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BLOOD UREA NITROGEN LEVELS IN HYPERTENSION PATIENTS WITH CHRONIC KIDNEY FAILURE

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Abstract

One of the disease issues in the world is hypertension. A risk factor for heart disease, stroke, and renal failure that causes early death is hypertension. Hypertension itself is the most common comorbidity disease seen in patients with chronic renal failure, where its prevalence increases with a decrease in kidney function, and can also cause blood vessels in the kidneys to constrict so that the flow of food substances to the kidneys is disturbed and if it occurs continuously kidney function will be disturbed. One of the indicators to determine disorders in kidney function is to check the level of Blood Urea Nitrogen. This study used a descriptive method to obtain a picture of blood urea nitrogen levels in hypertensive patients who experienced chronic kidney failure at M. Yunus Hospital Bengkulu in 2022. The results showed that of the 29 samples that had abnormal value levels as many as 25 samples (86.2%) or almost all, and those with normal value levels were 4 samples (13.8%) or a small part. Based on the study, it was found almost all samples had abnormal blood urea nitrogen values, and a small number had normal blood urea nitrogen values. To ensure that the kidneys function properly and are normal, it is recommended for hypertension individuals who develop renal failure to be able to alter their water intake and output.

Keywords: Hypertension, Chronic Kidney Failure, Blood Urea Nitrogen

INTRODUCTION

Hypertension is a disease that is a problem in the world and is a risk factor for heart disease, stroke and kidney failure resulting in premature death (World Health Organization, 2020). Globally, the incidence of hypertension in adult patients increased to 1.13 billion in 2015, compared to 1975 at 594 million (Risk, 2017). Data from basic health (Rikesdas, 2018), the incidence of hypertension in Indonesia has increased to a percentage of 34.1% of 260 million people with an estimated number of cases of 63,309,620 people, while the death rate in Indonesia due to hypertension is 427,218 deaths. Based on data from the Bengkulu Riskesdas Report in 2018, the prevalence of hypertension in Bengkulu Province is 11,329, with Bengkulu City as the person with the largest prevalence with a prevalence of 2,179 followed by the north Bengkulu regency with a prevalence of 1,756 and Rejang Lebong regency with a prevalence of 1,524 (Ministry of Health Republic Indonesia, 2019).

Hypertension itself is the most common comorbidity disease seen in patients with chronic renal failure, where its prevalence increases with decreased

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kidney function. Chronic renal failure is recognized as a risk factor for cardiovascular disease, which makes the treatment of hypertension even more important for chronic renal failure patients. Chronic renal failure interacts with hypertension on many levels. There is a two-way relationship between the two diseases. Resistant hypertension is very common among chronic renal failure patients and the prevalence seems to be comparable to the degree of renal dysfunction (Halbach, 2018). According to research conducted by Kalaitzidis and Elisaf in 2018 on the Treatment of Hypertension in Chronic Renal Failure that the prevalence of hypertension is increasing along with the decline in kidney function.

Hypertension can cause the tightening of blood vessels in the kidneys disrupting the flow of food substances to the kidneys and resulting in damage to kidney cells. If it occurs continuously, it will cause kidney cells to no longer function (Pongsibidang, 2017). The decrease in kidney function can be measured by several parameters, namely creatinine, ureum or blood urea nitrogen, and glomerular filtration rate (GFR) or glomerular filtration rate (LFG). Based on research conducted by Seki and friends in 2019, an increase in blood urea nitrogen was identified as a risk factor for kidney disease in patients with a medium to chronic kidney failure. Based on this study, it is also that measuring blood urea nitrogen levels is useful for predicting damage to the kidneys.

This research will be conducted in the hemodialysis unit of RSUD M. Yunus, Bengkulu Province. RSUD M. Yunus, Bengkulu Province is one of the hospitals in Bengkulu and is a referral hospital in Bengkulu Province. The chronic kidney failure patients recorded in this room were 113 patients with a number of patients suffering from hypertension. From the description above of the study, in an effort to reduce the mortality rate due to complications of hypertension sufferers, researchers are interested in conducting research on the picture of blood urea nitrogen in hypertension sufferers who experience chronic kidney failure at the M. Yunus Bengkulu Regional General Hospital.

METHODS

Research Design and Subject

This study used a descriptive method to obtain a picture of blood urea nitrogen levels in hypertensive patients who experienced chronic kidney failure at M. Yunus Hospital Bengkulu in 2022.

Instruments and Data Analysis Procedures

The tools and materials used include centrifuge, Chemical Analyzer, GP yellow tip, GP blue tip, micropipette, sample cup, vacutainer needle, vacutainer tube, cool box, tourniquet, label, cotton and cotton container,

tube rack, plaster and hand gloves. The serum is obtained by rotating the blood sample in the centrifuge for 7 minutes and then the examination is carried out using a Chemical Analyzer, followed by starting the examination and the results of the examination will come out.

The type of data collected is primary data by examining blood urea nitrogen levels in hypertensive patients who experience chronic kidney failure at M. Yunus Hospital, Bengkulu.

FINDINGS

Table 1 Distribution of blood urea nitrogen levels in patients with hypertension who experience chronic kidney failure at RSUD M. Yunus Bengkulu in 2022.

Category	Frequency	Percentage (%)
Normal	4	13.8%
Abnormal	25	86.2%
Total	29	100%

Table 4.1 showed that out of 29 samples that had abnormal value levels of 25 samples (86.2%) or almost all, and those with normal value levels of 4 samples (13.8%) or a small part.

DISCUSSION

In this study, it was found almost all samples had abnormal value levels, and a small part had normal value levels. The results of the study showed that almost all hypertension sufferers who experience chronic kidney failure have abnormal blood urea nitrogen levels. In this study, a small part of the blood urea nitrogen level was obtained. During in-depth interviews of patients who had normal levels of blood urea nitrogen, it was found that the patient had liver-related diseases besides that they also had problems related to malnutrition and lack of protein consumption. In hypertensive patients who experience chronic renal failure, the results of the blood urea nitrogen examination will definitely increase due to failure in kidney function.

In patients who have normal blood urea nitrogen levels, blood urea nitrogen levels can be influenced by various things, one of which is the patient's food intake, which can also be influenced by the input and output of fluids consumed by the patient. Patients who had a low-protein diet were found to have normal blood urea nitrogen levels, this is in line with research conducted at Sanjiwani Gianyar Hospital which stated that there was a decrease in levels due to patients who were on a low-protein diet as one of the requirements for patients with advanced renal failure (Arjani, 2017).

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This was also emphasized by the research of Heriansyah and Aji where they also found that a decrease in blood urea nitrogen levels can be caused by such as severe liver damage, a low-protein diet, malnutrition, hypervolemia (overhydration), pregnancy, and prolonged intravenous addition of glucose fluids and also the consumption of phenothiazine drugs (Heriansyah, Aji Humaedi, 2019). The increase in blood urea nitrogen levels was identified as one of the factors of kidney malfunction (Seki et al., 2019). In this case hypertension and chronic renal failure affect each other. Hypertension can lead to chronic renal failure, on the contrary, chronic renal failure can lead to hypertension. Prolonged hypertension can result in structural changes in arterioles throughout the body, characterized by fibrosis and hyalinization of the walls of blood vessels. The main target organs are the heart, brain, kidneys, and eyes (Lestari et al., 2018).

During in-depth interviews with patients who had abnormal levels of blood urea nitrogen, it was found that the patients had other comorbid diseases besides hypertension, namely diabetes mellitus which can affect the increase in blood urea nitrogen values. This discovery is in line with research conducted at Wahidin Sudirohusodo Hospital in Makassar which states that diabetes mellitus is associated with an increase in blood urea nitrogen levels, where people who have diabetes are 12.37 times more at risk of chronic kidney failure compared to those who do not have diabetes mellitus (Pongsibidang, 2017). In addition to having other comorbid diseases such as diabetes mellitus, almost some patients who have abnormal ureum levels are also elderly patients. As we get older, kidney function will also decrease as it begins to lose some nephrons, which are important sieves in the kidneys. Every ten years of age, kidney function decreases by 10 ml/min / 1.73 m². there is a progressive decrease in the glomerular filtration rate occurring after the age of 40 years to the age of 70 years, up to less than 50% of the normal (Ibrahim et al., 2017).

Blood urea nitrogen is the end result of protein and amino acid metabolism produced by the liver and channeled through the extracellular and intracellular fluid into the blood and then further filtered by the glomerulus (Verdiansyah, 2016). The kidneys are an important organ for removing unnecessary metabolic waste from the body. The kidneys have the main function of secreting the final result or most of the body's metabolism such as the ureum, creatinine, and uric acid. The rest of the body's metabolism if allowed to accumulate will become toxic to the body, especially the kidneys themselves. Kidney disease is a disease caused by a decrease in the function of the kidney organs until finally, the kidneys are not able to perform their duties properly (Verdiansyah, 2016).

Hypertension is a disorder of the circulatory system that causes an increase in blood pressure above normal values (>140/90 mmHg) (Nisa, 2017). Hypertension can increase the risk of coronary artery disease such as myocardial infarction or dementia; angina; atrial fibrillation; or atrial fibrillation. (Hidayah and Daulay, 2020). A prolonged increase in pressure will lead to clogging. Blockage of arteries and arterioles will have an impact on glomerular damage and tubule atrophy, resulting in the entire nephron being damaged, which leads to chronic renal impairment (Wong, 2017). Other studies also stated that people with hypertension are 21.45 times more at risk of developing chronic kidney failure compared to those who do not have hypertension (Pongsibidang, 2017).

People with hypertension with high blood pressure will make the blood vessels in the kidneys depressed. Finally, blood vessels become damaged and cause kidney function to decrease until kidney failure (Pongsibidang, 2017). One of kidney damage is measured by measuring blood urea nitrogen levels in people with hypertension. Another study also stated that 427 sample people who experienced hypertension by 25.52% had blood urea nitrogen levels that exceeded normal values of 42-94 mg / dL (Seki et al., 2019).

CONCLUSIONS AND SUGGESTIONS

Based on the study, it was found almost all samples had abnormal blood urea nitrogen values, and a small number had normal blood urea nitrogen values. To ensure that the kidneys function properly and are normal, it is recommended for hypertension individuals who develop renal failure to be able to alter their water intake and output.

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