



## ASCETIC FLUID CHOLESTEROL AND SERUM ALBUMIN IN DIFFERENTIAL VALUES OF ASCITES AND ITS DIAGNOSIS IN INDIANS

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### ABSTRACT

Ascites is determined as presences of pathological changes in peritoneal cavity. It's mainly accumulation of free fluid. In prospective study ascitic fluid cholesterol levels in various types of ascites, to compare diagnostic values of ascitic fluid cholesterol levels v/s SAAG, to study SAAG in various types of ascites. To find out specificity & sensitivity of ascitic fluid cholesterol levels in differential diagnosis of ascites. The study was conducted on 100 patients of ascites of different etiologies admitted in Sri Lakshmi Narayana Institute of Medical Sciences of 15-65 years of either sex. The following study groups were made viz.: - Group A 29 Cases of ascites caused by cirrhosis of liver, Group B 30 cases of ascites caused by Tuberculosis, Group C 25 cases of ascites caused by Malignancies, Group D, E, F 25 cases of ascites caused by others (e.g. CHF, CRF, Nephrotic Syndrome, Anemia-hypoproteinemia, Bacterial Peritonitis, etc. The paracentesis was performed after proper positioning of patient .150 ml. of ascitic fluid was drawn and examined for, total protein, albumin, adenosine deaminase (ADA) (when indicated), sugar, cholesterol, total cell count, cell type, malignant cells, microbiological tests (AFB stain , Gram staining, aerobic and anaerobic culture, sputum culture.) Liver function test, Serum cholesterol, Sputum for AFB and culture (When indicated), ECG, Chest X-ray, X-ray abdomen, Ultrasonography of abdomen: Histopathological examination. Exclusion Criteria- Hemodynamically unstable patients: Arterial hypotension and bleeding abnormality. Ascitic fluid cholesterol is an effortless, despicable and consistent biochemical parameter to differentiate (cirrotic) transudative and other ascites from malignant ascites. It is not useful in differentiating transudative cirrhotic from other tubercular ascites.

**Keywords :-** Mental Ascites, Nephrosis, Inflammation, Portal hypertension, Adenosine deaminase.

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### INTRODUCTION

Ascites is determined as presences of pathological changes in peritoneal cavity. It's mainly accumulation of free fluid. Clinically highest cases of ascites are a most complications diseases such as cirrhosis, congestive heart failure, tubercular peritonitis, nephrosis, disseminated malignancy, ect. As the

development of ascites in cirrhotic patients is related with a mortality of 15%-44% for long periods. [1, 2] Ascites can only be treated by correction of essential cause.

Therefore, to valuation of patient with ascites is imperfect without cause of ascites is recognized If not, a positive diagnosis of ascites patients in malignancy/any

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infection is proved by cytology or culture, a final cause cannot be absolutely recognized by predictable analysis of ascitic fluid. Sometime malignant tumors can be producing ascites without shedding malignant cells into ascitic fluids, that is, by setting up inflammation of the peritoneum and blocking lymphatic or blood vessels.

These cells are rarely found in patients with diffuse hepatic metastasis in the absence of peritoneal implants and in patients with hepatocellular carcinoma superimposed on cirrhosis with portal hypertension. Little amount of ascitic fluid has minute defer and poor preservation of cell, at the same time, benign "mesotheliosis. It is impossible to differentiate from malignant cells by routine morphology studies alone.

Recently, malignant and tubercular are both ascites is transuding in nature with lymphocytic predominance. Serum-ascites albumin gradient (SAAG) showed less value and it is not differentiated easily from each other. Ascitic fluid adenosine deaminase activity (ADA) is notable elevated in tubercular peritonitis than other ascites diseases. Many studies have shown ascitic fluid fibronectin and cholesterol are established superior to the conventional methods of ascitic fluid analysis in differentiating ascites caused by malignancies from others.<sup>3-5</sup> Estimation of cholesterol levels in ascitic fluid has been initiate useful in discriminate various types of maligant ascites from tubercular ascites.

The cholesterol may initiate in cell membrane can be degeneration of tumor cells or surrounding benign cell. Which can enter the cavity from the interstitial space because of obstructed lymph vessels or be related to raised permeability of the carcinomatous serous membrane or due to enhanced movement of plasma liporproteins into the cavity of peritoneal cavity. Elevated cholesterol concentrations have also been reported in inflammatory conditions involving the peritoneum, acute pancreatitis and chronic cardiac congestion. Usually, Ascitic fluid cholesterol is not a reflection of serum cholesterol concentration.<sup>6</sup> Ascitic fluid cholesterol alone due to higher concentration of cholesterol in effusion is more specifically related to tumor involvement of the serosal cavity. Now a days, fibronectin and cholesterol levels of peritoneal fluid had been found to differentiate among ascites of various aetiologies. The estimation of fibronectin stages in fluid is sensitive but complicated. Therefore the present study we have taken. To diagnosis of ascetic fluid cholesterol and serum albumin in differential values of Ascites.

#### **Aims and Objectives**

- To determine the ascitic fluid cholesterol levels in various types of ascites.
- To evaluated SAAG in various types of ascites.

- To compare diagnostic values of ascitic fluid cholesterol levels v/s SAAG.
- To compare clinical diagnosis with biochemical and cytological findings.
- To study specificity & sensitivity of ascitic fluid cholesterol levels in differential diagnosis of ascites.

#### **MATERIAL AND METHODS**

This prospective study was conducted. One hundred patients with ascites attending at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry, were selected for the study. The study was approved by Ethics Committee and informed consent was obtained.

100 cases of ascites of different etiology were selected in the age group of 15-65 years of either sex. Group A: 29 Cases of ascites caused by cirrhosis of liver, Group B 30 cases of ascites caused by Tuberculosis, Group C 25 cases of ascites caused by Malignancies, Group D 16 cases of ascites caused by others e.g. CHF, CRF, Nephrotic Syndrome, Aneia-hypoproteinemia, Bacterial Peritonitis.

#### **Paracentesis procedure:**

- Proper positioning of patients lower left abdominal quadrant.
- Aseptic precautions taken.
- 150 ml samples collected in two vials– one in EDTA for cytology& another one in plain vial for biochemistry.
- Samples were processed as soon as possible.

Ascitic fluid was drawn and examined like complete blood picture, liver profile, serum amylase and lipase, serum creatinine Alfa fetoprotein, CA-125, Prothrombin Time, Lipid profile, Serum CRP, Urine albumin, 24 hours urinary protein. Biochemical analysis of Ascitic fluid for Albumin, Total Protein, Cholesterol, Glucose, Amylase, LDH, CRP and ADA, Cytological examination for Cell counts and Differential count. Ascitic fluid with microbiological Analysis for gram stain, ZN stain, malignant cells and bacterial culture were performed. Other examination such as USG abdomen, upper GI Endoscopy, CT scan abdomen and Pelvis. Echocardiogram, Thyroid Profile, ECG, 2D echo, X ray chest. Upper GI endoscopy, FNAC of the peritoneal nodules and liver biopsy other tumor marker were done in selected cases where it was needed.

#### **Inclusion criteria:**

- Age >15 years
- Clinical features suggestive ascites.

#### **Exclusive criteria:**

- Haemodynamically unstable patients:

- Those patients who are already on treatment of chemotherapy and or radiotherapy.
- Bleeding abnormality.

#### Data analysis:

The results were statistically analyzed and their normal distribution, range, the mean, and standard deviation were calculated. Two tailed probability values of <0.05 was taken as representing significance.

#### RESULTS:

The frequently cirrhosis and tuberculosis are 3<sup>rd</sup> and 4<sup>th</sup> decade of ascites. In the 4<sup>th</sup> and 5<sup>th</sup> decade showed malignancy. In female, more common in tuberculosis congestive cardiac failure and anaemia. While cirrhosis of liver, nephrotic syndrome & malignancy were frequently results in males.

Out of 29 patients in group (cirrhotic), 21 (72.4%) were male and 8 (27.5%) were female.

Amongst 30 patients of group (tubercular ascites), 20(66.6%) were male and 10 (33.3%) were female. In malignant ascites group, out of 25 patients, 15 (60%) were male and 10 (40%) were females. Congestive Cardiac failure Out of 6 patients 2 (33.3%) were male and 4(80%) were female. The maximum number of cases in group and were in the age group of 41-50 years (11& 8 respectively). In group, the significant numbers of 29 cases were in age group of more than 51 years. While in group, age group of 20-40 years had maximum cases (15). The mean age among patients of group was 43.68.89 years, in group, 39.9 8.14 years, in group, 52.710.76 years, while in group it was 38.47.8years.

In present study, turbid appearance mostly present in the tuberculous peritonitis and in Malignancy .while in the cases of cirrhosis of liver, congestive cardiac failure, nephrotic syndrome and anaemia mostly clear yellow/amber coloured. In tuberculosis (90% cases) and ascites in Malignancy (64 % cases) haemorrhagic fluid was established.

**Table 1: Aetiological distribution of ascites cases.**

Sl.no	Aetiological	Cases	Percentage
Group A	Cirrhosis of liver	29	29%
Group B	Peritoneal Tuberculosis	30	30%
Group C	Ascites in malignancy	25	25%
Group D	Congestive Cardiac failure	6	6%
Group E	Nephrotic syndrome	05	5%
Group F	Anemia hypoprotienemia	05	5%

**Table 2: Age wise distribution of ascites cases.**

Groups	Age ranges								Ages mean $\pm$ S.D.			
	23-40		41-50		51-60		>61		percentage		Male	Female
	M	F	M	F	M	F	M	F	Total Male%	Total Female%		
A	5	4	9	3	6	1	1	0	21(72.4%)	8(27.5%)	5.25 $\pm$ 3.30	2 $\pm$ 1.82
B	6	4	5	3	8	2	1	1	20(66.6%)	10(33.3%)	5 $\pm$ 2.94	2.5 $\pm$ 1.29
C	4	2	6	3	4	5	1	-	15(60%)	10(40%)	3.75 $\pm$ 2.06	2.5 $\pm$ 2.08
D	0	1	2	1	-	2	-	-	2(33.3%)	4(80%)	0.5 $\pm$ 1	1 $\pm$ 0.81
E	-	-	3	1	-	-	1	-	4(80%)	1(20%)	1 $\pm$ 1.41	0.25 $\pm$ 0.5
F	-	1	2	-	1	-	1	-	4(80%)	1(20%)	1 $\pm$ 0.81	0.25 $\pm$ 0.5

**Table 3: Gross appearances of Ascites fluids**

Colure of fluid	Cirrhosis of liver	Peritoneal Tuberculosis	Ascites in malignancy	Congestive Cardiac failure	Nephrotic syndrome	Anemia hypoprotienemia
Yellow	69%	-	-	100%	100%	100%
Amber	17.2%	-	-	-	-	-
Turbid	10.3%	90%	64%	-	-	-
Haemorrhagic	3.4%	10%	36%	-	-	-

**Table 4: Distribution of SAAG.**

SAAG(mg/dl)	Group-A	Group-B	Group-C	Group-D	Group-E	Group-F
	No of patients	No of patients	No of patients	No of patients	No of patients	No of patients
0-1.1	19(65.5%)	24(80%)	6(24%)	4(66.6%)	4(80%)	3(60%)
>1.1	10(34.4%)	6(20%)	19(76.0%)	2(33.3%)	1(20%)	2(40%)

**Table 5: Distribution of ascites cholesterol.**

Ascitic fluid cholesterol (mg/dl) ranges	Group-A N=29	Group-B N=30	Group-C N=25	Group-D N=6	Group-E N=5	Group-F N=5	Mean±S.D.
	No. of patients	No. of patients	No. of patients	No. of patients	No. of patients	No. of patients	
<25	9(31.0%)	12(40%)	4(16%)	1(16.6%)	1(20%)	-	4.5±4.92
26-47	10(34.4%)	16(53.3%)	5(25%)	1(16.6%)	3(60%)	3(60%)	6.33±5.64
48-60	6(20.6%)	1(3.3%)	13(52%)	4(66.6%)	-	2(40%)	4.33±4.76
>60	4(13.7%)	1(3.3%)	2(8%)	-	1(20%)	-	1.33±1.50

## DISCUSSION

Nowadays one of the most frequent challenges in the treatment of ascites patients that is cirrhosis, congestive heart failure, tubercular peritonitis, nephrosis, disseminated carcinomas. This fluid can be exudates of tuberculous peritonitis and malignancy is common and also transudate, form that play vital role various cirrhosis, renal problem and other pathological problem. Many authors identified for new biochemical markers in the serum and ascitic fluid is still under identification In present study cholesterol have shown to be capable marke. In our study we found most of our cases (51%) in age group 41to 50 yrs., which matches with study of yogesh kumar . et al20177. i.e. (72%).

In the present study 66 % patients were male and 34 % (1) were female that correlated with Nath et al 19668 in which male and female percentage was 70% and 30% respectively. 42% cases of Jain S.C. et al 19669and Mehrotra M.P101964 (30%).(50%) cases of ascites were seen in tuberculosis that are comparable with 30% our observation due to more social campaigning, early identification & treatment of tuberculosis we found .

Our study observation 06 % cases of congestive cardiac failure as a cause of ascites. which is correlated with Mehrotra M. P. and Mangal R.P. 1964 (6%) study. For unexplained reason CCF was found to be the cause of ascites in a study by Sikka et al 196711. (21.7%). Similar to the finding of Tito L.et al 198812 (56.7%) and Ljubi Ci. C.N. et al 1993 (59.2%) 13 cases.

In present study male and female had about equal rate of malignant and other ascites, which was correlated to Garg R et al 14and Sood et al in cirrhotic and tubercular ascites, while elevated frequency 15, 12 of malignant ascites in female than male. Predominant cell type in ascitic fluid was lymphocyte in all groups, except

in group –B where it was RBC which was similar to the study by Simon B et al.15

Similarly cytological examination for malignant cells in group –C was positive in 12out of 25(48%) patients whereas sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy was 48% 100%, 100%, 64. 51%, and 72. 5% respectively. Even though, the specificity was very high (100%) but the sensitivity was very low (48%). Cytological examination cannot be used as a good screening diagnostic tool. These results are similar with studies of Gerber AL et al 16. Rommette et al 17, Castardo et al18.

In present study, in serum total protein of cirrhotic with tubercular and malignant ascites showed low diagnostic accuracy and sensitivity. The serum ascites albumin rise was >1.1gm / in cirrhotic ascites and other ascites while it was < 1.1 gm/ dl in tubercular and malignant ascites this results correlated by Pierre Pare et al.19

Using cut off, value of ascitic fluid cholesterol 48 mg/dl had lowest sensitivity (15%) and diagnostic accuracy (50.50%) there is no diagnostic importance in differentiating cirrhotic from tubercular ascites, while at same cut off value of 48 mg/ dl it appeared highest sensitivity (89.5%) and diagnostic accuracy (95%) in differentiating cirrhotic from malignant ascites. This findings is similar to the observation made by Garg R et al and Gupta R et al. There was no significant difference in the serum cholesterol level in group A, group B, group C and group D, E, F and In ascites due to malignancy a mean ascitic fluid cholesterol level of 61 mg/dL was found. These values specify that cholesterol levels in ascites due to malignancy are significantly higher than those found in non – malignant lesion these results correlated with Martin Prieto et al20 have found high

concentration of serum cholesterol in malignant ascites group than non malignant ascites group

## CONCLUSION

In conclusion of our study, Ascitic fluid cholesterol having high specificity, it can be used for differentiating between non-malignant and malignant

ascites and also help to differentiate tubercular ascites from malignant ascites. Therefore, this parameter is being clear-cut and cost efficient can be widely used to differentiate non-malignant and malignant ascites but is not helpful in differentiating cirrhotic and others from tubercular ascites.

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