Original Research Paper Medicine

The Role of Aftp in the Diagnosis of Tubercular Ascites

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KEYWORDS

Introduction

Ascites literally means 'an accumulation of fluid in the peritoneal cavity, causing abdominal swelling'. One of the most common causes of ascites is cirrhosis of the Liver, leading to portal hypertension which, in turn, causes collection of fluid in the peritoneal cavity. However, extra hepatic diseases may also lead to ascites, the common causes being infections like Tuberculosis, anemia/hypo-proteinemia, renal diseases, cardiac causes and malignancy. In India, Tubercular ascites occurs quite often. Tubercular Ascites is one of the forms of Extra Pulmonary Tuberculosis, which is often difficult to diagnose.

In clinical practice, a patient of ascites may often present a diagnostic dilemma. The dilemma increases when a patient may suffer from two different diseases. Tubercular peritonitis may often occur in a patient of cirrhosis of liver having long standing transudative ascites. When confronted with such a patient, it becomes imperative to properly diagnose the condition, so that the correct line of management may be started.

In patients with new-onset ascites of unknown origin, imaging studies like Ultrasound or CT scan of the abdomen should be done and peritoneal fluid should be analysed for cell count, albumin level, culture, total protein, Gram stain, and cytology.

Physical Inspection: Most ascitic fluid is transparent and tinged yellow. Cloudy ascitic fluid with a purulent consistency indicates bacterial infection. Tubercular infection may show a coagulum due to high protein consistency.

Cell count: Normal ascitic fluid contains fewer than 250 polymorphonuclear leukocytes (PMNs)/µL. Any inflammatory condition can cause an elevated white blood cell count. A PMN count of greater than 250 cells/µL is highly suggestive of bacterial peritonitis. In tuberculous peritonitis and peritoneal carcinomatosis, lymphocytes usually predominate.

Total protein: Previously, the classification of ascites was based on the level of ascitic fluid total protein (AFTP), which divided ascites into two types:

Exudative- AFTP $\geq$ 2.5 gm/dL

Transudative- AFTP $\leq$ 2.5 gm/dL

However, the accuracy is only approximately 56% for detecting exudative causes. The total protein level may provide additional clues when used with the SAAG. An elevated SAAG and a high protein level are observed in most cases of ascites due to hepatic congestion.

SAAG: The SAAG is the best single test for classifying ascites into portal hypertensive (SAAG >1.1 g/dL) and non–portal hypertensive (SAAG < 1.1 g/dL) causes. Calculated by subtracting the ascitic fluid albumin value from the serum albumin value, it correlates directly with portal pressure. The specimens should be obtained relatively simultaneously. The accuracy of the SAAG results is approximately 97% in classifying ascites. The terms high-albumin gradient and low-albumin gradient should replace the terms transudative and exudative in the description of ascites Classification of types of ascites according to the level of serum-ascites albumin gradient (SAAG)

Classification of Ascites by Serum-Ascites Albumin Gradient

HIGH GRADIENT ≥1.1 g/dL (11 g/L)	LOW GRADIENT <1.1 g/dL (11 g/L)
Alcoholic hepatitis	
Budd-Chiari syndrome	Biliary ascites
Cardiac ascites	Bowel obstruction or infarction
Cirrhosis	Nephrotic syndrome
Fatty liver of pregnancy	Pancreatic ascites
Fulminant hepatic failure	Peritoneal carcinomatosis
Massive liver metastases	Postoperative lymphatic leak
"Mixed" ascites	Serositis in connective tissue diseases
Myxedema	Tuberculous peritonitis
Portal vein thrombosis	
Sinusoidal obstruction syndrome	

Culture/Gram stain/smear examination: Culture has 92% sensitivity for the detection of bacteria in ascitic fluid, provided that samples are inoculated into blood culture bottles immediately, at the bedside. In contrast, Gram stain is only 10% sensitive for visualizing bacteria in early-detected spontaneous bacterial peritonitis. A smear for acid fast bacilli has a diagnostic sensitivity of only 0-3%. A definitive diagnosis of TB can be made by culturing Mycobacterium Tuberculosis organisms from a specimen obtained from the ascitic fluid. However, its yield is very low: 30-50%; and it may take 2-8 weeks to receive the results.

Adenosine De-Aminase (ADA) measurement: It is one of the most widely used biomarkers for the diagnosis of Extra Pulmonary Tuberculosis.ADA is an enzyme involved in purine metabolism that is found in many tissues, particularly in lymphocytes of the lymphoid tissue. Activity of this enzyme increases in TB infection because the Mycobacterial antigens stimulate the T-lymphocytes. It has been proposed to be a useful surrogate marker for TB in body fluids, such as pleural, pericardial, and peritoneal fluid, although possible false-negative and false-positive results should be considered. The sensitivity and specificity for diagnosing Tuberculous peritonitis have been reported to be 100% and 97%, respectively, using cut-off values from 36 to 40 IU/L, with the optimal cut-off point of 39 IU/L. Liao et al. suggested that lowering cut-off value to 27 IU/L could increase the sensitivity and specificity to 100% and 93.3%, respectively, in patients with liver cirrhosis, in whom false-negative results are a concern.

AIMS AND OBJECTIVES:

In our setting, we deal mostly with patients belonging to the poor socioeconomic strata. There is a serious dearth of funds, and only the very basic investigations are available free of cost to the patients. The estimation of albumin level is an expensive procedure. Hence, it is not economically feasible to estimate the serum and ascitic albumin level for calculating SAAG in every patient. Ascites fluid total protein is a much cheaper alternative. Hence, in this study, we attempted to compare the efficacy of AFTP against SAAG in the diagnosis of Tubercular Ascites.

Research Question: Is AFTP as effective as SAAG for the diagnosis of Tubercular Ascites?

MATERIAL AND METHODS

Patients who were admitted to Medicine Wards at JA Hospital, attached to GR Medical College, Gwalior, with the complaints of distension of abdomen, proved by ultrasound to have ascites, were included in the study. Total 102 Patients of ascites were included in the study. The incidence of Tuberculous ascites was observed and special features regarding their clinical presentation, ascitic fluid values and imaging studies were noted.

Inclusion criteria-

- Patients with ascites proved by ultra sound
- Patients aged more than 18 years

Exclusion criteria –

1. Pregnancy,
2. Hemodynamic instability
3. Bleeding disorders/prolonged prothrombin time.

After obtaining clearance from the Institute Ethical Committee, all patients were subjected to detailed workup as follows:

1. Complete Blood Count
2. Blood Sugar: Fasting and Post prandial
3. Liver Function Tests
4. Kidney Function Tests
5. Prothrombin Time
6. Australia Antigen Test
7. Hepatitis C IgG antibody in selected patients.
8. Ultrasound imaging of abdomen
9. Ascitic fluid analysis: a) Routine and Microscopy – Protein, Sugar, Cells etc.
   b) Adenosine De-Aminase (ADA) level estimation.

10) X Ray of Chest, PA view.

Definition of Tubercular ascites: The patient was diagnosed as a case of Tubercular ascites when the ADA level was found to be above the cutoff level of 30-45 IU/L.

OBSERVATIONS

TABLE NO.1
Disease wise distribution

Disease	No. of patients(n=102)
Cirrhosis of Liver	71(69.60%)
Tuberculosis Of Abdomen	18(17.6%)
Spontaneous Bacterial Peritonitis	6(5.8%)
Anemia with Hypo-proteinemia	5(4.9%)
Renal Disease	4(3.92%)
Cardiogenic Cause	2(1.96%)
Malignancy	1(0.98%)
Pyo-peritoneum	1(0.98%)

As shown in the table above, Tubercular ascites was seen in 18 (17.6%) patients out of the 102 subjects studied. Characteristics of these patients are as follows:

TABLE NO. 2
Distribution according to age and gender: N=18

Age group (years)	Male	Female
20-40	03 (16.66%)	03 (16.66%)
40-60	06 (33.33%)	04 (22.22%)
60-80	00 (00.00%)	02 (11.11%)

TABLE NO.3
Table depicting the clinical features of patients. N=18

Clinical Features	Number of patients	Percentage
Distension of abdomen	18	100%
Fever	02	11.11%
Pain in Abdomen	03	16.66%
Reduced Appetite	05	27.77%
Jaundice	05	27.77%
Pallor	15	83.33%
Pedal Edema	09	50.00%

TABLE NO.4
Relationship between SAAG, AFTP and ADA n=18

	SAAG<1.1	AFTP>2.5
Number of patients Having ascitic ADA >30-45IU/L N=18	13 (71.22%)	16 (88.88%)

Chi=7.22.

dp=1

p=0.007

Discussion:

The diagnosis of Extra Pulmonary TB (EPTB) remains a challenge all over the world, even more so in India. Peritoneal Tuberculosis is the sixth most common site of Extra Pulmonary TB. Peritoneal TB occurs in three forms: wet type with ascites, dry type with adhesions and fibrotic type with omental thickening and loculated asites.(K Mimidis)

In this study, an attempt was made to diagnose Tuberculous Ascites by the use of three methods: ADA in ascitic fluid, SAAG ratio and AFTP levels in ascitic fluid. ADA level of 30-45 IU/L was taken as the basis for diagnosis of Tubercular Ascites. Out of 102 patients, it was found that 18 (17.6%) patients fulfilled this criterion of TB ascites. The proportion of EPTB cases amongst all cases of TB varies in different populations all over the world. At present, the current reported rate of abdominal Tuberculosis 11% of all EPTB.(Al Karawi et al). In a large series of autopsies conducted in Western India, evidence of abdominal TB was found in 3.72% of cases by Pimparkar et al. in the period of 1964 to 1974. In our study, the incidence of abdominal tuberculosis was found to be higher. The reason could be the different method of diagnosis. Also, there has been a recent increase in the incidence of abdominal Tuberculosis all over the world. The recent increase in the prevalence rate of abdominal TB is believed to be a result of an increased prevalence of HIV infection in the world.

The demographic distribution of patients revealed that the disease occurred more commonly in male subjects in the age group of 40-60 years. The common clinical features included distention of abdomen (100%), pallor (83.33%) and pedal edema (50.00%).

In the group of patients having raised ascitic fluid ADA, we found that the number of patients having raised AFTP (16 cases, 88.88%) was more than the patients having lower SAAG (13 cases, 71.22%). This difference was statistically significant p=0.007. This means that raised AFTP was a better means for detecting exudative ascites due to Tuberculous infection in the abdomen than lower SAAG ratio.

Conclusion: In the setting where calculating SAAG may prove to be quite expensive, AFTP may prove to be a good predictor of Tubercular infection in ascitic fluid.

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