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C-Reactive Protein as Early Detection of Infections in Closed Fracture Post or if in Haji Adam Malik General Hospital

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Abstract : Objective: The purpose of this study was to to find out the difference in CRP levels between patients with infection and patients without infection post-operative closed fracturebefore the clinical signs of infection arise. Material and Methods : Eighteen patients were diagnosed with closed fracture had underwent an ORIF, nine patients had shown a signs of infection and 9 other patients had no signs of infection. Both of the group subject had a C-Reactive protein examination conducted on the 2^{nd} and 4^{th} day post-operative . The study was donein the period March 2018 to July 2018. The study was conducted with a cross-sectional approach, to analyze differences in C-Reactive Protein values. Results: Subjects who performed closed fracture surgery was 18 subjects, 4 (22.2%) female subjects, 14 (77.8%) male subjects. With the location of the fracture of the humerus as much as 1 (5.6%) subjects, radius 2 (11.1%) subjects, femur 3 (16.7%) subjects, tibia 10 (55.6%) subjects, fibula 2 (11.1%) subjects. From the results of the data collected, CRP 2 days after surgery 1.93 ± 0.83 , CRP 4 days after surgery 1.74 ± 1.1 . Conclusion: From the results of the statistical analysis of the comparison of CRP levels inpatients with infection and patients without infectionpost-operative closed fracture there were significant differences, this was indicated by the p value of 0.001 (p <0.05).CRP levels after debridement on day 2 and 4 remain or increased in patients with infection.

Keywords : C-Reactive Protein, Closed Fracture, Infection.

Introduction

Fracture is a breakdown of bone structural continuity. Fractures can be total or partial, which are generally caused by excessive force, often followed by damage to soft tissue of various degrees, regarding blood vessels, muscles and innervation. Fractures can be cracks, fractures, or flakes from the cortex; often occur perfectly and

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the bone part shifted. Trauma that causes broken bones can be direct trauma and indirect trauma. Trauma directly causes direct pressure on the bone and fractures occur in the pressure area. Indirect trauma, if trauma is delivered to an area further away from the fracture area.

Fracture is not only a problem of breaking bone continuity and how to treat it, but must be reviewed in its entirely and must be treated simultaneously. It must be seen what happens thoroughly, how, the type of cause, whether there is damage to the skin, blood vessels, nerves, and infections.

Prophylactic antibiotics have been shown to reduce the incidence of infection and it is recommended to take measures with a high risk of infection. In addition, prophylactic antibiotics are also given if an infection is expected with serious risks such as implant placement, joint replacement, and prolonged surgery.

Early detection of postoperative infection can minimize morbidity. Indicators that can be used as markers of clinical infection include fever, tachycardia, and increased leukocyte count and erythrocyte sedimentation rate (ESR). Other laboratory tests that can be done are examination of C-reactive protein (CRP). C-reactive protein (CRP) is an acute phase of protein that reacts quickly so that it is useful for detecting the onset of infection. Increased CRP is more evident in infections, where this increase is more specific than clinical symptoms.

The function and role of CRP in the body (in vivo) is not fully known, many things are still hypotheses. Although CRP is not an antibody, but CRP has various biological functions that show its role in the inflammatory process and the mechanism of the body's resistance to infection.

Methods

The study conducted was an observational analytic study not paired with a crossectional approach, which aimed to analyze the difference in CRP levels between patients with infection and patients without infectionpost-operative closed fracture.

Twenty eight patients were diagnosed with Tuberculosis Spondilitits where 14 patients had undergone anti-tuberculosis treatment and 14 other patients had not undergone anti-tuberculosis treatment in the period January 2019 to March 2019. The study was conducted with a cross-sectional approach, which aimed to analyze differences in Ca 125 values. Eighteen patients were diagnosed with closed fracture had underwent an ORIF, nine patients had shown a signs of infection and 9 other patients had no signs of infection. Both of the group subject had a C-Reactive protein examination conducted on the 2nd and 4th day post-operative.

The study was done in the period March 2018 to July 2018. The study was conducted with a crosssectional approach, to analyze differences in C-Reactive Protein values. All statistical calculations are carried out using a computer-based statistical program. This study was approved by the Hospital Health Research Ethics Committee of the Faculty of Medicine, University of North Sumatera / Haji Adam Malik.

Results

Subjects who performed closed fracture surgery was 18 subjects, 4 (22.2%) female subjects, 14 (77.8%) male subjects. With the location of the fracture of the humerus as much as 1 (5.6%) subjects, radius 2 (11.1%) subjects, femur 3 (16.7%) subjects, tibia 10 (55.6%) subjects, fibula 2 (11.1%) subjects. From the results of the data collected, CRP 2 days after surgery 1.93 ± 0.83 , CRP 4 days after surgery 1.74 ± 1.1 .

Variabel			Mean CRP
C-Reactive Protein	CRP without Infection		0.68 ± 0.26
(CRP)	CRP with Infection		1.74 ± 1.1
Analisis statistik		p 0.001	

Table 1. Statistic analytic value of CRP

Conclusion

From the results of the statistical analysis of the comparison of CRP levels inpatients with infection and patients without infectionpost-operative closed fracture there were significant differences, this was indicated by the p value of 0.001 (p < 0.05).CRP levels after debridement on day 2 and 4 remain or increased in patients with infection.

Discussion

In the study conducted at Haji Adam Malik General Hospital in Medan, there were 18 patients. Of the total samples, 9 postoperative patients who were not infected and 9 patients who were infected. Those who experience closed fractures are more common in men, as many as 14 people (77.8%). In addition, the incidence of fractures in this study was more common in the lower extremities, especially the tibia (55.6%).

In other study, in patients who had undergone hip joint replacement surgery, 8 patients had infections from a total of 70 patients. The study showed an increase in CRP levels on day 2 after surgery, whereas in patients who experienced infection CRP levels continued to increase on days 7 and 21 after surgery. The results of this study also showed that there were differences in CRP levels between patients who were not infected with patients who were infected (p = 0.001) and there was no relationship between age and sex on increasing CRP levels.

However, there is a study showed that of 30 patients with fractures, 11 patients had infection. In patients who experienced infection, there was a significant difference in CRP levels between preoperative and postoperative CRP levels on day 2 (p = 0.04), and a significant difference between preoperative CRP levels and postoperative CRP levels on day 4 (p = 0.001) but there was no significant difference between days 2 and 4 after surgery (p = 0.210). In other study, comparing of CRP levels in post-total hip replacement and total knee replacement patients and found that CRP levels would reach a peak on days 2 and 3 after surgery. Some mentioned that there were differences in CRP levels in patients who had infections and who did not have an infection, this was indicated by persistent or increased CRP levels.

In this study, there was a significant difference in CRP levels among patients who did not have an infection with patients who experienced infection on the 4th day after surgery. In this study, it was also found that in patients who had closed fracture postoperative infections, CRP levels on days 2 and 4 were settled or even increased. Therefore, CRP can be used as a parameter to detect and monitor the occurrence of infection in post-closed patients.

Conflict of Interest

Non declared in this study.

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