SERUM GLYCOPROTEINS IN THE LIVER DISEASES

IV. ALPHA-1 ACID GLYCOPROTEIN LEVEL IN LIVER CIRRHOSIS

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Summary

Circulating alpha-1 acid glycoprotein level in cirrhotic patients was determined by radioimmunoassay,
and was compared to the ones in normal subjects and chronic active hepatitis with sublobular necrosis.
Serum alpha-1 acid glycoprotein levels in liver cirrhosis (p<0.001) and chronic active hepatitis with
sublobular necrosis (p<0.02) were significantly reduced comparing to the normal subjects, although any
statistically significant difference was not observed between the formers.

In liver cirrhosis, the serum alpha-1 acid glycoprotein level correlated negatively with serum albumin
concentration but neither with serum alpha-1 globulin fraction nor with Indocyanine green clearance rate.

Key Words: alpha-1 acid glycoprotein, liver cirrhosis, chronic hepatitis, sublobular necrosis, KICC, alpha-globulin,
albumin, S-GPT, S-GOT, alkaline phosphatase.

Introduction

The concentration of mucoprotein was found to increase in the blood of patients affected
with cancer as well as pneumonia1). "Mucoprotein" was a crude fraction of alpha-1 acid
glycoprotein (AGP) at that time when Winzlar described a method for determining it2,3). A
single radial immunodiffusion method for quantitation of the mucoprotein was reported4). More
recently, we developed a radioimmunoassay to determine AGP more quantitatively5).

Greenspan determined the mucoprotein in serum sample obtained from 1,533 adult
patients from a General Medical Service and reported that more than 80% of patients with
infectious or homologous serum hepatitis and more than 70% of 94 cases of portal cirrhosis
showed low mucoprotein levels6).

The present study was made of serum AGP concentration in liver cirrhosis comparing to
normal and chronic active hepatitis with sublobular necrosis. The latter was selected
for the study since it is thought to be a severe one among chronic active hepatitis. Correlations
between serum AGP level and serum albumin level, alpha-1 globulin fraction to which AGP belongs, or Indocyanine green
clearance rate were also determined.

Materials and Methods

The present study included 27 patients with liver cirrhosis, 11 patients with chronic active
hepatitis with sublobular necrosis and 10 normal subjects. Sera were obtained serially
at least five times from each patient by venipuncture and mean values of AGP level calculated for each patient were used for analyses. All samples were obtained from the patients during their admission in the Okayama University Hospital or Mitoyo General Hospital. They were stored at $-20^\circ C$ until analysed.

The following determinations were done in all patients: urinary urobilinogen, serum total and direct bilirubin, serum glutamic pyruvic and glutamic oxalacetic-transaminases, serum choline esterase, total protein and its fractions, serum total cholesterol, alkaline phosphatase, cephaline flocculation, thymol turbidity and Indocyanine green clearance. The final clinical diagnosis was based on clinical course of the patient, laparoscopic findings and liver biopsy. Serum AGP level was determined as previously described $^5$.

**Results**

Serum AGP was measured by radioimmunoassay in sera of 27 cirrhotic patients and the level had a mean value of $49.3 \pm 14.5$ mg/dl (Table 1). In 10 normal subjects, serum AGP level had a mean value of $90.4 \pm 12.5$ mg/dl. Therefore between these groups, a statistically significant difference was calculated ($p<0.001$). The AGP level in chronic active hepatitis with sublobular necrosis was significantly reduced comparing to the normal ($p<0.02$) but the difference between this and liver cirrhosis was not statistically significant.

<table>
<thead>
<tr>
<th>Datum</th>
<th>No. of cases tested</th>
<th>AGP, mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Normal</td>
<td>10</td>
<td>90.4</td>
</tr>
<tr>
<td>Chronic active</td>
<td>11</td>
<td>63.3</td>
</tr>
<tr>
<td>hepatitis with SN*</td>
<td></td>
<td></td>
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<tr>
<td>Liver cirrhosis</td>
<td>27</td>
<td>49.3</td>
</tr>
</tbody>
</table>

SN*: sublobular necrosis.

Serum albumin, alpha-1 globulin and Indocyanine green clearance rate ($K_{ICG}$) were analysed for all sera obtained from the cirrhotic patients mentioned above. As shown Fig. 1, when serum albumin concentration was plotted vs serum AGP level, a negative correlation was observed between these parameters ($r=-0.612$, $p<0.01$). There was no correlation between alpha-1 globulin fraction and AGP level (Fig. 2). When $K_{ICG}$ values were plotted vs AGP, there was no correlation in the total but a positive correlation was observed in the patients with $K_{ICG}$ lower than 0.06 (Fig. 3). The other liver function