterol was found higher in malignant (128 8.10) vs (51.40 8.3) in non-malignant cases.

Almost similar result was also reported by Anita R. Bijoor et al[11]. studied the ascitic fluid and serum concentration of total cholesterol, total proteins and albumin in a group of 45 patients. Non-malignant ascites patients had ascitic fluid cholesterol values of 19.41±8.33 mg/dl, as against the malignancy related ascites patients, who showed levels of 95.87±1.24 mg/dl. Study performed by Vyakaranam S et al[12] also supports our study in which the ascitic fluid cholesterol level above 62 mg/dl give the diagnostic accuracy of 96%.

Zhu H et al[13], meta-analysed the literature on using ascitic cholesterol as diagnostic tests to help identify MRA (malignant related ascites). Meta-analysis included 8 studies involving 743 subjects. Summary estimates for ascitic cholesterol in the diagnosis of MRA were as follows: sensitivity, 0.82 (95% CI 0.78 to 0.86); specificity, 0.90 (95% CI 0.87 to 0.93).

We also observed that the non-malignant group mean value of SAAG (g/dl) is 1.88+0.52 vs 0.7+0.22 in malignant group, which is significant. Dharwadkar, Kavitarati[14] et. al, also reported that SAAG is definitely the best marker along with total protein ratio and ascitic fluid cholesterol.

Ascitic fluid protein is significantly elevated in malignant ascites. Mean value of protein (3.73gm/dl) was comparable with value obtained in the study by Sood A etal[15] and Abdel razik etal[16]

CONCLUSION

Ascitic fluid cholesterol having high specificity can be used for differentiating non-malignant and malignant ascites. Ascitic fluid cholesterol value above 100mg/dl has 100% specificity in distinguishing between malignant and benign ascites.

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