

Correlation of Ferritin Level to The Quality of Life

Korelasi Kadar Ferritin Terhadap Kualitas Hidup

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ABSTRAK

Latar Belakang : Penyakit ginjal kronik merupakan masalah kesehatan di seluruh dunia. Keadaan yang diakibatkan kondisi gagal ginjal stadium akhir menyebabkan penurunan kualitas hidup disertai angka mortalitas tinggi berkisar 22% per tahun. Banyak cara menilai kualitas hidup, salah satunya Short form-36 (SF-36) yang telah mengalami beberapa revisi penyempurnaan. Serum ferritin terus menjadi fokus perhatian. Hampir setengah dari semua pasien hemodialisis memiliki serum ferritin > 500 ng/ml. Serum ferritin merupakan penanda inflamasi yang baik, kadar yang rendah berkorelasi dengan kekurangan zat besi dan kadar yang tinggi berkorelasi dengan inflamasi.

Tujuan: Untuk mengetahui adanya korelasi dari tingginya kadar serum ferritin terhadap penurunan kualitas hidup pada penderita GJK yang telah menjalani hemodialisis

Metode: Penelitian ini merupakan penelitian Cross Sectional untuk mengetahui apakah tingginya kadar serum ferritin dapat memberikan dampak terhadap penurunan kualitas hidup pada penderita gagal ginjal kronik (GJK) yang telah menjalani hemodialisis rutin. Penelitian dilakukan di Unit Hemodialisis RSUP Dr. Sardjito, Yogyakarta.

Hasil: Sebanyak 61 pasien yang memenuhi kriteria inklusi untuk menjalani penelitian. Skor KDQOL-SF pada penelitian ini, didapatkan korelasi negatif (lemah) yang signifikan pada sleep (gangguan tidur) 58.79 ± 1.95 ($r = -0.306$) dan ($p = 0.017$). Pada skor Role Physical (aktifitas fisik) 24.59 ± 3.21 didapatkan adanya korelasi negatif (lemah) yang signifikan ($r = -0.268$) dan ($p = 0.037$). Untuk skor Emotional Well Being (kondisi emosional) 70.85 ± 1.39 ($r = -0.374$) dan ($p = 0.003$). Pada skor Energy Fatigue (kelelahan fisik) 62.29 ± 1.61 ($r = -0.261$) dan ($p = 0.043$)

Kesimpulan : Secara keseluruhan penelitian ini menunjukkan belum adanya hasil yang signifikan secara statistik adanya korelasi ferritin yang tinggi secara langsung terhadap kualitas hidup.

Kata Kunci: gagal ginjal kronik, hemodialisis, ferritin, KDQOL-SF

ABSTRACT

Background: Chronic kidney disease is a worldwide health problem. Circumstances that caused the condition of end-stage renal failure causes a decrease in quality of life with a high mortality rate ranging from 22% per year. Many ways to assess the quality of life, form-36 (SF-36) has undergone several revisions refinement. Serum ferritin continues to be the focus of attention. Nearly half of all hemodialysis patients had serum ferritin > 500 ng/ml. Serum ferritin is a marker of inflammation that is a good, low levels correlated with iron deficiency and high levels correlated with inflammation.

Objective: To determine the correlation of high levels of serum ferritin to decline in the quality of life in patients with CRF who had been undergoing hemodialysis

Methods: This study was a cross sectional study to determine whether high levels of serum ferritin may have an impact on the decline in the quality of life in patients with chronic renal failure (CRF) who had undergone regular hemodialysis. The study was conducted at Hospital Hemodialysis Unit Dr. Sardjito, Yogyakarta.

Result: A total of 61 patients who met the inclusion criteria to undergo research. Score KDQOL-SF in this study, negative correlations (weak) significant in sleep (sleep disorders) 58.79 ± 1.95 ($r = -0.306$) and ($p = 0.017$). On the Role Physical scores (physical activity) 24.59 ± 3.21 obtained a negative correlation (weak) significant ($r = -0.268$) and ($p = 0.037$). For Emotional Well Being scores (emotional condition) 70.85 ± 1.39 ($r = -0.374$) and ($p = 0.003$). On the score of Energy Fatigue (physical fatigue) 62.29 ± 1.61 ($r = -0.261$) and ($p = 0.043$).

Conclusion: Overall, this study shows the lack of statistically significant results showed a high correlation ferritin directly on quality of life.

Keywords: chronic renal failure, hemodialysis, ferritin, KDQOL-SF

INTRODUCTION

Chronic kidney disease is a worldwide health problem. In the United States, found an increased incidence and prevalence of kidney failure, with poor prognosis and high costs. Data for 1995-1999 states the incidence of this disease was estimated at 100 cases per million populations per year, and this figure increased by about 8% per year (Suwitra, 2009).

Anemia is common in the majority of CRF patients, usually begin to occur when the glomerular filtration rate (GFR) decreased to 35 ml / min. Anemia in CRF affects the quality of life of patients and lead to an increase in morbidity and mortality (Esbach, 2000).

Until now, there has been no agreement on a reliable marker to determine the reserves of iron (Fe) in the CRF. Serum ferritin continues to be the focus of attention. Nearly half of all regular hemodialysis patients had serum ferritin > 500 ng / ml. Iron supplementation is not recommended at this time, although most of the reported cases had serum ferritin hemochromatosis > 2000 ng / ml. (Zadeh et al., 2006).

Quality of life is very important hemodialysis patients maintained and evaluated to see the progression of the disease and treatment, so that the necessary objective measurement of clinical indicators. Many ways

to assess quality of life, one of which Short form-36 (SF-36) which has undergone several improvements such revisions KDQOL SF-36 (version 1.3) for checking the health status of specific CRF patients (Ron et al., 1997; Solar et al., 2008).

This study aimed to investigate the correlation of high levels of serum ferritin to decline in the quality of life in patients with CRF who had been undergoing hemodialysis

DISCUSSION

Chronic kidney disease is a pathophysiological process with diverse etiologies, resulting in a progressive decline in kidney function and end up with kidney failure. Renal failure is a clinical condition characterized by irreversible decline in kidney function. This condition requires that permanent renal replacement therapy, such as dialysis or kidney transplantation (Suwitra, 2009)

Morbidity and mortality in patients CRF which is undergoing hemodialysis were increased with the decrease in immune response of the patients. Decreased immune response could be due to the state of uremia, vitamin D deficiency, and excessive iron accumulation due to the hemodialysis action itself. Hoarding excessive iron would stimulate

the growth of bacteria and increase the virulence of bacteria. Hemodialysis causes a decrease in the immune response due to the occurrence of neutropenia, limfositopenia and hipokomplementemia which is mainly due to the influence of the type of dialysis membrane (Pusparini, 2000).

Malnutrition is common in dialysis patients and with any causes. Various causes of malnutrition in CRF patients is inadequate nutrition management, the effects of nausea, vomiting and decreased appetite. Dialysis procedure itself causes loss of nutrients into dialysate and this effect leads to increased catabolism during hemodialysis (Zadeh et al, 2001).

Anemia is common in the majority of patients (CRF), usually begin to occur when GFR fell to 35 ml / min. Anemia in CRF affects the quality of life of patients and lead to an increase in morbidity and mortality. Management of anemia include several things, EPO therapy, blood transfusions, as well as to identify and search for etiology (Esbach, 2000).

Red blood cell transfusions (PRC) can be used judiciously in patients with CRF. But in addition to the use of ESA and iron therapy, transfusions with human resources are still needed, especially in patients who experienced bleeding. Anemia effect on cardiac function and is associated with increased cardiovascular morbidity and mortality and decreased quality of life (KDOQI Guidelines, 2006; PERNEFRI, 2011).

Examination of the most appropriate tools to evaluate iron status is the measurement of the iron content of the bone marrow. Therefore, serum ferritin and transferrin saturation current is a major surrogate marker used in everyday clinical practice to assess iron status. Apart from being a marker of body iron

reserves, serum ferritin has also been shown to be a marker of inflammation in hemodialysis patients (Rocha et al., 2009).

Serum ferritin continues to be the focus of attention. Recently, an epidemiological study has shown that serum iron levels lower than the high associated with poor survival in hemodialysis patients routinely (Zadeh et al., 2006).

Levels of serum ferritin cannot describe the index of iron reserves in the body in the event of damage to body cells. Ferritin is produced by Reticulo endothelial system, which plays an important role in the metabolism of iron during the formation of human hemoglobin. The process of acute inflammation and infection will trigger the release of iron blockade that would reduce levels of serum iron (Zadeh et al., 2006; Wiryani and Suwitra, 2010).

Prolonged elevated levels of ferritin are a condition that can aggravate comorbidities and decreased quality of life in patients with CRF. Other physiological changes that occur, are such as increased heart rate, blood pressure, sleep disturbances, decreased appetite can also reduce the quality of life (Raafatl et al., 2012).

Results of previous studies have shown that quality of life is affected by the type and amount of secondary comorbidities, as well as the frequency of metabolic complications that arise. (Rose et al., 2002). By the time the clinician is only focused on the physical symptoms and parameters creatinine levels, patients are more concerned about other aspects of life, including social interaction, physical activity and cognitive function and sexual function (Adeera et al., 2001).

To assess generic health status can be used several questionnaires, one of which is

The Medical Outcome Study Survey (SF-36) which has been widely used to assess physical and mental health status of the generic (Hobart et al., 2002). SF-36 questionnaire has been designed to be applicable to various patient conditions. This questionnaire is a generic measure of physical and mental conditions (Kalantar et al., 2001).

METHOD

This study was a cross sectional study to determine how large the influence of high levels of serum ferritin may have an impact on the decline in the quality of life in patients with Chronic Renal Failure (CRF) who had undergone regular hemodialysis.

The target population is the entire study CRF patients undergoing hemodialysis in Hemodialysis Unit Hospital Dr. Sardjito, Yogyakarta. The population is affordable CRF patients undergoing regular hemodialysis for research.

Inclusion criteria for the study were 18-65-year-old, is serving a minimum of 3 months of regular hemodialysis, hemodialysis is done 2 times a week, and expressed willingness to follow the research by completing the informed consent.

Exclusion criteria were suffering from acute infections, malignancies and acute ischemic events, acute bleeding is known, and known to have active gastrointestinal disorders.

The independent variable in this study is the serum ferritin levels of patients who performed one time during the study. The dependent variable was the score KDQOL-SF. External variable is the level of hemoglobin, albumin, blood iron levels, total iron binding

capacity (TIBC), age, gender, background and comorbid disease.

The data presented in the form mean \pm standard deviations; mean difference between variables was assessed by Spearman. The univariate analysis with correlation test. Significance limit is taken with $p < 0.05$.

RESULTS AND DISCUSSION

A total of 180 patients were undergoing regular hemodialysis in Hemodialysis Unit Hospital Dr. Sardjito, Yogyakarta at the time of the study. A total of 75 patients who met the inclusion criteria underwent randomization to the study; it was found that 61 people can undergo research to complete.

Basic data retrieval and KDQOL-SF scores performed at baseline prior to blood tests. Research subjects still get regular hemodialysis 2 times a week and routine therapy.

Basic characteristics of the data showed no statistically significant differences in age, sex, occupation, marital status, educational level and comorbidity among each research subject. Similarly, the length of undergoing HD, Hb, BUN, creatinine, and albumin levels of iron. All the characteristics of a data base on the subject of the study there was no statistically significant difference.

A preliminary analysis of some of the factors that theoretically affect the quality of life including age, levels of hemoglobin, albumin, comorbid and work. Bivariate analyzes correlate each of these factors with quality of life domain scores. The result was no statistically significant correlation, so it can be said that these factors do not affect the quality of life scores in this study.

Table 1. Research Baseline Characteristics

Characteristics	Group (n=61) (Percent)	(mean ± SD)
Sex: n (%)		
- Male	32 (52,5)	
- Female	29 (47,5)	
Age(years)	46,28	9,92
Blood Pressure :		
-sistole (mmHg)	144,77	21,32
Diastole (mmHg)	81,97	8,96
Pulse (x/minute)	83,41	4,12
Occupation: n (%)		
- PNS	11 (18)	
- Private	11 (18)	
- Farmer	2 (3,3)	
- other	36 (60,7)	
Education: n (%)		
- uneducated	-	
- Graduated elementary-school	13(21,3)	
- Graduated from high school	27 (44,3)	
- college	21 (34,4)	
Comorbid: n (%)		
- DM	-	
- Hypertension	42 (68,9)	
- DM and Hypertension	13 (21,3)	
- HT+CHF	1 (1,6)	
- HT+CVD	2 (3,3)	
- HT +Obstruction	1 (1,6)	
- HT + Renal Cyst	1 (1,6)	
- HT + Hepatitis B	1 (1,6)	
Status:		
- Married	53 (86,9)	
- No married	7(11,5)	
- Widow/widower	1 (1,6)	
Duration of HD (month)	46,28	50,01
Smoking :		
- Not smoker	42(68,9)	
- smoker	4 (6,6)	
- ex smoker	15(24,6)	
Lab:		
- Hb (gr %)	8,85	1,53
- Ferritin (ng/ml)	1288,65	1262,05
- Fe (ng/ml)	78,26	45,73
- BUN (mg/dl)	56,44	21,80
- Creat (mg/dl)	10,15	4,13
- Alb (mg/dl)	3,41	0,53
- GDS (mg/dl)	118,9	41,2

Specification; PNS = civil servants;; SD = primary school; SMP = junior high school; SMA = high school; PT = college; DM = diabetes mellitus; CHF = Congestive Heart Failure; CVD = Cerebro Vascular Disease; HD = hemodialysis; Hb = hemoglobin; BUN = blood urea nitrogen; Creat = creatinine; Alb = albumin; SD = standard deviation;

A total of 180 patients were undergoing regular hemodialysis in Hemodialysis Unit Hospital Dr. Sardjito, Yogyakarta at the time of the study. A total of 75 patients who met the inclusion criteria underwent randomization to the study; it was found that 61 people can undergo research to complete.

KDQOL-SF scores in this study, there is a significant negative correlations (weak) enough to sleep (sleep disorders) 58.79 ± 1.95 ($r = -0.306$) and ($p = 0.017$). These results indicate that sleep disturbance is negatively correlated with ferritin levels. Where the higher level of sleep disturbance is occurs in ferritin greater. Sleep disturbances experienced by 45-80% of patients with CRF. The most frequent sleep disorder in dialysis population is insomnia, sleep apnea, restless-leg syndrome, and periodic limb movements. The relationship between sleep disorders and depression is in both directions. Neuropsychological symptoms of sleep apnea are often found in a population of kidney disorders, resembling the symptoms of depression or symptoms of uremia (Zalai & Novak, 2008).

On the Role Physical scores (physical activity) 24.59 ± 3.21 obtained a significant negative correlation (weak) ($r = -0.268$) and ($p = 0.037$). These results indicate that physical activity was negatively correlated with ferritin levels. The higher ferritin levels were decreased physical activity. In one study showed that in two thirds of patients who received dialysis therapy never return to normal activities or work like so many patients lose their jobs (Nurchayati S, 2010).

For Emotional Well Being scores (emotional condition) 70.85 ± 1.39 ($r = -0.374$) and ($p = 0.003$). These results suggest that the emotional state (low self-esteem, lack confidence discouraged) negatively correlated

Table 2. KDQOL-SF means scores and its correlation with ferritin levels

Score	subject (n=61) (mean±SD)	Correlation power (r)	scores (p)
KDQOL-SF			
KDQOL:			
Symptom/Problems	69,21±1,61	-0,075	0,565
Effects of Kidney Disease	59,46±1,93	-0,249	0,053
Burden of Kidney Disease	41,93±2,32	-0,090	0,492
Work Status	47,54±4,78	0,147	0,259
Cognitive Function	61,98±1,77	-0,078	0,551
Quality of Social Interaction	71,69±1,40	-0,139	0,285
Sexual Function	66,82±2,63	-0,036	0,785
Sleep	58,79±1,95	-0,306	0,017
Social Support	81,84±1,79	0,041	0,753
Dialysis Staff Encouragement	83,74±1,58	-0,020	0,878
Overall Health	56,09±16,09	-0,109	0,404
Patient Satisfaction	64,09±9,83	-0,041	0,756
SF:			
Physical Functioning	52,54±1,99	-0,071	0,589
Role Physical	24,59±3,21	-0,268	0,037
Pain	54,29±2,09	-0,225	0,081
General Health	40,16±1,63	-0,215	0,096
Emotional Well Being	70,85±1,39	-0,374	0,003
Role Emotional	42,29±1,21	-0,181	0,162
Social Functioning	58,03±1,78	-0,073	0,575
Energy Fatigue	62,29±1,61	-0,261	0,043
Total KDQOL-SF scores	56,84±1,14	-0,045	0,733

with ferritin levels. The higher ferritin levels decreased emotional condition. The patients with chronic renal failure to accept his situation who suffer from kidney failure requiring process and time. Limitations with kidney failure in terms of physical make them limited in performing activities related to themselves as well as social activities. It depends on the physical condition is still able to be achieved (Aini.S Nur, Nur Asiyah.S, 2013).

Score of Energy Fatigue (physical fatigue) 62.29 ± 1.61 ($r = -0.261$) and ($p = 0.043$). Fatigue is one of the symptoms most commonly found in approximately 70% of CRF. Fatigue may be caused by the consequences of kidney failure include anemia, malnutrition, hypotension and electrolyte changes associated hemodialysis, treatment side effects, and sleep disorders (Zalai & Novak, 2008).

Positive correlation (weak) obtained at Work Status 47.54 ± 4.78 ($r = 0.147$) and the Social Support 81.84 ± 1.79 ($r = 0.041$) but not statistically significant ($p = 0.259$) and ($p = 0.753$). While scores of other KDQOL-SF in this study showed a weak negative correlation ($r = 0.0$ s/d 0.2) but not statistically significant ($p > 0.05$).

There are several factors that can improve the quality of life of patients with renal failure undergoing hemodialysis. Among them are less than 65 years of age, higher education level, less than one year of hemodialysis, hemodialysis technology development, treatment of comorbidities, which is routinely given educational, social and psychological support, renal replacement therapy modalities other advocates, a kidney transplant. (Petrovic, D.G, et al, 2011)

Overall in this study showed no significant effect was statistically significant and shows the

influence of high ferritin directly on quality of life. Many determinants may be the cause of not finding a correlation in this study. During the study did not find any events that are side effects of treatment. All recipients can complete a full course of study.

Limitations of this study is a questionnaire at the time of data collection, the researchers also asked the help of the family in some respondents who have limitations that can affect the data retrieved. The level of denial of illness and complaints suffered by the respondent can also affect the questionnaire data that required a personal interview techniques or approaches a more in-depth in order to obtain more objective data.

CONCLUSION AND RECOMMENDATIONS

Overall the results of this study cannot show a correlation to high levels of ferritin to the quality of life of patients with CRF undergoing regular hemodialysis. Research needs to be conducted to assess the involvement of any organ damage and comorbidities caused by high levels of ferritin in the long term so expect more objective data obtained in relation to quality of life.

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