Study of acute phase proteins in liver disease

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Research Article

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ABSTRACT :

Acute-phase proteins are a class of proteins whose plasma concentrations increase (positive acute-phase proteins) or decrease (negative acute-phase proteins) in response to inflammation. Hence the present study was conducted to evaluate the levels of the acute phase proteins in the normal healthy group & the liver diseases patient.
The 40 liver diseases patients were enrolled in to the study. All the patients are informed consents. The liver diseases include the liver cirrohosis, jaundice, infective hepatitis. The age group of the patients are from 20-50 years. 20 normal healthy groups were also selected as control to study the levels of acute phase proteins in them. Ceruloplasmin and Serum transferrin is estimated from the pathological findings.
From the above study it can be concluded that the acute phase proteins in liver disorders plays important role. The increases level of the ceruloplasmin and transferrin shows the liver disorders.

Keywords: Acute-phase proteins, liver diseases patient, Ceruloplasmin, Serum transferrin, etc.

INTRODUCTION:

Acute-phase proteins are a class of proteins whose plasma concentrations increase (positive acute-phase proteins) or decrease (negative acute-phase proteins) in response to inflammation. This response is called the acute-phase reaction (also called acute-phase response).
In response to injury, local inflammatory cells (neutrophil granulocytes and macrophages) secrete a number of cytokines into the bloodstream, most notable of which are the interleukins IL1, IL6 and IL8, and TNFα. The liver responds by producing a large number of acute-phase reactants. At the same time, the production of a number of other proteins is reduced; these are, therefore, referred to as "negative" acute-phase reactants. Increased acute phase proteins from the liver may also contribute to the promotion of sepsis.[1]
The term acute phase response (APR) refers to the inflammatory response of the host occurring shortly after the tissue injury. It comprises a wide variety of reactions started by different causes, like infection, tissue injury, burn, trauma, surgery, cancer or immunological disorders. These reactions aim to prevent ongoing tissue damage, isolate and eliminate the cause of the inflammation, and begin the repair process necessary to restore the normal function. Usually, the local response is accompanied by a systemic reaction characterized by the fast alteration of the concentrations of several plasmatic proteins, the APPs (Acute Phase Proteins) produced by the liver (Baumann & Gauldie, 1994). In some diseases, the persistent immunological activation can cause chronic inflammation, often with pathological consequences. In other words, APR is a physiological condition occurring at the beginning of the inflammatory process and it is independent of the inflammation origin.
Measurement of acute-phase proteins, especially C-reactive protein, is a useful marker of inflammation in both medical and veterinary clinical pathology. It correlates with the erythrocyte sedimentation rate (ESR), however not always directly. This is due to the ESR being largely dependent on elevation of fibrinogen, an acute phase reactant with a half-life of approximately one week. This protein will therefore remain higher for longer despite removal of the inflammatory stimuli. In contrast, C-reactive protein (with a half-life of 6-8 hours) rises rapidly and can quickly return to within the normal range if treatment is employed. For example, in active systemic lupus erythematosus, one may find a raised ESR but normal C-reactive protein. They may also indicate liver failure.[2]
The acute phase response is a highly conserved system that

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takes place during inflammation. During this response the serum levels of a continuously growing list of plasma proteins change, either up- (some of them even 1000 fold) or downwards, under the influence of cytokines like IL-1, IL-6 or TNFa. Some APPs have antiinflammatory effects (e.g., C-reactive protein, leptin), while others influence leukocyte activation/trafficking (e.g., serum amyloid A), modulate the coagulation/complement cascade (e.g., anti-thrombin 3, Creactive protein) or work for example as scavenger proteins (e.g., haptoglobin, serum amyloid A).

The Ceruloplasmin and transferrin are the 2 important proteins considered as acute phase proteins. The increase levels of this two proteins is less distinct as compared to other proteins. The other proteins which shows changes in liver disorders are alha-1 antitrypsin, c- reactive and fibrinogen etc.

Methodology:

The 40 liver diseases patients were enrolled in to the study. All the patients are informed consents. The liver diseases include the liver cirrohosis, jaundice, infective hepatitis. The age group of the patients are from 20-50 years. 20 normal healthy groups were also selected as control to study the levels of acute phase proteins in them. Ceruloplasmin and Serum transferrin is estimated from the pathological findings.

Required permission was obtained from the concerned authorities for the study. The all the subject were informed about the aim of the study.

Inclusion Criteria:

- Liver cirrhotic patients
- Age group 20-50 years.

Exclusion Criteria:

- Renal failure patients
- Diabetes patients
- Pregnant women's

Result & Discussion:

The estimation of various markers was done in 40 liver diseases patients and 20 normal patients. Table 1 indicated the comparative evaluation of the liver proteins in the two study groups.

Table 1 : Comparative evaluation of the liver proteins in the study group

Parameters	Ceruloplasmin mg%	Transferrin mg%	Total protein g%	Albumin g%	Globulins g%
Group I: Liver Diseases patient	40.50±2.9	451.6±28.4	5.90±0.40	3.7±0.3	2.9±0.3
Group II: Normal Study Group Patient	19.6±2.4	270.8±11.5	6.30±0.2	4.1±0.4	2.8±0.6

Data is Mean ± Standard Deviation

From the above data the levels of the Ceruloplasmin and Transferrin is observed as evidently increased in the liver diseases patient. The levels of the Total proteins are decreased in the liver diseases patients. Similarly the level of the albumin is found to be lowered in the liver cirrhotic patient. Globulin levels showed there in no change in the both study group patients.

The Ceruloplasmin is solely synthesized in the liver. It is the type of the alpha 2 glycoprotein which is acute phase proteins. The elevated level of Ceruloplasmin is the indictor of the infections as well as inflammatory conditions. There are many conditions are observed which shows increased in there levels [3].

The other acute phase protein is Transferrin. It belongs to the group of Iron carrying beta –globulin and glycoprotein. An increase in transferrin was found in haemochromatosis and in infective hepatitis[4].

Serum Albumin has been measured to be a dependable marker of the functional status of liver. Present study shows a decrease in albumin in all cases of liver diseases. It was believed that both degradation and synthesis were depressed in cirrhosis [5,6]. Cirrhosis is characterized by a low serum albumin level.

Conclusion:

From the above study it can be concluded that the acute phase proteins in liver disorders plays important role. The increases level of the ceruloplasmin and transferrin shows the liver disorders.

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