RAPID TURNOVER SERUM PROTEINS
IN FULMINANT HEPATITIS

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Summary
An attempt was made to find reliable indices for early diagnosis of fatal cases of acute viral hepatitis, using the values of serum proteins with rapid turnover. Of the subfractions of serum protein, prealbumin, \( \alpha_2 \)-HS-glycoprotein and Normotest were measured simultaneously before the appearance of hepatic coma or gastrointestinal bleeding in 78 cases of acute viral hepatitis, verified by biopsy or necropsy. The mean value of prealbumin with a very short half-life of one or two days, was 6.0 mg/dl in fatal cases, 7.4 mg/dl in surviving ones of subacute form of fulminant hepatitis. The difference between fatal and surviving cases was not statistically significant. In contrast to this, the values \( \alpha_2 \)-HS-glycoprotein with a comparatively short half-life of four to six days, showed statistically significant difference between fatal (21.9 mg/dl) and surviving cases (37.4 mg/dl). Normotest was also depressed in fatal (10.7%) and surviving cases (45.3%). The difference was statistically significant. The present results indicate the possibility of differentiating fatal cases from surviving ones at an early stage, using the reduction of \( \alpha_2 \)-HS-glycoprotein and the value of Normotest.

Key Words: fulminant hepatitis, rapid turnover serum protein, \( \alpha_2 \)-HS-glycoprotein, Normotest prealbumin.

Introduction
Acute viral hepatitis is a relatively benign disease. However, a fulminant or subacute form with serious clinical signs such as ascites, edema, gastrointestinal bleeding and mental disturbance, is sometimes encountered. In such cases the outcome is generally death from hepatic failure or the development of postnecrotic cirrhosis\(^1\)\(^2\). It is useful in the early stages to differentiate fatal cases from surviving ones, especially before the appearance of hepatic coma and/or gastrointestinal bleeding. Such differentiation facilitates decisions regarding blood exchange\(^3\) and other therapies\(^4\)\(^5\)\(^6\). Therefore, we attempted to find reliable indices for the early diagnosis of fatal cases of acute viral hepatitis, using the measurement of subfractions of serum protein (acute phase reactants: serum proteins with rapid turnover)\(^7\) and Normotest (the complex of coagulation factors’ II, VII and X\(^8\)\(^9\)) compared to prothrombin level (the Quick test).

Material and Methods
Seventy-eight cases of acute viral hepatitis, verified by biopsy or necropsy, which were admitted during the period from April, 1971, to February, 1977, to the First Department of Internal Medicine, Kanazawa University Hospital. The cases were divided according to clinical and histological features, into 3 groups as follows: 23 cases (14 fatal cases and 9 surviving ones) of subacute form of fulminant hepatitis, with histological changes of submas-
cites, and edema (group A): 15 cases with zonal or submassive necrosis without serious signs (group B); and 40 cases with the classic type of spotty necrosis (group C)-biopsy was performed in the regeneration period.

Of the subfractions of serum protein, prealbumin and \( \alpha_2 \)-heat-stable glycoprotein (\( \alpha_2 \)-HS-glycoprotein) were measured in the sera of all the cases by the simple immuno diffusion method using anti-serum made by Boehringer-Berke. Normotest was also done before the appearance of hepatic coma and/or gastrointestinal bleeding. Moreover, prealbumin \( \alpha_2 \)-HS-glycoprotein and Normotest were serially estimated in several cases of each group.

**Results**

As presented in Fig. 1, the mean value of prealbumin with a very short half-life of one or two days\(^7\) was 6.0±4.7 mg/dl in fatal cases, 7.4±4.3 mg/dl in surviving ones, 8.7±4.4 mg/dl in the cases of group B and 18.5±8.3 mg/dl in the cases of group C. The difference between fatal and surviving cases was not statistically significant (p<0.05). Prothrombin level (the Quick test) was depressed in both fatal and surviving cases. The difference was not statistically significant (p<0.05), and showed considerable overlap.

In contrast to this, \( \alpha_2 \)-HS-glycoprotein with a comparatively short half-life of four to six days\(^8\), was substantially reduced in group A; 27.5±7.4 mg/dl and B; 60.9±13.9 mg/dl. There were statistically significant differences between fatal and surviving cases, each mean value, 21.9±7.4, 37.4±6.9 mg/dl and also between the cases of groups A and B (p<0.05). Moreover, the increase of the value of \( \alpha_2 \)-HS-glycoprotein in 12 of 40 (30%) cases of group C was noticed.

The value of Normotest was also substantially reduced in the fatal cases of group A. There were statistically significant differences between fatal and surviving cases, each mean value, 10.7±4.3, 45.3±19.6% and also between the cases of groups A and B (p<0.05, Fig. 2).

Comparison of \( \alpha_2 \)-HS-glycoprotein and Normotest, as shown in Fig. 3, yields high degrees of correlation both for total cases of acute hepatitis (\( \gamma =0.766, n=44, p<0.01 \)), and for the cases of only subacute form of fulminant hepatitis (\( \gamma =0.852, n=15, p<0.01 \)).

Prealbumin, which was substantially reduced in most cases of group A and B and about half the cases of group C, rapidly returned to

![Fig. 1. Prealbumin and prothrombin level. Data before the occurrence of hepatic coma and/or G-I bleeding.](image1)

![Fig. 2. \( \alpha_2 \)-HS-glycoprotein and Normotest. Data before the occurrence of hepatic coma and/or G-I bleeding.](image2)