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DESCRIPTION OF THE BLOOD FREEZING (CLOTTING TIME) ON CKD PATIENTS (CHRONIC KIDNEY DISEASE) IN RSUD DR. MM. DUNDA LIMBOTO IN 2020

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ABSTRACT

The kidney is one of the organs that functions to filter blood, plays a role in the hemostasis and hematopoiesis systems. When there is damage to the kidneys it can cause impaired kidney function, which means that the kidneys cannot filter the blood so that it affects the hemostasis system, one of which is Clotting Time. Clotting Time examination aims to look for a history of abnormal bleeding. The purpose of this research is toknow and describe the results of blood clotting period (*Clotting Time*) in patients with CKD (*Chronic Kidney Disease*) using the Lee and White method.

This research is a descriptive research with a quantitative approach. The population is unknown with a sample size of 28 respondents taken by accidental sampling. The inclusion criteria were respondents who were not currently taking drugs such as heparin and patients with CKD ≥15 years and over.

The results of this study were obtained from 28 samples which were examined where There were 15 CKD patients whose clotting period was abnormal with a percentage of 53.57% and there were 13 CKD patients whose clotting period was normal (46.43%). Based on the results of the examination that has been done, it can It was concluded that the examination of the clotting time in patients with CKD (Chronic Kidney Disease) in the hospital. Dr. MM Dunda Limboto had more abnormal results (elongated) than normal results. The suggestion for this research is that before CKD patients perform hemodialysis, it is expected that a Clotting Time examination is needed, especially for CKD patients to be able to monitor their health conditions, other researchers are advised to take hemostasis examination studies, including: Bleeding Time, APTT, fibrinogen, clot retraction, rumple leede, and prothrombin time.

Keywords: Chronic renal failure, *Clotting Time*, *Lee and White* Method

INTRODUCTION

Chronic Renal Failure (CKD) or Chronic Kidney Disease (CKD) is a clinical syndrome caused by chronic, progressive and irreversible decline in kidney function [10].

Damage to the kidneys can lead to decreased kidney function. The kidney is one of the organs that functions to filter blood, plays a role in the hemostasis and hematopoiesis systems, controls the balance of fluids in the body and prevents

the accumulation of waste by removing the body's metabolic waste from the blood. In patients with kidney failure, the end product of protein metabolism which is normally excreted into the urine is stored in the blood so that the ability of the kidneys in CKD sufferers to excrete the metabolic results of the body is disturbed, there will be a buildup of protein metabolism waste (uremic toxin retention), such as creatinine, uric acid and urea [4].

Chronic Kidney Failure is the 12th highest cause of death in the world in 2015, estimating that as many as 850,000 people die each year. In 2016 globally more than 500 million people out of about 1.5 million have to undergo hemodialysis. In 2017, the incidence of chronic kidney failure was registered at 124,500 new cases and as many as 85% of chronic kidney failure patients are waiting for their first kidney transplant [14].

Indonesia in 2017 shows the number of active patients undergoing hemodialysis is 77,892 people, while the number of new patients undergoing hemodialysis continues to increase from 2007 to 4,977 people until 2017 as many as 30,843 people [6].

Gorontalo Province shows that the prevalence of Non-Communicable Diseases (PTM) including cancer, stroke, chronic kidney failure, diabetes mellitus and hypertension. Cancer prevalence increased from 1.4% to 1.8%, stroke prevalence increased from 7% to 10.9%, and chronic kidney disease increased from 2% to 3.8%. Gorontalo Province in 2018 ranks 4th for the prevalence of Chronic Renal Failure.

The prevalence of chronic renal failure patients in RSUD Dr. MM. Dunda Limboto Gorontalo District, Medical Record data, the number of Chronic Kidney Failure patients in 2019 was 137 people. In 2020 the number of Chronic Kidney Failure patients from January to May is 70 people.

One of the complications of chronic kidney disease is the occurrence of bleeding disorders caused by retention of uremic toxins due to the presence of increased guanidinosuctionic acid which stimulates the endothelium to release NO (Nitric Oxyde), which is an inhibitor of platelet function. The role of NO in the kidneys is very complex because it can reduce kidney injury. In the range below the threshold, NO is important in maintaining renal blood flow, but an increase in urea can cause NO to exceed the threshold level resulting in inhibition of the chain of oxidation of phosphorylation and reduction of oxygen. Bleeding disorders in chronic kidney disease have prolonged bleeding time, normal platelet counts [4].

The disruption of the hemostasis process as described above will also affect the blood clotting process in patients with chronic renal failure. Clotting time examination is one of the screening or preliminary examinations that are often performed in clinical laboratories. This examination is part of the hemostasis examination or blood clotting. This examination aims to look for a history of abnormal bleeding. The hemostasis system or blood clotting system is a step to stop bleeding if there is damage [8].

There are several things that affect the results of the blood clotting period, which can be prolonged or shortened. The lengthening of the results of the blood clotting time examination can occur due to several things such as when doing this examination the blood discharge from the syringe is too hard and when doing the examination the tube is shaken so that it causes blood lysis, other factors that can trigger the lengthening of the results of this blood clotting time test as well. Due to the effect of drugs such as aspirin and anti-inflammatory drugs other than that

the cause of prolonged blood clotting time is influenced by the person's pathological condition [15]. While things that can shorten the blood clotting period include mixing blood with tissue thromboplastin, venous function that does not work well immediately.

Blood clotting time can be measured by laboratory tests, one of which is the Lee and White method which is measured in minutes. This test determines the length of time it takes for the blood to clot. The result is a measure of the activity of coagulation factors, particularly thromboplastin-forming factors and platelet-derived factors, as well as fibrinogen levels [3].

The Lee and White method of blood clotting time test is quite accurate, simple, and it is recommended by the WHO more than the slide method. This test measures the time it takes for the complete blood to clot in the tube. This method uses 3 tubes each filled with 1 ml of complete blood, incubated at 37°C. The tube is slowly tilted every 30 seconds so that the blood is in contact with the tube wall and sees that a clot has occurred. Normal blood clots 9-15 minutes at 37°C [3].

According to previous research, from 50 samples of CKD patients, the aPTT (activated Partial Tromboplastine Time) value examination showed the average aPTT value in elongated (high) CKD patients was 73.40 seconds compared to the aPTT value in normal people, namely 27.68 seconds with a value Normal aPTT is 25-40 seconds, with a P value <0.05 [8].

Based on the above background, the researcher is interested in conducting a study about the length of time blood clotting in patients with chronic renal failure in Gorontalo Province, thus encouraging the author to take the title of the research "Clotting Time Overview of CKD (Chronic Kidney Disease) patients at RSUD Dr. MM. Dunda Limboto".

RESEARCH METHODS

This research uses descriptive research [12] with a Quantitative approach [13]. Location of sampling and sample examination *Clotting Time* at RSUD Dr. MM. Dunda Limboto. When the research was conducted on 19-31 October 2020. The sample in this study were CKD patients. The sample met the inclusion criteria, namely CKD patients who are not currently taking drugs, CKD patients ≥ 15 years of age and over, while the exclusion criteria are that respondents have decreased consciousness based on physical examination records found in the patient's status. The sample size was 28 samples using a sample size calculation formula with an unknown population.The sampling technique is Accidental Sampling. The technique of data analysis is univariate analysis and data presentation is the frequency distribution table [9].

RESEARCH RESULT

Based on the results of research that has been carried out in the RSUD laboratory Dr. MM. Dunda Limboto, Gorontalo Province in October 2020 as many as 28 blood samples of CKD patients who met the inclusion criteria, the following data were obtained:

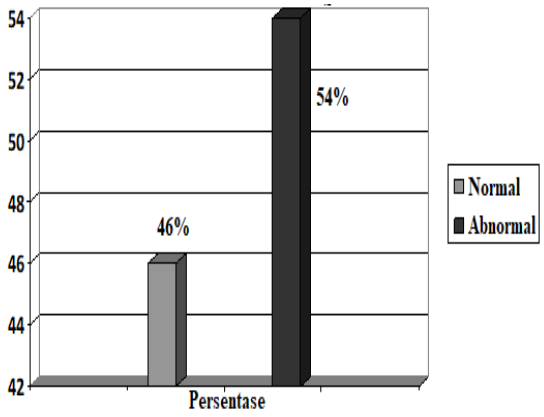
Table 1. *Distribution of frequency of blood clotting (clotting time) in patients with CKD (Chronic Kidney Disease)*

Hasil pemeriksaan masa pembekuan darah (*Clotting Time*)	Frekuensi	Presentase (%)
Normal	13	46%
Abnormal	15	54%
Total	28	100%

Source: Primary Data (2020).

Based on table 1 above, it shows that the results of the Clotting Time examination in CKD patients obtained a normal number of 15 patients while 18 patients were abnormal.

Picture 1. *Clotting Time Check Result Diagram*



Source: Primary Data (2020).

Based on the bar chart above, it shows that the percentage of the results of the Clotting Time examination in CKD patients is more abnormal, namely 54% compared to normal as much as 46%.

DISCUSSION

Chronic renal failure (CRF) is a pathophysiological process with various causes, as a result of changes in the function of the nephrons that have been damaged continuously for a long time to become the final stage [7].

After conducting research on patients with Chronic Renal Failure, from 28 samples, the results obtained were 15 (fifteen) CKD patients whose clotting period was abnormal (53.57%) and 13 (thirteen) CKD patients whose clotting period was normal (46.43%). So it is said that most of the respondents or CRF patients have an elongated clotting period. The results of this study are supported by previous research, where the results of the study entitled aPTT (Activated Partial Thromboplastine Time) value in CKD patients showed the average value of aPTT in prolonged (high) CKD patients, namely 73.40 seconds compared to the aPTT value in normal people. that is 27.68 seconds with a normal value of aPTT is 25-40 seconds, with a P value <0.05 [4].

The results of this study are also supported by previous studies, where in patients with chronic renal failure there was an increase in urea levels. This is caused by the accumulation of protein metabolic waste that cannot be excreted by the kidneys so that the bleeding time is prolonged. The results of this prolonged bleeding time will also affect the blood clotting period, because uremic toxin retention will cause platelet function abnormalities in the form of inhibition of platelet aggregation, and weakened adhesion, resulting in abnormal blood clotting time [5].

The theory from previous research states that the results of prolonged aPTT examination in patients with prehemodialysis chronic renal failure are due to endothelial dysfunction which will reduce coagulation factors V, VIII, IX, X, XI, XII, prothrombin, fibrinogen, precalicrein, kininogen, which increases fibrinolysis activity and decreased fibrinogen levels which are usually caused by inhibitors and coagulation factor deficiency [2].

The results of this study are supported by several theories which state that the disruption of the hemostasis process in CKD patients cannot be separated from the disruption of kidney function. Kdamage to the kidneys can cause decreased kidney function. The kidney is one of the organs that functions to filter blood, plays a role in the hemostasis and hematopoiesis systems, controls the balance of fluids in the body and prevents the accumulation of waste by removing waste products from the body's metabolism [11]. Likewise with previous studies, which stated that in patients with kidney failure, the end product of protein metabolism which is normally excreted

into the urine is stored in the blood as a result of decreased kidney function, if the ability of the kidneys in patients with kidney failure to excrete the results of body metabolism is disturbed, there will be a buildup of metabolic waste protein (uremic toxin retention), such as creatinine, uric acid and urea [4].

There is still a theory put forward by previous research, which states that bleeding disorders in chronic kidney disease have prolonged bleeding time, normal platelet counts, coagulation factors, namely aPTT (activated Partial Thromboplastin Time) and PT (Prothrombin Time) lengthening and impaired platelet aggregation function. The occurrence of bleeding disorders caused by retention of uremic toxins due to the presence of increased guanidinosuctionic acid which stimulates the endothelium to release NO (Nitric Oxyde) which is an inhibitor of platelet function. The role of NO in the kidneys is very complex because it can reduce kidney injury. In the range below the threshold, NO is important in maintaining renal blood flow [4].

Another theory that supports the results of this study is expressed by previous studies which state that the cause of bleeding in chronic kidney disease is not yet known with certainty. The existing theory predicts this occurs due to platelet dysfunction and the factors that influence it, such as uremia, complications of anemia, and drug interactions. Platelet dysfunction that occurs is due to decreased platelet granule-α function due to an increase in the ratio of adenosine triphosphate/adenosine diphosphate (ATP /ADP) and decreased serotonin. Arachidonic acid and prostaglandin metabolism is also disrupted, thereby interfering with the synthesis and release of thromboxane A2 which functions in platelet aggregation and adhesion. Circulating fibrinogen also tends to bind to glycoprotein IIb/IIIa receptors on the platelet surface, thereby decreasing the ability of platelet adhesion and aggregation. This causes a bleeding disorder in chronic kidney disease patients. Platelets also play a role in impaired glomerular filtration due to the complex disposition of the immune system [1].

CONCLUSION

Based on the research results it can be concluded that:

1. The results of the clotting time in patients with CKD (Chronic Kidney Disease) using the Lee and White method Of the 28 samples examined, there were 15 (fifteen) CKD patients whose clotting period was abnormal (abnormal) with a percentage of 53.57% and there were 13 (thirteen) CKD patients whose clotting period was normal (46.43%).
2. The results of the examination of the clotting time in patients with CKD (Chronic Kidney Disease) using the Lee and White method the highest that is during 18 minutes 20 seconds and the lowest freezing period results are during 10 minutes 10 seconds.

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