

Procalcitonin Serum Level in Cirrhosis Patients

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Bacterial infection is common and responsible for causing major morbidity and mortality in liver cirrhosis. Cirrhotic patient are immunocompromised therefore they are vulnerable to a variety bacterial infections. Early diagnosis of bacterial infection in cirrhosis is crucial yet often feature a major challenge due to non-specific manifestation. Therefore, serum biomarker such as Procalcitonin is needed to improve the diagnosis of bacterial infection in cirrhosis patients.¹

Procalcitonin (PCT) has been used as a marker of sepsis since 1993. It is a precursor of calcitonin hormone and release into the circulation in response to severe systemic inflammation.² Compared to other sepsis markers such as C-reactive protein (CRP), lactate, or various cytokines, PCT has higher diagnostic accuracy and superior to assess the severity of sepsis.^{2,3} Thus PCT is very reliable to diagnose systemic inflammation particularly bacterial infection.

However several studies show different threshold value of PCT in cirrhosis patients.⁴ It rises the question whether serum level of PCT is affected by damaged liver cells. The Study by Mesanti et al try to answer this question by measuring PCT level in cirrhotic patient without bacterial infection. Thirty nine (39) cirrhosis patients without bacterial infection is included in this study. The result show that there is increase in PCT level in cirrhosis patient without bacterial infection where decompensate cirrhosis have more increase in PCT level (0,738 ng/mL \pm 1,185) than compensate cirrhosis patient (0,065 ng/mL \pm 0,022) with p value 0,000 (p < 0,05).⁵ PCT level in decompensate cirrhosis is 11,4 times higher than in compensate cirrhosis.

The rise of PCT level in non-infected cirrhosis patient should indicate that the cut-off of PCT level will likely to be higher to have more accuracy. This is also showed in study by Cai ZH where PCT value > 2 ng/mL associated with more specificity.⁶

Another study by Qu J et al also correlate between PCT and hepatic function. The study shows that total bilirubin had moderate positive impact with PCT thresholds where different cut-offs should be applied based on different total bilirubin level. The PCT cut-off value become 0.94 when total bilirubin is more than 20 mg/dL. This study also show weak correlation with model for End-Stage Liver Disease (MELD) score and international normalized ratio (INR).⁷

These two studies show that PCT level in cirrhosis patients is different from general population where even without bacterial infection, cirrhosis patients have higher PCT level. This is also show that decrease in hepatic function have impact in PCT level. Although sepsis biomarkers such as PCT is valuable to diagnose bacterial infection in cirrhosis patient, different cut-off should be applied to increase the diagnosis accuracy.

REFERENCES

1. Bunchorntavakul C, Chamroonkul N, Chavalitdhamrong D. Bacterial infections in cirrhosis: a critical review and practical guidance. *World J Hepatol* 2016;8:307-21.
2. Meisner M. Update on Procalcitonin measurements. *Ann Lab Med* 2014;34:263-73.
3. Nargis W, Ibrahim, Ahamed BU. Procalcitonin versus C-reactive protein: usefulness as biomarker of sepsis in ICU patient. *Int J Crit Illn Inj Sci* 2014;4:195-9.
4. Conti F, Dall'AM, Gramenzi A, Biselli M. Biomarkers for the early diagnosis of bacterial infection and the surveillance of hepatocellular carcinoma in cirrhosis. *Biomark med* 2015;9:1343-51.
5. Mesanti O, Gani RA, Simadibrata M, Suhendro. Demographic characteristic of fundic gland polyp and its association with gastritis in Pathology Anatomy Department, Faculty of Medicine, Universitas Indonesia/Dr. Cipto Mangunkusumo General National Hospital. *Indones J Gastroenterol Hepatol Dig Endosc* 2017;18:15-9.
6. Cai ZH, Fan CL, Zheng JF, Zhang X, Zhao WM, Li B, et al. Measurement of serum Procalcitonin levels for the early diagnosis of spontaneous bacterial peritonitis in patients with decompensated liver cirrhosis. *BMC Infect Dis* 2015;15:55.
7. Qu J, Feng P, Luo Y, Lu X. Impact of hepatic function on serum Procalcitonin for the diagnosis of bacterial infections in patients with chronic liver disease. *Medicine* 2016;95:30.