Study of serum ascites albumin gradient in classifying ascites with portal hypertension and ascites without portal hypertension

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Abstract

Asitic fluid analysisis routinely done for finding out the type of ascites. In the present study we have analysed ascitic fluid to calculate serum ascites albumin gradient. This parameter helps us to find out whether ascites is with portal hypertension(PHT) or without PHT. Total 60 patients with ascites were analysed for SAAG and compared. The level of SAAG>1.1gm% is indicator of portal hypertension while SAAG level <1.1gm% is indicates the absence of portal hypertension.

Keywords: portal hypertension (PHT), SAAG (serum ascites albumin gradient).

INTRODUCTION

Ascites is a common clinical problem defined as an abnormal collection of free fluid in peritoneal cavity. The main function of this fluid is lubrication. For ascites to become clinically evident, about 150ml of fluid needs to be in peritoneal cavity. Factors contributing to accumulation of fluid in abdominal cavity:

1. Increased sympathetic out flow
2. Increased hydrostatic pressure in splanchnic capillary bed
3. Hypoalbuminemiaand reduced plasma oncotic pressure.
4. Elevation of pressure in hepatic sinusoids.
5. Renal factors.

Traditionally ascetic fluid has been routinely tested for:

1. Cell count
2. Bacterial culture
3. Total protein concentration

Certain other criteria to differentiate ascites are

1. Specific gravity
2. Ascetic LDH
3. Total leucocyte count
4. Asitic fluid to serum total protein ratio

Even if ascites is classified as exudative (ascetic fluid total protein>2.5 to 3.0gm%) and transudative (AFTP<2.5 to 3.0gm%) many problems and exceptions have been noted with this concept. Many infected or malignant samples have been reported to have protein concentration in transudative range and many samples obtained from patients with cirrhosis and heart failure have had concentrations in exudative range. Secondly this concept makes no provision for those patients who have mixed ascites that is portal hypertension and other cause of ascites. To overcome this, the concept of SAAG was introduced. Using this gradient we can classify ascites as portal hypertension related and non portal hypertension related ascites.

MATERIAL AND METHODS

Total 60 patients who were diagnosed to have ascites were studied. And these were divided into following groups
We have levels of albumin and total protein in serum and ascitic fluid.  


2. Estimation of total protein by Biuret method (Reinhold, 1953).

**OBSERVATION AND RESULT**

**Table 1: Levels of total proteins in serum and ascitic fluid**

<table>
<thead>
<tr>
<th>Group</th>
<th>Serum total protein (gm%) Mean + S.D.</th>
<th>Ascitic fluid total protein (gm%) Mean + S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>6.17 + 1.19</td>
<td>1.38 + 0.68</td>
</tr>
<tr>
<td>II</td>
<td>6.30 + 0.77</td>
<td>3.76 + 0.91</td>
</tr>
</tbody>
</table>

*p > 0.05, **p < 0.05

The total protein levels in serum in group I and group II have Mean and SD as 6.17 + 1.19 and 6.30 + 0.77 respectively. The p value being > 0.05, the difference between these groups was not statistically significant. The total protein levels in ascetic fluid in group I and group II have mean and SD as 1.38 + 0.68** and 3.76 + 0.91** respectively. The difference was found to be statistically significant with p value < 0.05.

**Table 2: Levels of albumin in serum and ascetic fluid and value of SAAG**

<table>
<thead>
<tr>
<th>Group</th>
<th>Serum albumin (gm%) Mean + S.D.</th>
<th>Ascitic fluid albumin (gm%) Mean + S.D.</th>
<th>SAAG (gm%) Mean + S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>3.25 + 0.66</td>
<td>0.84 + 0.49**</td>
<td>2.41 + 0.81***</td>
</tr>
<tr>
<td>II</td>
<td>3.26 + 0.42</td>
<td>2.35 + 0.96**</td>
<td>0.91 + 0.82**</td>
</tr>
</tbody>
</table>

*p > 0.05, **p < 0.05, ***p < 0.05

Serum albumin levels in group I and II have mean SD value as 3.25 + 0.66* and 3.26 + 0.42* respectively. Again p > 0.05 so difference was not statistically significant. Ascitic fluid levels in group I and II have mean SD value as 0.84 + 0.49** and 2.35 + 0.96** respectively. Again p < 0.05 so difference was statistically significant. This table also shows values of SAAG in both groups. In group I it was found to be > 1.1 and in group II it was < 1.1. The discrimination value for SAAG was taken as 1.1. The SAAG value > 1.1 indicates PHT as seen in group I and < 1.1 indicates absence of PHT as seen in group II.

**DISCUSSION**

This diagnostic approach is based on the fact that portal pressure gradient is directly related to the oncotic pressure gradient between the splanchnic vasculature and the ascites. 2,5 SAAG is a gradient and not a ratio. It is a difference between serum and ascitic fluid albumin levels. And albumin is the major determinant of oncotic pressure in serum, SAAG is directly related to oncotic pressure gradient and thus proportional to the portal pressure gradient. 2,3 Thus, with the help of SAAG we are determining portal pressure gradient and differentiating ascites into:

1. Ascites with portal hypertension
2. Ascites without portal hypertension

**REFERENCES**


Source of Support: None Declared
Conflict of Interest: None Declared