

C-Reactive Protein Level in Decompensated Liver Cirrhosis and Its Correlation with Serum Alanine Aminotransferase and Albumin Levels

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Citation

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Abstract

Aim: To know the correlation between C-reactive protein and alanin amino transferase, or with serum albumin level in the decompensated liver cirrhosis (LC) patients. **Material and methods :** We consecutively studied decompensated (ascitic) LC patients. The serum high sensitivity (hs)-CRP was measured with immunoturbidimetry . We studied the correlation between hs-CRP and ALT, or with serum albumin level with p value < 0.05. **Results :** There were 108 decompensated (ascitic) liver cirrhosis patients. The median of hs-CRP level was 63.6(0.76-783.2) mg/L; median of ALT level was 74.3(16-912) UI/L; mean of the serum albumin level was 25.1±8.49 g/L. The correlation coefficient between hs-CRP and ALT was $r = 0.22$ ($p=0.02$); hs-CRP and serum albumin level was $r = -0.28$ ($p= 0.003$). **Conclusion:** There were still positive low correlation between hs-CRP and ALT and negative low correlation between hs-CRP and serum albumin level even in patients with decompensated liver cirrhosis.

INTRODUCTION

Liver Cirrhosis is characterized histologically by extensive loss of liver cells and disorganization of the liver lobules and disorganized regenerated remaining liver cells which are surrounded by fibrous tissue (fibrous nodules). C-reactive protein (CRP) is a plasma protein which is synthesized in the hepatocyte and the concentration increase during inflammatory states even chronic inflammation (1,2). Alanine aminotransferase (ALT) also produced in hepatocyte cytosol and the concentration is increased in liver inflammation but usually within normal range in end stage liver cirrhosis(3). Albumin is also synthesized in the liver and its serum level is reduced in chronic liver disease as well as in the inflammatory states, and become one of the severity markers of liver cirrhosis (3,4). The interesting question: is the effect of liver cirrhosis on serum CRP level followed by changes in serum ALT and albumin level in the similar direction ? To our knowledge this kind of study has never been done before. Aim of our study is to know the correlation between CRP and ALT, and between CRP and serum albumin level in decompensated liver cirrhosis patients.

MATERIALS AND METHODS

We consecutively studied the decompensated (ascitic) liver cirrhosis patients, who were hospitalized in Panti Rapih and Dr.Sardjito General Hospital , Yogyakarta , Indonesia, between January 2007 and October 2008 . Patients with hepatocellular carcinoma based on transabdominal ultrasound (hepatic nodular or diffuse lesions) and alfa fetoprotein > 400 ng/mL, or with treatment which influenced the hs-CRP results, such as non steroid anti-inflammatory drugs, were excluded from the study.

The serum high sensitivity (hs)-CRP was measured with immunoturbidimetry method. Serum ALT , albumin level and other relevant liver function tests markers, included Anti HCV and HBsAg were measured. Serum creatinine was also measured.

Spearman rank correlation coefficient was applied to reveal the correlation between hs-CRP and ALT or between hs-CRP and serum albumin level. P value < 0.05.

RESULTS

There were 108 decompensated (ascitic) liver cirrhosis patients(66 male;42 female) included in the study with the mean of age was 59.68±10.26 years old. The characteristic

of the patients showed the mean of albumin was 25.14 ± 8.49 g/L, median of ALT $39.75(7.7-403)$ UI/L; hs-CRP $63.6(0.76-783.20)$ mg/L; bilirubin serum $40.01(2.74-343.2)$ μ mol/L; and the mean of creatinine serum was 99.89 ± 41.57 μ mol/L. The hepatitis viral serological marker showed anti-HCV(+) 45 patients, HBsAg(+) 41 patients and cryptogenic 22 patients. There was low correlation between ALT and hs-CRP level and statistically significant ($r = 0.22$; $p = 0.02$). The low negative correlation was also revealed between serum albumin level and hs-CRP and statistically significant ($r = -0.28$; $p = 0.003$).

DISCUSSION

Our study showed that serum CRP(hs-CRP) level had positive low correlation with serum ALT level, and the serum CRP(hs-CRP) level had negative low correlation with serum albumin level in decompensated liver cirrhosis patients. ALT is a cytosol enzyme of hepatocytes which mainly produced in the liver and become the marker of the liver parenchymal inflammation. A study showed that the serum CRP level was produced mainly in the hepatocyte and under transcriptional control by the cytokine IL-6 (2). It seems, based on our study, even though there was extensive loss of liver cells and necrotic process of the liver parenchyma in decompensated liver cirrhosis, the serum CRP level was still maintained in high level and independent of serum ALT level with its low correlation. The remaining viable hepatocytes may still contribute to this result. It was different with a study in milder liver disease such as liver steatosis subjects which the elevated ALT level was associated with the higher CRP level (> 3 mg/L) (6). A study in nonalcoholic steatohepatitis (NASH) also demonstrated elevation of hs-CRP (7).

Serum albumin is also produced by the hepatocytes and usually depressed in the decompensated liver cirrhosis, however the synthesis rate may be still normal, low or even increase (4). The albumin synthesis in liver cirrhosis is influenced by many factors, such as nutritional states, change in colloid osmotic pressure, pressure alteration within the liver and cytokines (4,8). The cytokines (IL-6, IL-1, and TNF- α) have an important role which not only inhibit the albumin synthesis in the liver, but also stimulate the acute phase proteins production, such as CRP (2,4,5). Inflammatory states usually increase synthesis of many plasma proteins, acute phase response, including CRP, but decrease the albumin level (2,5). Our study showed even in the decompensated state of liver cirrhosis the negative

correlation between serum CRP level and serum albumin level was still maintained, but this low correlation may reflect the multifactorial influences in the albumin synthesis and serum albumin level.

Studies also try to predict the association of CRP level and the prognosis (9) and also as a marker of hepatocellular carcinoma (10), and a study suggested that CRP expression correlates with progression of the disease in chronic hepatitis B but not chronic hepatitis C (11).

In conclusion, serum CRP(hs-CRP) level has only positive low correlation with serum ALT level and negative low correlation with serum albumin level in the decompensated liver cirrhosis patients. Further study is needed to reveal the possibility of serum CRP level as one of the end stage liver cirrhosis marker.

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