Relationship Between Inflammation and Sex Hormone Profile in Female Patients Receiving Different Types of Renal Replacement Therapy

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ABSTRACT

Background. Patients with end-stage renal disease (ESRD) experience female sexual dysfunction (FSD). The purpose of this study was to compare FSD in different types of renal replacement therapy and control patients.

Methods. The study was consisted of 47 renal transplantation (RT), 46 hemodialysis (HD), and 28 continuous ambulatory peritoneal dialysis (CAPD) patients and 36 healthy control subjects. All groups were evaluated with the following scales: Female Sexual Function Index (FSFI) questionnaire, Short Form (SF)−36 questionnaires, and Beck Depression Inventory (BDI). Demographic data, laboratory values, and hormone levels were obtained. The patients with FSFI score <26.55 were accepted as experiencing sexual dysfunction.

Results. Overall, total FSFI scores in RT, HD, CAPD, and control were 22 (range, 2–35), 22.4 (4–34), 18.35 (2–34), and 29.6 (2–35), respectively. The mean total FSFI score was not different in patients receiving different kinds of renal replacement therapy ($P > .05$) although they were significantly worse then the control group ($P < .001$). On regression analysis, age was significantly associated with FSD ($\beta = -0.14$; $P = .001$). In addition, the physiologic health domain of SF-36 was significantly better in control groups ($P < .001$). The difference in terms of mean of BDI score did not reach statistical significance among patient groups ($P > .05$). Female sexual dysfunction score was negatively correlated with BDI ($r = -0.371$; $P < .001$) and positively correlated with the mental-physical components score of SF-36 ($r = 0.423$ [$P < .001$] and $r = 0.494$ [$P < .001$], respectively) in all patients groups. Regarding the hormones of the patients, there was a significant difference between RT and the HD and CAPD groups in dihydroepiandrosterone sulfate (DHEAS; $P < .001$), RT and HD in prolactin ($P < .001$), and RT and CAPD in free testesterone ($P < .001$).

Conclusions. Renal transplantation, hemodialysis, and peritoneal dialysis patients were at more risk of developing sexual dysfunction and lower quality of life scores than healthy subjects. Notably, the mode of renal replacement therapy had no impact on female sexual function.

END-STAGE renal disease (ESRD) and renal replacement therapies (RRTs) tend to have a serious impact on sexual function and quality of life (QoL). ESRD is a negative condition adversely affecting patients sexual function [1].

Sexual dysfunction is more common among women than men. Sexual dysfunction was reported in 43% of women and 32% of men [2]. The same study also reported that sexual dysfunction most frequently occurs in the 50–74-year-old

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age group and that 9.4 million women in the United States alone experience sexual dysfunction [2]. Sexual functions are complex chain reactions that start in the brain [3]. Estrogen and androgens are the main regulator hormones for the physiology of female sexual functions [3]. Testosterone binds to albumin and sex hormone–binding globulin (SHBG). The differences of SHBG changes concentrations of blood levels of free testosterone [4].

Sexual dysfunction and studies on female sexual dysfunction (FSD) in ESRD patients were numerous in the past decade. An estimated sexual dysfunction of ~9% among female pre-dialysis patients was reported to increase to 60%–70% after the start of dialysis [1].

Secretion of gonadotropin-releasing hormone is decrease in uremic women. Increasing blood levels of prolactin are usually seen in female chronic renal failure patients [5,6]. Increasing prolactin level causes sexual dysfunction by changing hypothalamic-pituitary axis functions in the patients [5,6]. The prevalence of lack of desire for sexual activity is mostly related to organic conditions, but also related to the underlying presentation of depression and psychosocial factors in female dialysis patients [7].

Some studies have demonstrated that FSD deteriorates the health-related quality of life (HRQoL). HRQoL among women in the ESRD population with FSD is poorer in those with comorbid illnesses and improves with age [8]. Psychologic depression is highly prevalent in ESRD patients. The presence of depressive symptoms, very prevalent in ESRD patients, is an independent factor of FSD in ESRD patients [9]. We used the complete form of the Female Sexual Function Index (FSFI) to evaluate female sexual function; patients whose FSFI score is <26.55 were accepted as experiencing sexual dysfunction [10]. Additionally, we tried to explore the impact of sexual dysfunction on QoL. The 36-item Short-Form Health Survey Questionnaire (SF-36) was applied. The aim of the present study was to evaluate FSFI in different RRTs and the correlation with FSFI by investigating the effects of quality of life and depression.

METHODS

The study protocol was approved by our local Scientific Ethics Committee. In this study, we included 47 renal transplantation (RT) patients (group I; mean age, 37.52 ± 10.28 y; mean follow-up duration, 66.0 ± 60.7 mo), 46 hemodialysis (HD) patients (group II; mean age, 41.18 ± 8.35 y; mean follow-up duration, 95.37 ± 55.02 mo), 28 continuous ambulatory peritoneal dialysis (CAPD) patients (group III; mean age, 39 ± 10.2 y; mean follow-up duration, 64.69 ± 33.34 mo), and 36 control subjects (group IV; mean age, 36.47 ± 7.66 y). All patients received RRT at Ankara Başkent University Hospital from 1987 to 2009.

The RT patients were receiving 3 different immunosuppressive treatment protocols, namely, prednisolone, cyclosporine (CsA), and azathioprine (Azt) or mycophenolate mofetil (MMF). None of the patients received sirolimus. All RT patients were receiving dialysis therapy before RT, and none of them were preemptive. The RT was performed ≥6 months previously. HD patients were being treated thrice weekly with standard bicarbonate dialysis (140 mmol/L Na, 2 mmol/L K, and 0.5 mmol/L Mg), semisynthetic membranes (dialysis filters surface area, 1.1–1.7 m^2), and an average blood flow rate of 300–500 mL/min. Dry weight was targeted in each case to achieve a normotensive edema-free state. The average urea Kt/V in these patients was 1.23 ± 0.31. All patients were on treatment with erythropoietin. No patients were smokers. CAPD patients received 2,000 mL standard treatment 4 times a day. CAPD patients used 1.36%, 2.27%, and 3.86% glucose solutions. Peritoneal membrane status was determined with the use of the peritoneal equilibrium test (PET). In all CAPD patients, creatinine dialysate-to-plasma ratio was >0.5.

Diabetic individuals, uncontrolled hypertension patients, coronary or peripheral artery patients, patients with total abdominal hysterectomy and/or bilateral oophorectomy, patients with abdominal operation (other than RT), patients on oral contraceptive and sirolimus treatment, patients who had been on RRT for <6 months, participants <18 years of age, with major depression, or with alcohol consumption, smokers, participants who were not competent enough to give their informed consent, and individuals who reported having been sexually inactive over the previous 4 weeks were excluded.

The following parameters were evaluated in all groups. Demographic variables included age, sex, and etiology and duration of ESRD. Clinical data included presence of diabetes mellitus, hyperlipidemia (HL; total cholesterol >200 mg/dL), systolic and diastolic blood pressure, and body mass index (BMI). In this study, serum samples were measured following ≥8 hour fast, with the use of standard methods in the routine clinical and hormone laboratory. All of the volunteer individuals were asked to complete the questionnaire forms—BDI, FSFI, and SF-36—by themselves.

Statistics

Statistical analyses were performed with the use of SPSS for Windows (Chicago, Illinois). Any P value of <.05 was considered to be statistically significant. Results were provided as mean ± SD, median and range, and percentages (%). Mann-Whitney U, Kruskal-Wallis, and chi-square test were used for analysis to determine the differences among the groups.

RESULTS

There was no significant difference between study and control groups regarding demographic characteristics ($P >$ .05). Demographic, clinical, and biochemical characteristics of the participants are presented in Table 1. Total FSFI scores of women in groups I, II, III, and IV were 22 (range, 2–34.5), 22.4 (4–33.7), 18.35 (2–34.4), and 29.6 (2–34.9), respectively (Table 2). Total FSFI scores were found to be statistically lower in all RRT groups compared with the control group ($P <$ .001). Furthermore, regarding all sexual functions (desire, arousal, lubrication, orgasm, satisfaction, and pain), scores of all RRT groups were significantly lower than the control group ($P <$ .001). But among the RT, HD, and CAPD patients, there was no significant difference in mean total FSFI score ($P >$ .05; Table 2). In conclusion, regarding presence of FSD, higher sexual dysfunction was observed in patient groups compared with the control group: 19 (40.4%) RT, 19 (41.3%) HD, 14 (50%) CAPD, and 6 (16.7%) control (Table 2). On regression analysis, age was significantly associated with FSD ($\beta = -0.14$; $P = .001$).

Comparison of ESRD groups with the control group regarding sexual function scores are presented in Table 1.