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Brief report

Low serum albumin and high ferritin levels in chronic hemodialysis patients with major depression

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Abstract

We investigated the relationships between serum albumin and ferritin levels in chronic hemodialysis patients with or without major depression. During a 1-year period, a total of 107 chronic hemodialysis patients were recruited. The diagnosis of major depression in patients was made by one psychiatrist. The data showed that patients with major depression ($n=15$) had significantly lower albumin and higher ferritin levels than patients without major depression ($n=92$). Chronic hemodialysis patients with major depression might have a more severe inflammation reaction and greater oxidative damage than patients without major depression.

Keywords: Depression; Albumin; Ferritin; Hemodialysis; Inflammation

1. Introduction

In addition to age-related risk factors, the morbidity and mortality in patients with end-stage renal disease (ESRD) treated with hemodialysis is affected by co-morbid illnesses such as cardiovascular disease, diabetes mellitus and nutritional status (Owen et al., 1993; Ikizler and Hakim, 1996). The role of comorbid depression has also been related to treatment compliance, outcome and survival (Kimmel et al., 1993, 1998, 2000; DiaMatteo et al., 2000).

Depressive symptoms are common in patients receiving dialysis therapy (Wuerth et al., 2001; Watnick et al., 2003). Some studies noted a point prevalence of 6% to 18% for major depression among patients who had been receiving dialysis therapy for at least 6 months (Sacks et al., 1990; Fishbein, 1994). There have been attempts to understand the impact of depression on the patient with uremia from the point of view of psychosocial factors (Kimmel et al., 1993, 1998, 2000; Kovac et al., 2002). However, studies that discuss the relationship between major depression and biological factors (e.g., albumin and ferritin) in chronic hemodialysis patients simultaneously are scare (Maes et al., 1996).

Albumin plays an important role in physiological functions, including serving as a transport and binding protein (Whicher and Spence, 1987). At the same time, it is also a negative acute phase protein and related to the immune/inflammatory response in cardiovascular disease and renal disease (Foley et al., 1996; Bergstrom and

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Table 1
Demographic and clinical data of hemodialysis patients with or without comorbid major depression

	Age (years)	BMI (kg/m^2)	Duration of hemodialysis (years)	Albumin (g/l)	Ferritin (ng/ml)	KT/V	nPCR (g/kg/day)
Patients with major depression (n=15)	53.5±13.8	22.7±3.6	4.0±3.3	35.9±1.9	668.5±659.9	1.3±0.3	1.2±0.3
Men (n=6)	58.5±9.8	23.2±3.3	3.9±4.2	35.3±2.6	626.1±821.7	1.2±0.2	1.2±0.1
Women (n=9)	50.1±15.6	22.4±4.0	4.1±2.8	36.2±1.2	696.7±581.1	1.4±0.3	1.3±0.3
Patients without major depression (n=92)	53.3±13.3	22.7±3.5	5.3±4.1	37.4±3.6	359.4±257.5	1.4±0.2	1.2±0.2
Men (n=43)	53.8±12.4	23.0±3.5	6.7±4.7	37.4±3.3	269.0±206.1	1.3±0.2	1.2±0.2
Women (n=49)	52.8±14.1	22.5±3.5	4.2±3.1	37.4±3.8	438.7±273.5	1.5±0.2	1.3±0.2
Total (n=107)	53.3±13.3	22.7±3.5	5.2±4.0	37.2±3.4	402.7±355.0	1.4±0.2	1.2±0.3
Men (n=49)	54.4±12.1	23.0±3.4	6.3±4.7	37.1±3.3	312.8±348.6	1.3±0.2	1.2±0.2
Women (n=58)	52.4±14.2	22.5±3.6	4.2±3.0	37.2±3.6	478.7±345.3	1.5±0.2	1.3±0.3

BMI: body mass index, nPCR: normalized protein catabolic rate.

Lindholm, 1998; Levey and Eknoyan, 1999; Stenvinkel et al., 1999). Albumin also makes a contribution to the total antioxidant capacity in the human blood (Ghiselli et al., 1995; Loban and Kime, 1997). In some studies, lower serum albumin and higher ferritin levels have been related to the inflammatory response and oxidative stress in uremia (Kaysen, 2001, 2002; Schomig et al., 2000).

On the other hand, there have been many reports showing that depression is accompanied by an activation of the immune/inflammatory system, including an acute phase response as indicated by changes in serum acute phase protein (Swartz, 1990; Maes et al., 1991, 1995, 1997; Song et al., 1994). Lower serum albumin (one of the negative acute phase proteins) levels have been observed in patients with major depression (Maes et al., 1995, 1997, 1999; Huang, 2002). However, the relationship between ferritin and depression has rarely been studied (Maes et al., 1996).

In this study, we investigated the relationships between serum albumin and ferrin levels in chronic hemodialysis patients with or without major depression, and our aim was to determine whether chronic hemodialysis patients with major depression might have a more severe inflammatory reaction and greater oxidative damage than chronic hemodialysis patients without major depression.

2. Methods

2.1. Subjects and design

This study was conducted in a large hemodialysis unit of Chang Gung Memorial Hospital at Kaohsiung from July 2002 to June 2003. A total of 107 chronic hemodialysis patients who had received regular hemodialysis for at least 6 months were enrolled. Hemodialysis was undertaken for 4 h three times per week. All patients were free of overt infections, neoplasm and viral hepatitis. Patients with leukocytosis and abnormal liver function were excluded. KT/V (Daugirdes)=− ln((post-dialysis BUN/post-dialysis BUN)−0.03+(4−3.5*(post-dialysis BUN/post-dialysis BUN))*(ultrafiltration/post-dialysis body weight)) was calculated as a parameter to evaluate dialysis adequacy. To assess protein–energy malnutrition, the normalized protein catabolic rate (nPCR, g/kg/day) was used as an estimation of nutrient intake.

Patients were assessed with the Chinese Health Questionnaire (CHQ) (Chong and Wilkinson, 1989) to screen for possible anxiety or depressive disorders. The diagnosis of major depressive disorder was made by one psychiatrist using a semi-structured clinical interview, according to DSM-IV criteria. All patients provided written informed consent.

2.2. Laboratory data

Serum albumin levels were detected in the clinical biochemistry laboratory of our hospital with the bromocresol green method, Hitachi 705 at 37 °C (Albumin Automated Analysis, Wako, Japan). Serum ferritin levels were detected by the ADVIA Centaur Ferritin assay (a two-site sandwich immunoassay using direct chemiluminometric technology, Bayer Corporation, USA).

2.3. Statistical analyses

All results are presented as means±standard deviation (S.D.) and evaluated using analysis of variance (ANOVA) and analysis of covariance (ANCOVA). The differences of age and body mass index (BMI=body weight/height^2, kg/m^2) between genders (men and women) were assessed using ANOVA. The serum levels of albumin and ferritin were evaluated by ANCOVA after adjustment for age, sex and presence/absence of