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Association between drop-out and inflamation in peritoneal dialysis patients

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ABSTRACT

BACKGROUND: In this study, association of between drop-out and inflamation were investigated in peritoneal dialysis (PD) patients with end-stage renal failure (ESRF) .

METHOD: Of the 150 ESRF patients who were started with or switched to PD, 46 drop-out patients were evaluated retrospectively. Patients demographic characteristics, drop-out and inflamation markers as albumin levels, CRP levels and fibrinogen levels were researched. The laboratory results were taken as the average of the last three months.

RESULTS: In the drop-out group mean decrease in serum albumin and mean increase in C-reactive protein and fibrinogen was significantly different from the other group ($p<0.001$,

p<0.001, p<0.05, respectively). When demographic characteristics, diabetes mellitus, and hypertension status was evaluated, the difference was not significant (p> 0.05).

CONCLUSİON : Infllammation markers should be used to asses the drop-out of peritoneal dialysis patients.

KeyWorlds: Chronic renal failure, peritoneal dialysis, C-reactive proteine, albümin, fibrinogen, drop-out

Introduction

Peritoneal dialysis (PD) is a form of kidney dialysis that is used worldwide to treat patients with end stage renal disease. PD treatment is preferred due to several reasons such as better control of blood pressure and biochemical parameters, independence of hospital-health services, better quality of life, control of anemia and lower costs with respect to hemodialysis. Various survival rates were reported in the literature among different countries and different areas [1-3.] There are many factors influencing survival in patients who receive PD treatment. Clinical outcomes of PD may be influenced by PD experience level of the center, genetic factors, age, and comorbid situations [2,3.]

An elevated level of serum acute-phase reactant, have been found to predict the clinical outcome of various cardiovascular diseases and stroke in the general population and in patients with chronic kidney disease and those undergoing dialysis. The relationship between chronic inflammation and cardiovasculer diseases in dialysis patients is well known [4-7], but there is not enough research to show the relationship between the inflammation and drop-out on PD patients.

The aim of this study, the relatoinship between drop-out and inflamation markers (albumine, C-reactive protein, and fibrinogene) were investigated in PD patients.

Material and Methods

This study was conducted retrospectively between April 2009 and August 2014 in Erzurum Region Education and Research Hospital Peritoneal Dialysis Unit and Hatay Antakya State Hospital Peritoneal Dialysis Unit. The study was approved by the Ethical Committee of the

Erzurum Regional Education and Research Hospital. A hundred and fifty consecutive end stage renal failure patients (65 female, 85 male) who were subjected peritoneal dialysis included to the study. Among these patients, 46 drop out cases (17 female, 29 male) investigated. Inclusion criteria included newly diagnose, initial peritoneal dialysis in our center. Patients with incomplete file data and the patients lost during follow up period were excluded. Peritoneal dialysis catheter was implanted to all patients by a nephrology specialist using Seldinger technique, and educations were given by the same team. Peritoneal dialysis solutions of 2 l with 1.36%, and when necessary 3.86%, glucose or Icodextrin were used three or four times a day by the patients using PD. All the patients received a chronic renal failure diet consisting of 35 kcal/kg, including 1.4 g/kg of protein, 1000 /1500 mg of calcium, 700 mg of phosphorus and 250 mg of magnesium, polyvitamins and recombinant human erythropoietin.

Patients' age, sex, weight, PD time, droup-out reasons, fasting blood glucose, total cholesterol, LDL-cholesterol, HDL-cholesterol, triglycerides, albumin, C-reactive protein, and fibrinogen levels were recorded. The laboratory results were taken as the average of the last three months.

Serum albumin was measured using enzyme assay methods with Coag Modular-P800 ALB Plus (Roche Diagnostics GmbH, Mannheim, Germany. Normal cut off value of 3,5-5.2g/dl was used.Serum C-reactive protein levels were measured using latex-enhanged nephelometry (Behring Nephelometer Analyzer System: Behring Diagnostics, Somerville, NJ). Normal cut off value of <3.0 mg/dl was used. Patients who has elevated serum CRP levels undergone laboratory (ESR, leucocytosis etc.) and physical examination according to evaluate if they have the findings for infections of various systems. Blood samples for CRP were obtained from the infected patients after 21 days who have been treated for infection. Plasma fibrinogen was measured using enzyme assay methods with Coag-A-Mate XC plus (Organon-Tecnika, Alamogordo, NM). Normal cut off value of 175-400mg/dl was used.

Statistical Analysis

The software Statistics Package for the Social Sciences (SPSS) version 11.5 was used for the statistical procedures. The student's test for paired and unpaired measurement or Kruskal–Wallis test were used to compare the differences between demographic and clinical variables

between groups. Mann-Whitney U test was used to compare the nominal variables between subgroups. The p value lesser than 0.05 accepted meaningfull.

Results

Of the 150 patients who received dialysis treatment in our center, 122 patients had peritoneal dialysis as the first choice renal replacement therapy, whereas 28 patients switched from hemodialysis to peritoneal dialysis.

The demographic characteristics and etiology of chronic renal failure in groups are given in Table 1. We failed to find statistically significant differences between the groups ($p>0.05$).

The mean serum fasting glucose, total cholesterol, LDL- cholesterol, HDL- cholesterol, trigliseride, albumine, C- reactive proteine (CRP), and fibrinogene levels and statistical analysis results are given in table 2.

The mean serum fasting glucose, total cholesterol, LDL- cholesterol trigliseride , and HDL-cholesterol levels were not meaningful statistically ($p>0.05$).

The inflammation markers which are decreased mean serume albumine levels, high CRP values, increased fibrinogene levels were meaningfull statistically in drop-out group when compared to PD group ($p<0.001$, $p<0.001$, $p<0.05$).

The distribution of reasons for drop-out were as follows: switch to hemodialysis

in 21 patients (voluntarily 6, recurrent peritonitis 5, hypervolemia and ultrafiltration insufficiency 8, peritoneal sclerosis 2 patients), death in 15 patients (ischemic cerebral events 6, ischemic heart disease 7, pneumonia 1 and sudden death 1 patients), renal transplantation 6 patients. allergy to periton fluid 2 patients, and improvement in renal functions 2 patients.

Discussion

In this study, the association between drop-out and inflamation markers (albumine, C-reactive protein, and fibrinogene) were investigated in PD patients.

Our study found that CRP was significantly higher in drop-out group. Cardiovascular events are the most common cause of death in dialysis patients[8,9]. It may be related to uremic toxins, volume status, vascular calcification, anemia, hypoalbuminemia, and chronic inflammation [8-

[10]. An elevated CRP level has been reported to be an independent predictor of myocardial infarction and cardiovascular mortality in PD patients Several parameters of inflammation have been identified as risk markers for mortality in patients with dialysis patients .[11]. Inflammation as a risk marker for mortality has also been demonstrated in studies performed on PD-patients. CRP has been shown to be an independent risk factor of all-cause mortality and CVD. [12-13.] Despite the superiority of IL-6, CRP still remains the most commonly measured inflammatory parameter in the clinical setting due to its high availability, low cost and lack of diurnal variation [14.]There is not a research in literature which investigates the association between CRP and drop-out in peritoneal dialysis patients.

Hypoalbuminemia is another problem in PD patients. Malnutrition and inflammation have been simultaneous reported in the CRF patients. We observed significant associations between concentrations of CRP, albumine, and fibrinogene. In fact, albumine is the negative acute-phase protein. This result explains the presence of an ongoing inflammatory state [15-16.] A lower level of serum albumine patients on out-drop group was found in our research. Serum albumine levels are a negative acute phase reactant which decreases in inflammation. Serum CRP and other acute phase reactants increases in inflammation whereas albumine levels decreases. Albumine synthesis decreases in inflammation at ESRF also decreased calory intake and inreasead catabolysm worsens table [17,18.] There is not a research in literature which investigates the association between albumine and drop-out in peritoneal dialysis patients.

In chronic uremic patients, the inflammatory response is characterized by a local reaction induced by pro-inflammatory cytokines that may be followed by activation of the acute phase proteins, such as C-reactive protein (CRP) and fibrinogen[19-22.] Our study found that fibrinogene was significantly higher in drop-out group. Fibrinogene also is an acute phase reactant as CRP. High serume levels results in platelet aggregation, coagulation and vasculer endotheliel changes. It has been shown that high levels of fibrinogene is an independen cardiovasculer risc factor. Weight loss, reguler physical exercise, giving up tobacco usage and use of benzofibrate decreases serum levels of fibrinogene. Still there is not a specific agent which selectively decreases fibrinogen levels [15,23,24.] There is not a research in literature which investigates the association between fibrinogene and drop-out in peritoneal dialysis patients.

Some limitations of the present study warrant consideration. A larger sample size of the drop-out group would be more beneficial. Additional studies are necessary to further evaluate the optimal methods to screen for and treat drop-out in PD patients.

Conclusion

As a conclusion, Although inflammation markers were higher in out-drop group compared to PD patients, the relationship between drop-out and presence of inflammation parametars were observed in PD. Inflammation markers should be used to assesment the drop-out of peritoneal dialysis patients.

Tables

TABLE 1. Demographic characteristics and etiology of Peritoneal Dialysis Patients

Variables	Categories	Drop-out group (n=46)	PD group (n=104)
		n (%) or M(SD)	n (%) or M(SD)
Age (years)		64.35 ±14	66,4 ±14,6
Gender	Female	17 (36.9)	48(46.1)
	Male	19 (63.1)	56(53.2)
Weight(kg)		64.6 ±14	66.4 ±16
Dialysis time(months)		22.4 ±10.8	28,8 ±18,9
Chronic renal failure			
Etiology	Diabetic nefropathy	22(47.8)	53(50.9)
	Chronic glomerulonephritis	9(19.1)	21(20.1)
	Hypertensive nefropathy	8(17,3)	19(18.2)
	Chonic pyelonephritis	4(8.6)	7 (6.7)
	Obstructive nephropathy	3(7.2)	4(4.1)

Note. PD: Periton Dialysis Patients

TABLE 2. Mean values of biochemical values in the groups

	Drop-out group (n=46) M(SD)	PD group (n=104) M(SD)	p-value
Glucose (mg/dl)	111.6 ±14.8	116.6 ±18.8	0.286
Total cholesterol (mg/dl)	184.6 ±44.5	153.43 ±38.6	0.364
HDL- cholesterol (mg/dl)	38.4 ±12.6	40.8 ±11.4	0.396
LDL- cholesterol (mg/dl)	108.6 ±35.8	116.7 ±30.6	0.08
Triglycerides (mg/dl)	194.6 ±59.8	128.5 ±50.4	0.486
Albumin (g/dl)	3.02 ±0.5	3.9 ±0.4	0.000
Crp (mg/dl)	12.6 ±4.3	4.6 ±2.2	0.000
Fibrinogen (mg/dl)	534.6 ±150	438.4 ±146	0.04

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