International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 4; Issue 3; March 2018; Page No. 183-184

Assessment of acute phase proteins in the patients affected by liver disease condition

Dr. K Vanaja
Assistant Professor, Department of Biochemistry, Viswabharathi Medical College, Kurnool, Andhra Pradesh, India

Abstract
Acute phase proteins (APPs) are blood proteins primarily synthesised by hepatocytes as part of the acute phase response. The acute phase response is a non-specific and complex reaction of an organism, triggered by different stimuli including injury, trauma, infection, stress, inflammation, as well as neoplasia. It comprises a wide variety of behavioural, physiological, biochemical and nutritional changes.

The liver diseases contain the liver cirrohosis, jaundice, infective hepatitis. 30 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. The present study was planned in the Department of Biochemistry in Viswabharathi Medical College.

From the above study it can be concluded that the acute phase proteins in liver disorders plays important role. Evaluation of bio-chemical parameters not only predicts the decompensating but also increases the scope of early diagnosis, prognosis, and therapy there by reducing the mortality and morbidity of cirrhosis.

Keywords: acute-phase proteins, liver diseases patient, ceruloplasmin, serum transferrin, etc.

Introduction

Acute phase proteins (APPs) are blood proteins primarily synthesised by hepatocytes as part of the acute phase response. The acute phase response is a non-specific and complex reaction of an organism, triggered by different stimuli including injury, trauma, infection, stress, inflammation, as well as neoplasia. It comprises a wide variety of behavioural, physiological, biochemical and nutritional changes. The most important metabolic changes include the highly increased or decreased production of a large family of proteins from the liver, the acute phase proteins. Acute phase proteins (APPs) are a large group of biochemically and functionally unrelated proteins whose plasma concentrations increase or decrease in response to tissue injury, acute infections, burns, or chronic inflammation. Levels of acute phase proteins can either increase (positive acute phase proteins) or decrease (negative acute phase proteins) several fold soon after the onset of a systematic inflammatory reaction. The acute phase proteins include C-reactive protein (CRP), serum amyloid A (SAA), fibrinogen, mannose binding proteins, complement components, alpha 1-acid glycoprotein (AGP), etc. 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].

Acute phase proteins (APPs) are a large group of biochemically and functionally unrelated proteins whose plasma concentrations increase or decrease in response to tissue injury, acute infections, burns, or chronic inflammation. Levels of acute phase proteins can either increase (positive acute phase proteins) or decrease (negative acute phase proteins) several fold soon after the onset of a systematic inflammatory reaction. Acute phase proteins are synthesized predominantly in the liver. 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 IL-1, IL-6 and IL-8, and TNF-α. Following stimulation hepatocytes produce a number of proteins and release them into circulations; these proteins are thus referred to as positive acute phase proteins. At the same time, the production of a number of other proteins is reduced; these are, therefore, referred to as negative acute phase proteins. Positive acute-phase proteins serve different physiological functions in the innate immunity. Some act to destroy or inhibit growth of microbes, while others give negative feedback on the inflammatory response. The Levels of elevated expression of acute phase proteins can differ widely from species to species and some proteins that function as an acute phase protein in one species may not be an acute phase protein in another species.

The acute phase proteins include C-reactive protein (CRP), serum amyloid A (SAA), fibrinogen, mannose binding proteins, complement components, alpha 1-acid glycoprotein (AGP), etc. Perhaps the best known acute phase protein is CRP. The level of CRP in blood plasma can rise as high as 1000-fold with inflammation. Especially, marked rises in CRP reflect the presence and intensity of inflammation. SAA is another acute phase protein used to detect and monitor

infection and inflammatory disease. Ferritin, also an acute phase protein, is a primary iron-storage protein and often measured to assess a patient's iron status. 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. It is identified that the acute phase protein levels augmented throughout the inflammatory reactions such as trauma, aseptic necrosis and infections.

Based on above cited literature findings the present study was planned to assess the levels of acute phase protein synthesis in the liver disorders like cirrhosis of liver and infective hepatitis.

Methodology

The present study was planned in the Department of Biochemistry in Viswabharathi Medical College. The age group of the patients is ranges from 30 to 60 years. Total 30 patients affected by liver diseases were evaluated for the present study. The approval of the institutional ethic committee had been taken before the study. All the patients were informed consent. The aim and the objective of the study are conveyed to all patients.

The liver diseases contain the liver cirrohosis, jaundice, infective hepatitis.30 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 institutional ethical committee for the study. The all the subject were informed about the aim of the study.

Inclusion Criteria: Liver cirrhotic patients & Age group 22-50 years.

Exclusion Criteria: Renal failure patients, Diabetes patients & Pregnant women's

Result & Discussion

The estimation of various indicatorswas done in 50 liver diseases patients and 25 normal patients. The following data indicated the virtual estimation of the liver proteins in the two study groups.

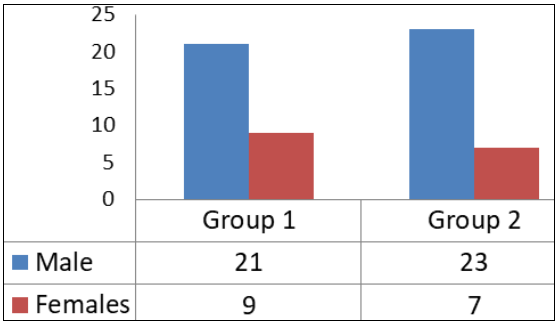

Fig 1: Males & Females Ratio

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

Parameters	Group 1: Normal Study Group Patient	Group 2: Liver Diseases patient
Albumin g%	4.4±0.3	3.7±0.2
Globulins g%	2.8±0.4	2.9±0.3
Ceruloplasmin mg%	22.5±2.0	43.2±2.1
Transferrin mg%	281.8±14.5	475.2±21.3
Total protein g%	6.35±0.3	5.80±0.20

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

In the present study acute phase proteins like ceruloplasmin and transferrin are increased in concentration indicates the liver disorders with tissue lesions accompanied by inflammatory process. From the above study it can be concluded that the acute phase proteins in liver disorders plays important role. Evaluation of bio-chemical parameters not only predicts the decompensating but also increases the scope of early diagnosis, prognosis, and therapy there by reducing the mortality and morbidity of cirrhosis.

Reference

1. Abbas A, Lichtman A, Pillai S. Basic immunology Functions and Disorders of the Immune System (4th ed.) Philadelphia, PA: Saunders/Elsevier, 2012, 40.
2. Ananian P, Hardwigsen J, Bernard D, Le Treut YP. Serum acute-phase protein level as indicator for liver failure after liver resection. Hepato gastroenterology. PMID 15966220. 2005; 52(63):857-61.
3. Blumberg WD. Elsinger J. journal of Bio chem. 1963; 238:1675,
4. Dahls British. Med. Jour. 1948, 1, 731.
5. Berson SA, Yallow RS. Jour.Clinic invest. 1954; 33:377.
6. Dykes PW. Q. J. Med. 1971; 30:297.
7. Dr Vijaya Kumari K, *et al.* Journal of Dental and Medical Sciences. 2015; 14(1):08-11.