Depression, Inflammation, and Social Support in Hemodialysis Patients

Hemodiyaliz Hastalarında Depresyon, İnflamasyon ve Sosyal Destek

Hemodiyaliz Hastalarında Depresyon ve Sosyal Destek / Depression and Social Support in Hemodialysis Patients

Rahman Yavuz[1], Demet Yavuz[2], Alparslan Altunoglu[2], Müjdat Batur Canoz[2], Siren Sezer[2], Bektaş Murat Yalcın[3], Mehmet Derya Demirag[4]
[1]Department of Medical Education, Ondokuz Mayıs University Faculty of Medicine, Samsun,
[2]Department of Nephrology, Baskent University Faculty of Medicine, Ankara,
[3]Department of Family Medicine, Ondokuz Mayıs University Faculty of Medicine, Samsun,
[4]Samsun Training and Research Hospital, Internal Medicine, Samsun, Turkey

Özet

Amaç: Depresyon ve inflamasyon son dönem böbrek yetmezliği (SDBY) hastalarında sıktır. Çalışmamızda depresyon, inflamasyon ve sosyal destek arasındaki ilişkiyi incelemeyi amaçladık. Gereç ve Yöntem: Çalışmaya 137 hasta alındı. Tüm hastalarda Beck Depresyon Ölçeği (BDÖ), Çok Boyutlu Algılanan Sosyal Destek Ölçeği (ÇBASDÖ) ve Malnütrisyon İnflamasyon Skoru(MİS)' nu kullandık. Bulgular: BDÖ, ÇBASDÖ ve MİS sırasıyla 15.9±9.5, 60.5±15.1, 7.8±2.9 olarak bulundu. Hastalar BDÖ puanlarına göre; depresyonu olan hastalar (BDÖ puanı≥ 17, n= 55, % 40) ve depresyonu olmayan hastalar (BDÖ puanı< 17, n = 82, % 59) olmak üzere iki gruba ayrıldı. Depresif hastaların çoğunluğu kadındı (% 58) ve yalnız yaşıyorlardı (% 97). Haftalık eritropoeitin dozu ve CRP düzeyleri depresyonu olmayan hastalara göre depresyonu olan hastalarda daha yüksekti ve bu fark istatistiksel olarak anlamlı değildi (p>0.05). MİS, depresyonu olan hastalarda (6±2.2), depresyonu olmayan hastalara (10.5±1.8) göre daha yüksekti (p<0.001). Depresyonu olan hastaların ÇBASDÖ puanları (57.3±17.9), depresyonu olmayan hastaların puanına göre (62.7±12.5) daha düşük bulundu (p<0.05). BDÖ ve ÇBASDÖ puanları arasında negatif korelasyon varken, BDÖ puanı ve MİS arasında pozitif bir korelasyon saptandı. Yapılan çok değişkenli lineer regresyon analizinde (cinsiyet, BUN, albümin, MİS ve ÇBASDÖ), depresyon bağımsız olarak MİS (β= 0.60, t=9.9 p<0.001) ve ÇBASDÖ (β= -0.37, t=-6.2 p<0.001) ile ilişkili bulundu. Tartışma: Hemodiyaliz hastalarının daha fazla sosyal ve psikolojik desteğe ihtiyacı vardır. Çalışmamızda yüksek düzeyde inflamasyon ve düşük sosyal destek, depresyonun varlığı ile ilişkili bulundu. Ancak, bu sonuçların doğrulanması için büyük ölçekli çalışmalara ihtiyaç vardır.

Anahtar Kelimeler

Depresyon; Malnütrisyon; İnflamasyon; Sosyal Destek

Abstract

Aim: Depression and inflammation are common in patients with end-stage renal disease (ESRD). In our study, we aimed to investigate the relationship between depression, inflammation and social support. Material and Method: Accordingly, 137 patients were enrolled. We used Beck Depression Inventory (BDI) and Multidimensional Scale of Perceived Social Support (MSPSS) and Malnutrition Inflammation Score (MIS) in all patients. Results: BDI, MSPSS and MISS were 15.9±9.5, 60.5±15.1, 7.8±2.9 respectively. The patients were divided into two groups with respect to BDI scores: patients with depression (BDI score ≥ 17, n= 55, 40.2%) and patients without depression (BDI score< 17, n = 82, 59.8%). In depressive patients, the majority were female (58%) and lived alone (97%). The weekly erythropoietin dose and CRP levels were higher in patients with depression than in patients without depression and this difference did not reach statistical significance (p>0.05). MIS scores were higher in patients with depression (10.5±1.8) than in patients without depression (6±2.2) (p<0.001). Patients with depression (57.3±17.9) had lower MSPSS scores than patients without depression (62.7±12.5) (p<0.05). There was positive correlation between BDI and MIS, while negative correlation was observed between BDI and MSPSS. In the multivariate linear regression analysis (gender, BUN, albumin, MIS and MSPSS), depression was independently associated with MIS (β= 0.60, t=9.9 p<0.001) and MSPSS (β= -0.37, t=-6.2 p<0.001). Discussion: Hemodialysis patients needed more social and psychological support. They had higher inflammation and lower social support that associated with the presence of depression, although large-scale studies are needed to confirm our results.

Keywords

Depression; Malnutrition; Inflammation; Social Support

DOI: 10.4328/JCAM.3679 Received: 21.06.2015 Accepted: 12.07.2015 Printed: 01.12.2015 J Clin Anal Med 2015;6(suppl 6): 801-5
Corresponding Author: Rahman Yavuz, Department of Medical Education, Ondokuz Mayıs University Faculty of Medicine, Samsun, Turkey.
GSM: +905053691692 F.: +90 3624576041 E-Mail: rahmanyavuz55@hotmail.com

Introduction

Depression is a common psychiatric condition in end-stage renal disease (ESRD) patients. Depression often causes a serious decline in energy level, loss of appetite and reduced interest in everyday activities. Most ESRD patients show such symptoms and they can be overwhelming [1]. Depression may also lead to malnutrition which is a common problem in the ESRD patients [2].

All the evidence points that malnutrition is an important cause of morbidity and mortality in ESRD patients. As depression is commonly associated with poor oral intake, it can aggravate malnutrition in chronic dialysis patients. In many studies, it is suggested that increased cytokines may trigger signs of depression and stimulate catabolism and cause negative protein balance. Moreover, ongoing chronic inflamation may contribute to malnutrition. A new scoring system called Malnutrition Inflammation Syndrome (MIS) is helpful for showing us the hospitalization risk in ESRD patients [2,3]. A triad of depression, malnutrition and, inflammation contributes to the high mortality in these patients [4,5]. Social affection and support is an important issue for the treatment of depression in patients with chronic ilness. For several reasons, hemodialysis patients need serious medical, social and psychological support and social support is an essential part of ESRD treatment. The patients can get social help and support from family, friends and also the medical personnels. Indeed, ESRD and its treatment with dialysis, often prove to be a huge burden on the psychology and social lives of these patients [6]. One way of measuring the level of social support is to use the MSPSS. Although how it works is not clearly known, social support seems to have a positive effect on the cardiovascular, endocrinologic and immune system in patients with normal kidney functions.

On the other hand, poor social support and unhappy marital life are related with higher blood pressure, higher circulating levels of catecholamines, and worse immune function [7,8]. Good social support has been associated with lower BDI score and higher MIS score in hemodialysis patients [9]. The objective of this study was to evaluate the relationship between depression, malnutrition inflammation and social support in hemodialysis patients.

Material and Method

The study protocol was approved by our local scientific ethics committee (The IRB approval number is 2007/179). In this study 137 hemodialysis patients (male/female, 78/59, mean age, 53.3±13.2 years, mean dialysis duration 56.1±5.4 months), who had been on hemodialysis for the last six months were included from Ondokuz Mayıs University Hemodialysis Unit and Samsun Training and Reserach Hospital Nephrology Department. If the patients had a history of malignity, acute or chronic inflammatory illness or a hospitalization period within last six months were excluded. The therapies such as corticosteroids and antidepressants could affect the results and thus these patients were eliminated.

Standard bicarbonate dialysis solution by semisynthetic membranes (dialysis filters surface area 1.1 to 1.7 m2) were used in all patients three times a week. All patients were normotensive and without edema by the exact dry weight target. The average urea Kt/V in these patients was 1.4±0.2. In all patients, age, gender, duration of ESRD, education duration, and body mass index (BMI) were recorded. Moreover, patients' medication was recorded in terms of erythropoietin dose. At the beginning of the inflammatory infectious state blood tests were performed. Serum calcium, phosphorus, C-reactive protein (CRP), albumin, hemoglobin, total iron-binding capacity, and ferritin were measured following at least an eight hour of fasting. All blood samples were obtained during the midweek hemodialysis session and serum samples were made by standard methods in the routine clinical laboratory. Social support was assessed by the MSPSS, depression was assessed by BDI and the malnutrition and inflammation status was assessed by the MIS.

The BDI is an inventory that utilizes the existent symptoms of depression. The BDI score ranges from 0 to 63. The BDI was used for the diagnosis of depression. We used the MSPSS to evaluate perceived social support. The MSPSS consisted of three support categories: social support from family, social support from friends, and from one special person. Research demonstrated that MSPSS outcomes are related with depression in renal failure patients who receive maintenance hemodialysis [6]. MIS is a new, comprehensive scoring system created using seven components of the Subjective Global Assessment, and combining them with three new parameters (body mass index, serum albumin, and total iron-binding capacity). Each component of the MIS has four levels of severity, from 0 (normal) to 3 (very severe). In malnutrition, MIS tends to rise. The MIS is an indicator of malnutrition inflammation complex syndrome and MIS score is used to estimate morbidity and mortality in hemodialysis patients [9]. SPSS software (Statistical Package for the Social Sciences version 10.0; SPSS Inc., Chicago, IL, USA) was used for the analysis of the statistics datas. Statistical significant p value was <0.05 for the results. Datas were shown as mean±standard deviation. Data were expressed as mean±standard deviation. According to BDI score, the patients were divided into two groups. BDI score ≥ 17 indicates mild-to-moderate depression. Comparisons of continuous variables were assessed by student's t test. Comparisons of the categoric variables were assessed by the pearson chi-square test. To show the correlations we used the pearson r coefficient. The situations that predicts depression in hemodialysis patients were detected by using multiple linear regression analysis. The factors affecting depression (variables included gender, BUN, albumin, MIS, and MSPSS) were evaluated with linear regression analysis.

Results

Table 1 shows the demografic, clinical and laboratory data of 137 hemodialysis patients. Table 2 shows the demografic and laboratory data of patients with and without depression. BDI, MSPSS and MIS were 15.9±9.5, 60.5±15.1, 7.8±2.9 respectively, in all patients. Most of the patients were married (67.3%), living with family, and unemployed (61.2%) in all patients. We grouped the patients into two according to their BDI scores: patients with depression (BDI score ≥ 17, n= 55) and patients without depression (BDI score< 17, n = 82). In the non-depressive group, BUN and serum albumin levels were higher than the depressive group (p<0.05). In depression group, most of the pa-

Table 1. Demographic, clinical and laboratory data of all patients

Variable	Mean ±SD (n=137)
Mean Age, y	53.2±13.2
Gender, M/F	78/59
Mean duration of dialysis, months	56.1±5.4
Mean duration of education, year	6.60±4.89
BMI (kg/m2)	26.2±5.7
Married (%)	67.3
Lives with family (%)	91.5
Unemployed (%)	61.2
MSPSS (12-84)	60.5±15.1
MIS (0-30)	7.8±2.9
BDI (0-63)	15.9±9.5
Kt/V	1.4±0.2
BUN, mg/dL	83.3±14.6
Creatinine, mg/dL	9.3±2.6
Calcium, mg/dL	9.4±0.7
Phosphorus, mg/dL	5.12±1.53
iPTH, pg/mL	382.1±97.9
Total cholesterol, mg/dL	178.1±53.2
LDL, mg/dL	94.7±33.1
Triglyceride, mg/dL	184.7±94.5
Albumin, g/dL	3.9±0.5
CRP, mg/L	14.4±9.6
Hemoglobin, g/dL	10.8±1.3
Ferritin, ng/mL	328.9±213.2

SD; standard deviation, MSPSS; Multidimensional Scale of Perceived Social Support, MIS; Malnutrition Inflammation Score BDI; Beck Depression Inventory.

Table 2. Comparison of demographic and laboratory data in patients with depression and without depression

Variable	Patients Without Depression (BDI<17) (n=82)(59.8%) Mean±SD	Patients With Depression (BDI≥ 17) (n=55)(40.2%) Mean±SD	P
Mean Age, y	53.6±14.5	53.1 ±11.3	NS
Gender, M/F	55/27	23/32	NS
Mean duration of dialysis, months	60.2±62.5	49.9 ±37.8	NS
Mean duration of education, year	7.8±4.3	5.6±3.8	p<0.05
MSPSS (12-84)	62.7±12.5	57.3±17.9	p<0.05
MIS (0-30)	6±2.2	10.5±1.8	p<0.05
BUN, mg/dL	86.3±14.6	78.3±1.3	p<0.05
Creatinine, mg/dL	9.6±2.5	8.8±2.1	NS
Calcium, mg/dL	8.7±0.8	10.5±11.6	NS
Phosphorus, mg/dL	5.8±1.6	5.6±1.3	NS
iPTH, pg/mL	318.3±57.5	477.15±41.6	NS
Total cholesterol, mg/dL	172.7±48.1	185.9±49.5	NS
LDL, mg/dL	91.7±32	99.2±34.4	NS
Triglyceride, mg/dL	186.7±97.3	182.1±91.1	NS
Albumin, g/dL	3.9±0.3	3.3±0.3	p<0.05
CRP, mg/L	12.7±11.1	16.8±7.9	NS
Hemoglobin, g/dL	10.8±1.6	10.5±1.3	NS
Ferritin, ng/mL	415.17±266.96	351.63±207.66	NS

SD; standard deviation, MSPSS; Multidimensional Scale of Perceived Social Support, MIS; Malnutrition Inflammation Score

tients were living alone (97%) and females (58%) but there was no certain statistical change between the depressive and non depressive patients groups when we compare in terms of lonely status and gender. Additionally we observed no significant difference in patients with and without depression in terms of marital status and occupational status (p>0.05). Depression score was higher for patients paying rent in comparison with patients not paying rent (p<0.01). The erythropoietin requirement was higher in patients with depression than without depression (6535.6±3713.5, 5439.7±2548.1, p>0.05 respectively). Accorging to our analysisis, MIS scores were higher in patients with depression (10.5±1.8) than in patients without depression (6±2.2) (p<0.001), and patients with depression (57.3±17.9) had lower MSPSS scores than patients without depression (62.7±12.5) (p<0.05). While BDI and MIS (r=0.62, p<0.001), showed positive correlation, BDI and MSPSS (r=-0.41, p<0.001) showed negative correlation. In the multivariate linear regression analysis, depression was independently associated with MIS (β= 0.60, t=9.9 p<0.001) and MSPSS (β= -0.37, t=-6.2 p<0.001) (variables included gender, BUN, albumin, MIS, and MSPSS) (Table 3).

Table 3. Multiple linear regression model of factors affecting depression in hemodialysis patients.

Variable	β coefficient	t	P Value
Gender	0.46	3.98	>0.05
BUN	0.51	9.17	>0.05
Albumin	0.73	8.7	>0.05
MIS	0.60	9.9	<0.001
MSPSS	-0.37	6.2	<0.001

MIS; Malnutrition Inflammation Score, MSPSS; Multidimensional Scale of Perceived Social Support

Discussion

In the present study we observed that hemodialysis has significant negative affects on the physical and psycho-social lives of ESRD patients. Depression and malnutrition-inflammation also are major problems in hemodialysis patients. Depressive patients had lower education level, MSPSS, serum albumin levels and higher MIS levels than non-depressive patients. Moreover, our results show that higher MIS and lower MSPSS values were associated with the presence of depression.

The prevalance rate for depression in patients with ESRD is high [2]. Koo et al. showed that depression is related with malnutrition in the ESRD patients [2]. However, they did not evaluate the relationship between the demographic data (such as education, marital status, work status, living with family, and social support) and depression. Some studies, reported that an association between depression and MSPSS values, and in patients with depressive mood MSPSS was significantly lower than in patients with non-depressive mood [8,9]. There are a few studies on the triad of social support, depression and, malnutrition-inflammation [9]. In our study, we also evaluated the triad of depression, social support and malnutrition-inflammation.

In hemodialysis patients nearly half of them complain from depression and 5-20% have major depression [10]. High depression score in the ESRD patients is associated with mortality [11]. In our patients, the mean depression score was 15.9±9.5

and we found that 40.2% of our patients had depression according to the BDI. In fact, diagnosis of depression is not easy in the ESRD patients. There is usually an overlap between the symptoms of uremia and depression. Symptoms and signs of renal failure, side effects of treatments (such as weight loss and low appetite) are similar to those of depression [10-12]. The main risk factors of depression in ESRD patients are female gender, living alone, low education, and low albumin levels [12]. and higher inflammation may be contributing to this quite high depression rate.

Protein-energy malnutrition and inflammation are disorders that often appear together and follows each other in hemodialysis patients [13]. It is suggested that malnutrition can lead to inflammation. Inflammatory process in ESRD is connected with the uremic environment and also elevated levels of proinflammatory cytokines are found paralelly to the process [13]. Serum levels of proinflammatory cytokines elevated in depressed patients [2]. BDI score influences MIS score, and thus, it may lead to poor oral intake, muscle loss, hypoalbuminemia, recurrent anemia and increased atherosclerosis by aggravating malnutrition and inflammation in patients with ESRD [14] and there was a significant association between depression and MIS values [9]. Morever a study showed that MIS and CRP were predictors of mortality and morbidity in the ESRD patients [15]. In our study we measured serum albumin levels, CRP levels, and MIS to evaluate the causes of inflammation. Patients with depression had higher MIS, CRP levels, and lower serum albumin levels, Accordingly, our findings suggest that the MIS score is an important factor for depression in hemodialysis patients. Anemia has been associated with increased fatigue, lethargy and weakness in individuals and also with sleep disorders in hemodialysis patients. In one study, fatigue is related to presence of depression [16]. Because depression is connected with appetite and oral intake. Bilgic et al. reported a strong correlation between depression and lower levels of hemoglobin [17]. In our study, although hemoglobin levels did not differ between the patients with and without depression, although the erythropoietin dose was higher in patients with depression than in patients without depression.

Social support is a complex relationship in which feelings affections ,help and obligations are given bilaterally [18]. Most of the times family members relatives close friends or a special person give social supports [18]. Life style modifications change of social activities restricted independence are often found in patients with ESRD. All of these changes make easy to develop depression state. Social support clearly is a good cure for depressive symptoms in the ESRD patients. The ESRD patients receive either functional or emotional support which can be given by a family member or spouse [8]. Some studies suggested a relationship between social support and low mortality, and showed that perceived social support is closely related with depression in the ESRD patients [6]. In our study, most of the patients were married, unemployed and lived with family patients with and without depression. We observed that the patients with depression was living alone, had significantly lower social support, lower educational status. Single patients were significantly more depressive than others, this showed the importance of protected family stracture. Healty family structure is considered value for hemodialysis patients as a section of social support. Also social support and marital status seems to have a positive effect on depression. This strong family structure can be protecting from depression in the developing country like Turkey.

Depression, inflammation, and absence of social support are still common problem in hemodialysis patients. Higher inflammation and lower social support were associated with the presence of depression. Hemodialysis patients needed more social and psychological support. Thus, the clinicans and the hemodialysis personnel should be aware of pschological and social signs and symptoms in hemodialysis patients. As a result, we advice to spend sufficient attention to detect the diagnosis of depression and effectual therapies and social supporting programs for hemodialysis patients.

Study limitations

This study is conducted with a somewhat small population. There was no control group in the study, and a control group was formed by dividing patients into study groups. DSM-IV R is the gold standard for diagnosis of depressive disorder. In the current study, depression was diagnosed using BDI. CRP and MIS levels were used to determine inflammation; use of IL-6 and TNF-α may further increase the value of our study.

Competing interests

The authors declare that they have no competing interests.

References

1. Rostami Z, Einollahi B. Citalopram versus psychological training for depression and anxiety symptoms in hemodialysis patients. Iran J Kidney Dis 2013;7(1):73-4.
2. Koo JR, Yoon JW, Kim SG, Lee YK, Oh KH, Kim GH et al. Association of depression with malnutrition in chronic hemodialysis patients. Am. J. Kidney Dis 2003;41:1037-42.
3. Kalantar-Zadeh K, Ikizler TA, Block G, Avram MM, Kopple JD. Malnutrition-inflammation complex syndrome in dialysis patients: Causes and consequences. Am. J. Kidney Dis 2003;42(5):864–81.
4. Anisman H, Merali Z, Poulter MO, Hayley S. Cytokines as a precipitant of depressive illness: animal and human studies. Curr Pharm Des 2005;11(8):963-72.
5. Kalantar-Zadeh K, Kopple JD, Block G, Humphreys MH. A malnutrition-inflammation score is correlated with morbidity and mortality in maintenance hemodialysis patients. Am J Kidney Dis 2001;38(6):1251-63.
6. Patel SS, Peterson RA, Kimmel PL. The impact of social support on end-stage renal disease. Semin Dial 2005;18(2):98–102.
7. Uchino BN, Cacioppo JT, Kiecolt-Glaser JK. The relationship between social support and physiological processes: a review with emphasis on underlying mechanisms and implications for health. Psychol Bull 1996;119(3):488-531.
8. Cohen SD, Sharma T, Acquaviva K, Peterson RA, Patel SS, Kimmel PL. Social support and chronic kidney disease: an update. Adv Chronic Kidney Dis 2007;14(4):335-44.
9. Micozkadioglu H, Micozkadioglu I, Zumrutdal A, Erdem A, Ozdemir FN, Sezer S, Haberal. Relationship between depressive affect and malnutrition-inflammation complex syndrome in haemodialysis patients. Nephrology (Carlton) 2006;11(6):502-5.
10. Raymond CB, Wazny LD, Honcharik PL. Pharmacotherapeutic options for the treatment of depression in patients with chronic kidney disease. Nephrol Nurs J 2008;35(3):257-263.
11. Lopes AA, Bragg J, Young E, Goodkin D, Mapes D, Combe C, Piera L, Held P, Gillespie B, Port FK. Dialysis Outcomes and Practice Patterns Study (DOPPS). Depression as a predictor of mortality and hospitalization among hemodialysis patients in the United States and Europe. Kidney Int 2002;62(1):199-207.
12. Anees M, Barki H, Masood M, Ibrahim M, Mumtaz A. Depression in hemodialysis patients. Park J Med Sci 2008;24:560-5.
13. Zoccali C, Benedetto FA, Mallamaci F, Tripepi G, Fermo I, Focà A et al. Inflammation is associated with carotid atherosclerosis in dialysis patients. Creed Investigators. Cardiovascular Risk Extended Evaluation in Dialysis Patients. J Hypertens 2000;18(9):1207-13.
14. Abdullah MS, Wild G, Jacob V, Milford-Ward A, Ryad R, Zanaty M et al. Cytokines and the malnutrition of chronic renal failure. Miner Electrolyte Metab 1997;23(3-6):237–42.
15. Kalantar-Zadeh K, Kopple JD, Humphreys MH, Block G. Comparing outcome

predictability of markers of malnutrition-inflammation complex syndrome in haemodialysis patients. Nephrol Dial Transplant 2004;19(6):1507-19.
16. Karakan S, Sezer S, Ozdemir FN. Factors related to fatigue and subgroups of fatigue in patients with end-stage renal disease. Clin Nephrol 2011;76(5):358-64.
17. Bilgic A, Akgul A, Sezer S, Arat Z, Ozdemir FN, Haberal M. Nutritional status and depression, sleep disorder, and quality of life in hemodialysis patients. J Ren Nutr 2007;17(6):381-8.
18. House JS, Landis KR, Umberson D. Social relationships and health. Science 1988;241(4865):540-5.
19. Leonard BE. The immune system, depression and the action of antidepressants. Prog Neuropsychopharmacol Biol Psychiatry 2001;25(4):767–80.

How to cite this article:
Yavuz R, Yavuz D, Altunoglu A, Canoz M.B, Sezer S, Yalcın B.M, Demirag M.D. Depression, Inflammation, and Social Support in Hemodialysis Patients. J Clin Anal Med 2015;6(suppl 6): 801-5.