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CORRELATION BETWEEN QUALITY OF LIFE WITH INTERLEUKIN-6 SERUM LEVELS INCHRONIC KIDNEY DISEASE PATIENTS UNDERGOING REGULAR HEMODIALYSIS

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Abstract

The morbidity and mortality rates of patients with chronic kidney disease (CKD), who undergo regular hemodialysis are still high. Cytokine levels, such as IL-1, IL-6, and TNF-α are often found to be increased in hemodialysis patients. The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) has been widely used in evaluating the quality of life of patients suffering from chronic diseases. This study aims to determine the level of quality of life and serum interleukin-6 levels in regular hemodialysis patients. This study was an observational cross-sectional method which was carried out at the hemodialysis center at the General Hospital. H. Adam Malik (RSUP HAM) during February - April 2017 with a sample of 45 people who were collected consecutively. Samples were patients with chronic kidney failure who had undergone regular hemodialysis at RSUP HAM. The majority of subjects causing chronic kidney disease were hypertensive nephropathy in 25 patients (55.6%). Serum IL-6 laboratory examination showed a mean value of 9.02. Based on our SF-36 questionnaire, we found a mean value below 50 for all scales examined in the study samples. Spearman correlation test between IL-6 with each scale from the SF-36 questionnaire found all parameters produced positive correlation data (p <0.05). We conclude that there is a significant correlation between IL-6 levels and the quality of life of Chronic Kidney Disease patients undergoing hemodialysis.

Keywords: Chronic Kidney Disease, Hemodialysis, Interleukin-6. SF-36 Questionnaire.

Introduction

CKD is a pathophysiological process with various etiologies, resulting in a progressive decline in kidney function, which generally ends with kidney failure. The morbidity and mortality rates of CKD patients, who undergo regular hemodialysis are still high, ranging from 15-20% per year, although improvement in management of cardiovascular disease, infection and dialysis therapy has been carried out (1).

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SF-36 is one instrument that has been proven to be used to assess quality of life in almost all chronic disease studies including hemodialysis patients and can also be used to assess quality of life in healthy populations. This instrument is simple and easy and is widely used (3,4).

Interleukin-6 (IL-6) has the most important role in the production of most acute phase proteins, whereas other cytokines affect the acute phase protein subgroup. IL-6 is a multifunctional cytokine that plays a role in the regulation of inflammation, immune response, acute phase reactants and hematopoiesis, exerting its effects on local and systemic tissue (4).

About 30-50% of predialysis patients, hemodialysis (HD) has elevated serum levels of inflammatory markers. Nevertheless, the high trend in the distribution of inflammatory markers that are often used such as C-Reactive Protein (CRP) and interleukin-6 (IL-6) indicates patient-specific processes. Epidemiologic data significantly show that plasma IL-6 is associated with cardiovascular morbidity and mortality in non-renal patients. In CKD patients an increase in IL-6 levels is a strong predictor of poor outcome(1,4).

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n this study trying to link the inflammatory factor (IL-6) with quality of life (as assessed using the SF-36 questionnaire) CKD patients undergoing routine hemodialysis.

Research methods

Sampling method
This research is observational with cross sectional method. The study was conducted at the H. Adam Malik General Hospital Medan throughout February - April 2017. The sample collection was carried out using the consecutive method with a total sample of 45 people. Criteria for inclusion of samples were male or female patients, aged> 18 years, and kidney failure patients who underwent hemodialysis for> 3 months with stable conditions. Patients involved in the study were asked for oral and written consent by signing an informed consent sheet. This study was approved by the Local Health Research Ethics Committee.

Data Analysis
Data samples were taken based on the results of history taking, physical examination (vital signs and anthropometry), laboratory results as well as patient questionnaire results. Examination of blood samples using the Human Interleukin-6 Immunoassay (R&D System) method to obtain the value of interleukin-6. During the hemodialysis process, patients were also asked to fill out the SF-36 questionnaire. The data will be analyzed by Pearson correlation test if normally distributed or Spearman correlation test if not normally distributed using SPSS 22.0. A p value <0.05 (95%) was considered statistically significant.

Results
We found that the majority of samples experiencing CKD were caused by hypertensive nephropathy (55.6%), age> 40 years (82.2%), and working as an entrepreneur (48.9%). Serum IL-6 laboratory examination showed a mean value of 9.02. From the examination using the SF-36 questionnaire, we obtained a mean score below 50 for all scales examined (table 1).

Table 1. Characteristics of Subjects

Characteristics	n = 45
Gender	
Male	29 (64.4%)
Female	16 (35.6%)
Age (>40 years)	37 (82.2%)
Occupation	
Enterpreneur	25 (48.9%)
Civil Servant	8 (17.8%)
Housewife	10 (22.2%)
Pension	5 (11.1%)
Diagnosis	
Hypertensive Nephropathy	25 (55.6%)
Diabetic Nephropathy	11 (24.4%)
Obstructive Kidney Disease	6 (13.3%)
Chronic Glomerulonephritis	3 (6.7%)
IL-6 Serum (Mean)	9.02
SF-36 Components	
SF-36 Physical Functions	41.96
SF-36 limitations due to emotional problems	32.8
SF-36 Mental Health	43.22
SF-36 Social Functions	44.56
SF-36 limitations due to physical problems	30.29

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SF-36 feeling sick	46.51
SF-36 general health	27.89
SF-36 energy	31.89

The distribution of IL-6 data and scores for the entire SF-36 scale were not normally distributed so we used the Spearman correlation test to conduct correlation tests between IL-6 and each scale from the SF-36 questionnaire. We found that all parameters produced negative correlation data so it was concluded that there was a significant negative correlation between IL-6 and the SF-36 scale component (table 2).

Discussion

From our research, we found that in patients undergoing regular hemodialysis, there was a mean IL-6 serum level which was quite high (9.02 pg/mL). This is in accordance with research conducted by Bosolla, et al. which states that serum IL-6 levels are higher in the group experiencing fatigue due to chronic hemodialysis (5.1 + 3.4 SD) than the group without fatigue (1,6 + 1,5 SD) (P <0,001) (5).

Research conducted by Barreto et al. also states that plasma IL-6 levels significantly increase in advanced-stage CKD and independently predict mortality when compared with three other acute phase proteins (CRP, TNF-α, and albumin) (6).

In this study, we also obtained a low SF-36 value in patients undergoing regular hemodialysis which means a decrease in the quality of life of patients. The SF-36 value for each parameter in this study is in the range of 27.89 - 46.51. This is consistent with research conducted by Rambod, et al. which states that there is a strong association for several physical health components of SF-36 compared to mental health components in patients undergoing dialysis. Research conducted by Crus, et al also stated that the mean SF-36 value in CKD patients undergoing hemodialysis was below 70 in most questionnaire parameters(7,8).

Table 2. Spearman Correlation Test Results

Parameter	IL-6	
	Nilai Korelasi Spearman	P-Value
SF-36 fungsi fisik	-0.361	0.015
SF-36 keterbatasan akibat masalah emosional	-0.298	0.047
SF-36 kesehatan mental	-0.359	0.015
SF-36 fungsi sosial	-0.382	0.010
SF-36 keterbatasan akibat masalah fisik	-0.319	0.033
SF-36 perasaaan sakit	-0.367	0.013
SF-36 kesehatan umum	-0.325	0.029
SF-36 energi	-0.313	0.036

In most studies, normal healthy populations usually have values above this level (7,8).

These results contradict research conducted by Jhamb, et al. which states that the SF-36 vitality scale may fail to fully predict people with more severe fatigue in patients undergoing dialysis (9).This difference is likely due to the subjectivity factor of the implementer who assessed the SF-36 instrument.

In this study a positive correlation was found between an increase in IL-6 and a low SF-36 value in all parameters (P <0.05). This is in line with research conducted by Cruz, et al and Germin-Petrovi et al. which states that there is a negative impact on the quality of life of patients in the early stages of CKD, although we cannot detect a significant relationship between the stage of the disease and the components of the SF-36 questionnaire (10,11,12).

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However, research by M. Artom et al found that the SF-36 vitality subscale failed to reflect several aspects of fatigue, such as lack of motivation and weakness. Research conducted by Feroze, et al. also mentioned that there was no significant correlation between SF-36 and inflammatory mediators, such as IL-6 (13,14). More in-depth studies and further research on these differences must be carried out so that the causes of these differences can be found.

Conclusion

There is a significant correlation between IL-6 levels and patients undergoing hemodialysis. An increase in IL-6 levels also has a negative correlation with a decrease in SF-36, which indicates an increasingly high level of fatigue and a decrease in the quality of life of patients. Based on this, the SF-36 questionnaire can be used as an instrument to predict quality of life in patients undergoing regular hemodialysis.

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