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IMAGES OF CREATININE LEVELS IN DIABETES MELLITUS IN INSTITUTION IN TOTO KABILA Hospital

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ABSTRACT

DM is a health problem in the form of symptoms caused by increased blood glucose levels due to insufficient or insulin resistance. The condition of hyperglycemia that occurs can cause complications, one of which is diabetic nephropathy in which the kidneys have decreased function resulting in damage to the lining of the blood vessels caused by high glucose levels. Based on data from the Gorontalo City Health Office, in 2018-2019 there was an increase in DM sufferers by 4,415 to 6,785 people.

The purpose of this study was to know the description of creatinine levels in DM patients hospitalized at Toto Kabila Hospital. This research is a quantitative descriptive study and creatinine examination using automatic methods. The population in this study were all DM patients with Accidental Sampling sampling technique.

The results of the creatinine level examination showed normal results, namely 53.6% and abnormal results, namely 46.4%. The result of creatinine levels at age tends to be more at the age of 46-55 years, namely 55.6%, and at the age of 56-65 years, 54.5%. The results of creatinine levels in the sex showed that the normal result in women was 100% and the abnormal result was 0.0%, in men the normal result was 18.8% and the abnormal result was 81.3%. The results of creatinine in the offspring showed that there was an offspring, namely 41.7% and the absence of offspring, namely 50.0%. The results of the study concluded that DM patients with normal creatinine results were more than those with abnormal results.

Keywords: Creatinine, Diabetes Mellitus, Hyperglycemia

INTRODUCTION

Diabetes mellitus (DM) is a metabolic disease characterized by hyperglycemia that occurs due to abnormalities in insulin secretion, insulin action, or both. DM is a major health problem in society, because the number of this disease is increasing from year to year [1].

DM is a disease that can cause chronic complications in human organs such as the kidneys, eyes, nerves and blood vessels. One of the chronic microvascular complications is diabetic nephropathy. Diabetic nephropathy is a condition in which the kidneys have decreased function and damage to the blood filter membranes caused by high sugar levels, this statement explains that diabetic nephropathy is found in DM patients around 34-54% [1].

The relationship between blood creatinine and DM is that DM sufferers have high blood sugar levels or (hyperglycemia) this condition causes the walls of blood vessels to be damaged, weak and fragile so that blockages occur

which cause microvascular complications, one of which is diabetic nephropathy. Hyperglycemic conditions also play a role in the formation of atherosclerosis. As a result, there is narrowing of the blood vessels and a decrease in the speed of blood flow which results in reduced blood supply to the kidneys. This can cause disruption of the filtration process in glomerular and decreased kidney function which is marked by increasing levels of urea and creatinine in the blood. In addition there are other factors that cause creatinine to increase, namely foods that contain protein, as well as meat and fish. Diabetics greatly reduce carbohydrate consumption, so they often replace their meals with foods high in protein, such as fish or meat as an energy source. In the body, these foods will produce keratin which is used by muscles as an energy source, and creatinine is produced as a waste of muscle metabolism [2].

Creatinine is a productend of creatine metabolism. Creatine is mostly found in skeletal muscle, where this substance plays a role in energy storage as creatinine phosphate (CP). The amount of creatinine produced by a person's body is equivalent to the mass of skeletal muscle they have. High and low creatinine levels in a person's blood can be used as an important indicator in determining whether a person has impaired kidney function, so that serum creatinine levels can function as an indicator of the course of DM which can potentially experience kidney failure in DM patients who have experienced complications of kidney failure. [1].

The number of people with diabetes has increased from 108 million in 1980 to 422 million in 2014. The prevalence of diabetes in the world related to age has increased from 5.9% -7.1% in the 20-79 year age group. Based on research conducted by the World Health Organization (WHO), it shows that the highest increase in diabetes sufferers occurs in Southeast Asian countries including Indonesia [3].

Data on diabetes mellitus sufferers shows that Indonesia has increased from 2013 to 2018, increasing to 2%. The prevalence of DM of all ages in Indonesia is slightly low compared to the prevalence of DM at age> 15 years, which is 1.5%, and Gorontalo province has a DM prevalence above the national prevalence where the prevalence is 2.4% in 2018 [4].

Gorontalo Province from 2018 to 2019 shows an increase in diabetes sufferers by 4,415 to 6,785 people scattered in districts / cities. Pohuwato Regency with DM as many as 4,069 people, Boalemo Regency as many as 407 people, Bone Bolango Regency as many as 209 people, Gorontalo Regency as many as 1,883 people, North Gorontalo Regency as many as 115 people, Gorontalo City as many as 102 people, this shows that Bone Bolango Regency is in the order of -4 regions with the highest number of DM sufferers in Gorontalo Province [5].

From inpatient examination data at the Toto Kabila Hospital, Bone Bolango Regency, it shows that DM patients from 2018 to 2019 tended to increase, namely 1,208 cases to 1,691 cases, and from January to March 2020, namely 265 cases. In this case the DM patient has an age range of around 40 years and over (middle age).

Based on the description above, the researchers are interested in conducting research on the description of creatinine in DM sufferers. So that the discovery of creatinine in the blood becomes a sign or symptom that a person is indicated to have decreased kidney function, especially in people with diabetes. The condition of hyperglycemia that occurs in DM sufferers is one of the factors causing high creatinine levels in the blood.

RESEARCH METHODS

This type of research is a quantitative descriptive study, which is one type of research that aims to describe or describe a phenoma to be studied. Where in this study will describe creatinine levels in people with Diabetes Mellitus at Toto Kabila Hospital.Research design is a model or method used by researchers to conduct research that provides direction for the course of research [6]. The design used in this study is cross sectional where the sampling is done once at the same time [6]. The sampling location was carried out at the Toto Kabila Regional Hospital and the sample examination was carried out at the Toto Kabila Hospital laboratory. The time of this research was carried out in October 2020.

The variable used was a single variable where the creatinine level of diabetes melltus patients was hospitalized. The population in this study was an unknown population where all patients with diabetes mellitus were hospitalized at Toto Kabila Hospital. The sample in this study were 28 patients with diabetes mellitus who were hospitalized at Toto Kabila Hospital.The tools and materials used during the study were tourniquet, clinic, tube rack, cuvette, centrifuge, blue tip, yellow tip, automatic ful device (BS-120), disposable, alcohol cotton, creatinine reagent, serum sample, yellow vacuum tube. . The sampling technique in this study used the Accidental Sampling technique, in which the sampling of respondents who happened to be in the study site [7].

The data analysis technique used in this research is univariate descriptive with the results obtained from laboratory tests which will then be processed using the SPSS (Statistical Packege for Social Science) program. The presentation of data in this study is that the results of the examination processed from the SPPS (Statistical Package for Social Science) program will be presented in tabular form and explained in narrative form.Researchers gave a value to the examination by looking at normal creatinine levels from 0.50 to 1.30 mg / dL.

RESEARCH RESULT

This research was conducted at Toto Kabila Regional Hospital in October 2020, with the aim of knowing the creatinine levels in inpatients of diabetes mellitus at Toto Kabila Hospital. The sample used for this study was 28 samples.

Table 1. *Distribution of Creatinine Test Results in Diabetes Mellitus*

Checking Creatinine Levels in DM		
Result	**Frequency**	**Percentage (%)**
Abnormal	13	46.4
Normal	15	53.6
Total	28	100

Source: Data Processed (2020)

Based on the table above, it shows that the results of the creatinine level examination were higher at normal creatinine levels, namely 53.6% compared to abnormal creatinine levels, namely 46.4%.

Table 2. *Frequency distribution of creatinine levels by age*

Age	Results of Creatinine Levels				Total	
	Normal		Abnormal			
	n	%	n	%	n	%
17-25	1	100	0	0.0	1	100
36-45	2	66.7	1	33.3	3	100
46-55	4	44.4	5	55.6	9	100
56-65	5	45.5	6	54.5	11	100
> 65	2	50.0	2	50.50	4	100

Source: Data Processed (2020)

Based on the table above, it shows that abnormal creatinine levels are higher at the age of 56-65 years, namely 54.5% compared to 46-55 years, namely 55.6% and 36-45 years, namely 33.3% aged 17-

25 years, namely 0 , 0% and age> 65 years 50.50%.

Table 3. *Frequency Distribution of Creatinine Levels Based on Gender*

Gender	Results of Creatinine Levels				Total	
	Normal		Abnormal			
	n	%	N	%	n	%
Male	3	18.8	13	81.3	16	100
Women	12	100	0	0.0	12	100

Source: Data Processed (2020)

Based on the table above, it shows that the abnormal creatinine level is more in the male gender, namely 81.3% compared to the female, namely 0.0%.

Table 4. Frequency Distribution of Creatinine Levels Based on Heredity

offspring	Results of Creatinine Levels				Total	
	Normal		Abnormal			
	n	%	n	%	N	%
There is	7	58.3	5	41.7	12	100
Not	8	50.0	8	50.0	16	100

Source: Data Processed (2020)

Based on the table above, it shows that the abnormal creatinine level is higher for those who have no offspring, namely 50.0% compared to those with offspring, namely 41.7%.

DISCUSSION

Symptoms that arise in a person with Diabetes Mellitus are caused because of an increase in levels blood glucose / hyperglycemia. Diabetes mellitus type 2 (T2DM) is characterized by the presence of peripheral insulin resistance, interference*hepatic glucose production* (HGP), and decreased function of pancreatic beta cells which will eventually lead to total beta cell destruction. Examination of creatinine levels is one indicator to assess kidney function because this compound is excreted in the urine [8].

At times when Diabetes is not well controlled, the complications that develop can be harmful to health. Acute complications can cause death, high or abnormal glucose levels can have a negative impact on health. Diabetes can attack all organs of the body. Over time Diabetes can damage blood vessels, heart, kidneys, eyes and nerves, and increase the risk of heart disease and stroke [9].

Creatinine Test Results

Creatinine is a productend of creatine metabolism. Creatine is mostly found in skeletal muscle, where this substance plays a role in energy storage as creatinine phosphate (CP). The amount of creatinine produced by a person's body is equivalent to the mass of skeletal muscle they have. High and low creatinine levels in a person's blood can be used as an important indicator in determining whether a person has impaired kidney function, so that serum creatinine levels can function as an indicator of the course of DM which can potentially experience kidney failure in DM patients who have experienced complications of kidney failure. [1].

There are several factors that can affect blood plasma creatinine levels, including: changes in muscle mass, a diet high in creatinine from meat or creatinine-rich supplements, decreased creatinine secretion due to competition with ketone acids and organic anions (in uremia), excessive physical activity can increase creatinine levels, medications as well as age and sex [10].

This research was conducted at Toto Kabila Hospital with a sample of 28 people with Diabetes Mellitus, which shows that The frequency of Diabetes Mellitus sufferers associated with the results of creatinine levels is grouped into 2 categories, namely normal and abnormal. Based on the research results

obtained. Based on the results obtained showed that the results of the creatinine level were higher at normal creatinine levels, namely 53.6% compared to abnormal creatinine levels, namely 46.4%.

Creatinine levels in Diabetes Mellitus who have a history of other diseases that are often found such as hypertension and CKD, because Diabetes Mellitus sufferers who experience complications such as kidney failure do cause creatinine levels to increase and creatinine levels can control kidney function for diabetics who have experienced complications of CKD . Diabetic nephropathy is one of the complications of kidney function disorders that can cause kidney failure in people with Diabetes Mellitus. A person with diabetes who has experienced complications of kidney failure accompanied by an increase in blood pressure will result in decreased glomerular filtration and ultimately end-stage renal failure. Kidney failure will result in an increase in creatinine levels,

High blood glucose levels in the body can slowly damage the filtration membrane, because glucose will react with proteins so that it can change the structure and function of cells including the glomerular basement membrane. Damaged protein barrier layer will result in leakage of protein into the urine (albuminuria), this can lead to impaired kidney function [1].

Hypertension that occurs together with increased kidney damage, will also encourage sclerosis in the kidneys of diabetic patients. It is thought that hypertension in diabetes is mainly due to intrarenal or intraglomerular efferent arteriolar spasm. Several studies have identified some of these risk factors, including: hypertension, glycosylated hemoglobin, cholesterol, increased age, insulin resistance, gender, and a high protein diet. And several studies have also reported that long-term diabetes complications, such as diabetic retinopathy, neuropathy, and nephropathy can be prevented or slowed by tight control of blood glucose levels and hypertension accompanied by restriction of protein in the diet [11].

Results of Creatinine Levels by Age

Decreased kidney function is also influenced by age. In old age, there is a decrease in the glomerular filtration rate. Regeneration of new nephrons by the kidneys cannot be done, so that when there is kidney damage or the aging process there is a decrease in the number of nephrons. The number of functioning nephrons at age 40 decreases by 10% every 10 years and by age 80 only 40% of the nephrons are functioning properly. Although, it does not vary much from 10-15% in each individual. Those aged> 45 years are more likely to develop diabetes. As a person gets older, it will also be followed by a decrease in kidney function. This occurs because at the age of more than 40 years, some nephrons will be lost, causing incomplete creatinine filtration so that creatinine levels in the blood increase [9].

Based on the data obtained, the results of creatinine levels based on age indicate that abnormal creatinine levels are dominated by the 56-65 years age group, namely 54.5% and 46-55 years old, namely 55.6%.

High creatinine levels indicate a decrease in kidney function which will lead to kidney failure. In addition, high creatinine levels are caused by people with Type 2 diabetes who have experienced complications of kidney failure. As a person gets older, it will also be followed by a decrease in kidney function. This happens because at the age of more than 40 years will experience the process of losing some nephrons, causing incomplete creatinine filtration so that creatinine levels in the blood increase. With increasing age coupled with chronic

diseases such as Diabetes Mellitus, the kidneys tend to become damaged as a result of high blood sugar levels and kidney function cannot be restored so that many people with Diabetes Mellitus experience complications of kidney failure [1].

Results of Creatinine Levels Based on Gender

Serum creatinine concentration describes muscle mass, creatinine levels in men are higher than women. The total creatinine excreted per day normally in men averages 14-26 mg / kg / day, and in women 11-20 mg / kg / day [9].

Based on the data obtained, the results of creatinine levels based on gender have normal female results, namely 100% and abnormal results, namely 0.0% and men who have normal results, namely 18.8%, and abnormal results, namely 81.3%. men are higher than women due to factors that are influenced by changes in muscle mass, excessive physical activity carried out by men, which causes creatinine levels in men to increase compared to women.

Result of Creatinine Levels Based on Heredity

Based on the data obtained, the results of creatinine levels based on heredity showed that heredity was lower, namely 41.7% compared to factors without heredity, namely 50.0%. One of the causes of the high prevalence of Type 2 Diabetes Mellitus is due to the interaction between factors with genetic susceptibility and exposure to the environment.

The irreversible risk factors for Diabetes Mellitus type 2 include age, sex, and genetic factors. And the risk factors for Diabetes Mellitus type 2 that can be changed are smoking habits, physical activity and a good and healthy diet.

CONCLUSION

Based on the results of research conducted regarding the description of creatinine levels in Diabetes Mellitus sufferers at Toto Kabila Hospital, the following conclusions were obtained:

Based on the results obtained, it shows that the results of creatinine levels are higher at normal creatinine levels, namely 53.6% compared to abnormal creatinine levels, namely 46.4%. where it can be concluded that the creatinine levels in Diabetes Mellitus are more normal than abnormal.

Based on the data obtained, the results of creatinine levels based on age indicated that abnormal creatinine levels were dominated by the 56-65 years age group, namely 54.5% and 46-55 years old, namely 55.6%. where it can be concluded that the creatinine levels in Diabetes Mellitus are higher at the age of 56-65 years compared to patients under 56-65 years of age.

Based on the data obtained, the results of creatinine levels based on gender have normal female results, namely 100% and abnormal results, namely 0.0% and men who have normal results, namely 18.8%, and abnormal results, namely 81.3%. changes in muscle mass, and muscle mass in women is smaller than that of men.

Based on the data obtained, the results of creatinine levels based on heredity showed that heredity was lower, namely 41.7% compared to factors without heredity, namely 50.0%. Where it can be concluded that creatinine levels in Diabetes Mellitus tend to be more likely to have no hereditary history compared to those who have offspring, this is due to one of the factors, namely lifestyle and poor diet.

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