

Ureum and Creatinine Levels of Kidney Failure Patients Pra and Post Hemodialysis in Jayapura General Hospital Papua

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Abstract

Kidney failure is a worldwide health problem seen from the increase in incidence, prevalence, and the level of morbidity. Indonesia is one country with high rates of kidney failure. The purpose of this research was to determine the description of the results of urea and creatinine levels in patients with kidney failure before and after hemodialysis. The population used in this study was all renal failure patients who would carry out hemodialysis at the Jayapura Regional General Hospital (RSUD). The number of samples in this research is 30. The method of examining urea and creatinine used is the photometry method. This research was conducted from 10 May to 10 June 2018. To determine the levels of urea and creatinine before and after hemodialysis, the average value of the results of the examination was calculated and the results of the average urea level before hemodialysis 53.37 mg/dl and the average yield were obtained. Average after hemodialysis 18.83 mg/dl. The results of the average creatinine level of patients before 12.25 mg/dl and the average results after hemodialysis were 43.63 mg/dl. The results of the examination showed that there were no significant differences and that the results remained high. This research concluded that there was no significant difference between the examination of urea and creatinine levels before hemodialysis and after hemodialysis.

Keywords: Kidney Failure; Ureum; Creatinine; Hemodialysis

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1 Introduction

A kidney is one of the organs to release metabolic waste products in the body that are not needed anymore by the body. Humans have two kidneys. It is located at the waist near the back of the rib cage [1]. Kidney failure is still a problem with the high number of sufferers in Indonesia because of the incidence, prevalence, and even morbidity is still high. Hemodialysis is still the main choice for therapy in patients with kidney failure [2].

Based on data, the national incidence of kidney failure has reached 0.2% or 504,248 people, with the highest number in Central Sulawesi [3].

Hemodialysis is a therapy using a device called a dialyzer and is used to separate blood from the remnants of metabolism or poisons, and then return it into the bloodstream. Hemodialysis through the process of diffusion, osmosis, and ultrafiltration. The frequency of hemodialysis in patients with kidney failure varies depending on the amount of kidney function remaining, on average patients undergo two or three times a week [4].

Creatinine urea examination is used to determine how much kidney function patients with kidney failure are still functioning properly. If it is known that creatinine urea in the urine decreases, it will cause a decrease in the glomerular filtration rate (kidney filtering function). Decreased glomerular filtration rate which makes creatinine ureum will increase in the blood. High levels of urea and creatinine can cause anemia, kidney damage, decreased immune response, damage to the central nervous system, weakness, loss of appetite, weakness, and discoloration of urine [5].

Kidney failure patients in Jayapura Regional General Hospital (RSUD) are

increasing every year. In 2016, the number of kidney failure patients was 230, in 2017, the number increased to 287 patients, while in 2018 there were 300 patients. Patients who routinely perform hemodialysis from January to June are only 128 patients [6]. Research that has been done to determine the level of ureum and creatinine levels in patients with renal failure who have done hemodialysis shows that often doing hemodialysis therapy does not guarantee ureum levels and creatinine levels to be normal [7]. Research conducted by Regina [8] found that the creatinine levels before and after hemodialysis were above normal 25 people (100%). Urea levels before above normal 25 people (100%) and after hemodialysis is known high results 12 people (48%) and normal results 13 people (52%).

Still, lack of research on examination of urea and creatinine levels in Papua, especially in Jayapura, makes researchers intend to research examining Ureum and Creatinine levels in patients undergoing hemodialysis at Jayapura District Hospital.

2 Methods

This research is descriptive with a laboratory test approach to determine levels of ureum and creatinine in kidney failure patients before and after hemodialysis therapy. The location of the study was the Hemodialysis Room of Jayapura Regional Hospital, for 1 month conducted from 10 May to 10 June 2018. The population in this study were all kidney failure patients who would undergo hemodialysis therapy at Jayapura Regional Hospital. The sample in this study was 30 patients with kidney failure serum, before and after hemodialysis therapy.

Venous blood that has been taken is centrifuged, and the serum is taken and examined using the photometric method with the EasyRA tool with the following interpretation:

- Normal value:
- Ureum Examination: 7-18 mg/dl
- Creatinine examination: 0.95 mg/dl

3 Results and Discussions

The results of the study are shown in the table 1.

Table 1. Average Ureum and Creatinine Levels in Patients with Kidney Failure Before and After Hemodialysis at Jayapura District Hospital

Examination	Before Hemodialysis			After Hemodialysis		
	N	T	Mean (mg/dl)	N	T	Mean (mg/dl)
Ureum	0	30	53.37	17	13	18.55
Creatinine	0	30	10.31	0	30	3.68

Table 1 shows that the number of kidney failure patients who did hemodialysis with a dialyzer (Figure 1) was 30 people. Urea examination results before hemodialysis are high in 30 people with an average of 53.37 mg/dl, and after normal hemodialysis 17 people, 13 people high with an average of 18.55 mg/dl. Whereas creatinine levels before hemodialysis were high in 30 people with an average of 10.31 mg/dl, and after high hemodialysis 30 people with an average of 3.68.



Figure 1. Dialyzer device being used in kidney failure patients

The results of the average ureum level examination in 30 patients with kidney failure before and after undergoing hemodialysis therapy showed a decrease. Where the average yield before hemodialysis was 53.37 mg/dl and after hemodialysis, the ureum level decreased to 18.55 mg/dl. However, in 13 patients, it still showed ureum levels above the normal value or still showed high results.

Decreased ureum levels in hemodialysis patients but still above normal values according to research from Makmur who examined the effect of hemodialysis on blood urea and creatinine levels in renal failure patients who found that there was a decrease in urea and creatinine in hemodialysis patients but some of them still had values above normal (high) [9].

Urea examination after hemodialysis showed that 17 normal patients and 13 patients remained high. In 13 patients who got normal results, it could be said that hemodialysis was successful, it had filtered all the toxic substances in the blood to get normal urea levels. This also concerns the patient's food intake by the instructions given by a doctor or nutritionist before hemodialysis. While 17 patients found results still above normal values, this could be because of inadequate food intake. According to Kresnawan [10] hemodialysis as therapy is most often used to cleanse and remove toxins in the blood of patients with kidney failure, but it turns out hemodialysis can cause loss of nutrients in the blood such as protein.

Decreased urea levels in the blood of patients with kidney failure can occur after hemodialysis. Hemodialysis is a special therapy for patients with kidney failure using tools. According to Scalon [11], hemodialysis is secreting fluids such as toxic substances urea and creatinine from the body by using an artificial kidney machine (dialyzer). In the process of hemodialysis, it channels blood flow filled with toxic substances into a dialyzer machine which already contains a special fluid called dialysis, the liquid that helps the blood washing process. Then inside the machine blood full of toxins is filtered. This makes the level of urea in the blood can decrease.

The principle of hemodialysis is that the dialysis machine will pump blood out of the body into the dialysis machine. Blood in the machine will be filtered and through the process of diffusion and ultrafiltration to separate

poisons and useless substances from the blood. Blood free of toxic substances will flow back into the body [12].

From research conducted by Regina [8] to see levels of urea and creatinine in patients with renal failure before and after hemodialysis showed that hemodialysis reduced the patient's urea level to normal. Get results where the ureum levels before hemodialysis are above normal 25 people and after hemodialysis 13 normal people, 12 people are above normal, one of them before hemodialysis is 124 mg/dl after hemodialysis to 20 mg/dl, however, this hemodialysis therapy cannot completely reduce levels ureum becomes normal. Some patients still show urea levels are still above normal despite hemodialysis. A lack of dialysis fluid can cause this in the machine or during the process of hemodialysis of the blood in the dialyzer and the hose can cause blood clots so it can disrupt the process of hemodialysis [13].

Based on the results of the study from Heriansyah et al [14], the authors concluded that there were significant changes in pre-hemodialysis and post-hemodialysis urea and creatinine levels in chronic kidney failure patients undergoing hemodialysis therapy. Of the 149 patients, all patients experienced a decrease in urea and creatinine levels. Patients with chronic kidney failure who experienced a decrease in urea levels up to 65% after hemodialysis were 39.6%.

The same research has been done by Runtung [15] showed that there was an influence of hemodialysis on creatinine ureum levels in CRF patients, where there was a decrease but there were still patients who had high ureum and creatinine values.

The results of the average creatinine levels before and after hemodialysis in 30 people with kidney failure showed a decrease. The average creatinine level before hemodialysis was 10.31 mg/dl and after hemodialysis was 3.68 mg/dl. However, these results remain high because they are above the normal value. Almost the same as ureum levels, creatinine levels in the blood can decrease when hemodialysis carry out for filtering toxic substances in the blood such as urea and creatinine because hemodialysis functions the same as the kidney whose job is to filter out toxins in the body of patients with kidney failure. However, the

creatinine level does not decrease until it reaches normal results.

Research conducted by Regina [8], showed results before and after hemodialysis creatinine levels in patients with kidney failure 25 people were above normal, after hemodialysis, there was only a decrease in creatinine levels which was not much different from the results before hemodialysis. One of them before hemodialysis creatinine levels of 5.3 mg/dl after hemodialysis only decreased to 1.7 mg/dl. This result remains above the normal creatinine value. In a study conducted by Niarna and Andi [15] to see creatinine levels in kidney failure patients who do hemodialysis twice a week and 3x a week hemodialysis showed that there is no difference in creatinine levels that are still getting high results.

Despite hemodialysis, creatinine levels in the blood of kidney failure patients remain above normal values. This is because we consider serum creatinine being more sensitive and is a special indicator of kidney disease compared to tests with blood urea levels. Increased creatinine in the blood shows a decrease in kidney function and the shrinkage of skeletal muscle mass [17]. Patients who have exposed to kidney failure will still have high levels of the creature.

According to Sutedjo [18], creatinine is high because renal glomerulus is damaged and cannot carry out its function to filter out fluids in the body that will make the kidneys no longer fully function, this makes creatinine always high in patients with kidney failure. Despite hemodialysis, creatinine levels in the blood will remain above normal limits.

In the process of hemodialysis, the engine speed is between 300-400 ml/min, with a mechanism that is the mechanism of diffusion aimed at filtering and removing and dissolved substances in the blood, while the ultrafiltration mechanism aims to reduce excess fluid in the blood. Both mechanisms can be combined or separated, according to the initial purpose of hemodialysis [19].

Increased levels of urea and creatinine after hemodialysis can occur because of poor machine performance starting from the hemodialysis process, how much dialysis fluid is given and the working mechanism of the dialyzer machine that is not functioning properly, but increased levels of ureum and

creatinine can also because of food intake, fluids, and electrolytes during the hemodialysis process. Protein intake is only allowed 1-1.2 g / KGB / day, it limited potassium intake to 40-70 meq/day. It limits the fluid that enters the body according to the amount of urine around 200-250 cc/day, sodium intake limited to 40-120 meq/day. If it is not limited it will cause an excess amount of fluid and protein so that during the hemodialysis process not all fluids removed because the hemodialysis period is only 4-5 hours a week 2 times [20].

4 Conclusions

From the results of the study, we can conclude that all patients experienced a decrease in the value of ureum and creatinine after performing hemodialysis, but only 57% of ureum examination patients had ureum levels in the normal threshold. Creatinine examination showed that all patients still had high creatinine levels.

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6 Declations

6.1 Authors Contributions

The names of the authors listed in this journal contributed to this research.

6.2 Funds

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6.3 Conflict of Interest

The authors declare that there is no conflict of interest.

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