Original Articles

TOTAL HAEMOLYTIC COMPLEMENT ACTIVITY IN APPARENTLY HEALTHY PAKISTANIS AND PATIENTS WITH LIVER DISEASE

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Abstract

Total haemolytic complement (CH50) activity was estimated in 90 apparently healthy individuals and 68 patients with various liver diseases. Low levels of total complement were observed in cirrhosis and high levels in patients with liver cancer. The normal level in this study was 28.7 units.

Introduction

Abnormalities in the complement system have been observed in a variety of hepatic disorders. They may be due to increased synthesis of various components of the complement in inflammatory and neoplastic diseases, diminished synthesis in patients with extensive liver damage or increased utilization in the formation of antigen antibody complexes in autoimmune diseases of the liver (Pagalstos et al., 1971).

This paper reports the levels of total haemolytic complement (CH50)in apparently healthy Pakistanis and patients with various liver diseases.

Material and Method

Total complement (CH 50)activity was determined in 90 apparently healthy controls, 27 cases of acute viral hepatitis, 21 cases of cirrhosis of the liver and 20 with liver cancer. A histological confirmation of the diagnosis was obtained in all the cases.

Serum Bilirubin, alkaline phosphatase, serum transaminases and prothrombin time were measured by routine laboratory methods. Serum protein electrophoresis was performed by Beckman microzone system and hepatitis B antigen by counter-current. immunoelectrophoresis (Zuberi and Lodi, 1974).

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Total haemolytic complement was determined by the method of Kabat and Mayer (1961). Sheep red cells in Alsever's solution were washed and after sensitization with rabbit haemolysin were incubated for 90 minutes at 37°C. Different amounts of complement percentage lysis were determined by Von Krohg's plot and the serum volume for 50% lysis was then expressed as reciprocal value to give CH 50 units.

Results

Table I shows mean values±S.D.±S.E. in normal subjects and patients with liver diseases. The mean level of total haemolytic complement in 90 healthy controls (40 males and 50 females) was 28.74±0.85 (CH 50) units.

Table I: Total Haemolytic Complement Levels in Healthy Subjects and Patients with Liver Disease

Group	*No of Cases*	*Range (CH 50 units)*	*Mean ± SD ± S.E.*
Normal	90	15—50	28.74 ± 8.08 ±0.85
Acute Viral Hepatitis	27	15—45	27.98 ±10.06 ±1.82
Cirrhosis	21	13—34.4	23.08 ± 6.80 ±1.48
Liver Cancer	20	28—55	40.5 ± 8.08 ±1.9

Table II: Serum Complement (CH50 Units) at Different Levels of Albumin, SGOT, SGPT, Bilirubin and Hepatitis B Antigen

Diagnosis	*Albumin*		*SGOT*		*SGPT*		*Bilirubin*		*Hb/Ag*	
	Normal	*Low*	*Normal*	*Raised*	*Normal*	*Raised*	*Normal*	*Raised*	*Positive*	*Negative*
Acute Viral Hepatitis	27.5 (24)	28.46 (3)	29.9 (3)	26.06 (24)	28.28 (10)	27.06 (17)	28.6 (3)	21.36 (24)	27.24 (7)	28.0 (20)
Cirrhosis	26.05 (7)	20.11 (13)	24.2 (3)	21.96 (17)	25.1 (5)	21.06 (15)	23.17 (15)	23.00 (5)	25.0 (1)	21.0 (20)
Liver Cancer	41.3 (13)	39.7 (7)	42.2 (3)	40.8 (17)	39.6 (14)	41.4 (6)	40.5 (17)	40.5 (3)	—	40.5 (20)

Note :—Number of cases is given in parenthesis.

The mean total complement levels were normal in viral hepatitis, low in cirrhosis, and high in liver cancer. No significant correlation was observed between CH 50 values and the serum albumin, transaminases, bilirubin and the presence or absence of hepatitis B antigen (Table II).

Discussion

The pattern of immune response, the liver diseases (Whittingham et al., 1973) and the levels of serum complement seems to differ in different ethnic groups. The mean total complement value in normal subjects in this study is lower than 34.9 units reported by Potter et al. (1973).

Increased total complement activity has been observed in viral hepatitis of moderate severity and non viral hepatitis and consistently low levels in massive hepatic necrosis and hepatitis associated with serum sickness like symptoms (Pagalstos et al., 1971; Alpert et al., 1971). The mean values obtained here are almost normal probably because most of the patients, with hepatitis were studied in the third or the fourth week of the disease when the acute phase was over. Arthritis and serum sickness-like symptoms associated with acute viral hepatitis were not seen in this series.

The reduction in the total complement activity observed here in patients with cirrhosis may be due to diminished synthesis in the chronically diseased liver (Alper et al., 1969; Colten, 1972) and extrahepatic sites (Colten et al., 1966) consumption by antigen and antibody complexes (Wilson and Dixon, 1970; Kohler and Ten Bensel, 1969) due to the increase in plasma volume (Leiberman and Reynolds, 1967) or the presence in the serum of a complement inactivating factor (Pickering et al., 1968).

Hypercomplementaemia due to increased synthesis in patients with liver cancer, reported by other workers (Pagalstos et al., 1971; Fox et al., 1971) has also been found in this study.

The changes in the total haemolytic complement in liver diseases in this study are similar to those reported by others (Pagalstos et al., 1971; Potter et al., 1973; Alpert et al., 1971; Fox et al., 1971) but the significance of lower levels in healthy subjects is still uncertain.

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