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Original Article

Comparison of uremic pruritus between patients undergoing hemodialysis and peritoneal dialysis

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Abstract

Background: Uremic pruritus is a common, but unpleasant, complication of end-stage renal disease. The uremic burden may differ between hemodialysis (HD) and peritoneal dialysis (PD) patients. This difference may also change the clinical characteristics of uremic pruritus between the 2 modalities. In this study, we investigated the uremic pruritus between patients on HD and PD.

Methods: A total of 425 HD and 223 PD patients from the Clinical Research Center registry in Korea were included. Patients were assessed for pruritus intensity, scratching activity, pruritus distribution, and frequency of pruritus-related sleep disturbance using the visual analog scale and questionnaire.

Results: The prevalence of uremic pruritus was higher in PD patients than that in HD patients (62.6% vs. 48.3%, $P = 0.001$). In the multivariable logistic analysis, PD treatment was significantly associated with the prevalence of uremic pruritus (odds ratio, 1.76; 95% confidence interval, 1.20–2.57, $P = 0.004$) after adjustment for clinical variables. The visual analog scale score, representing a subjective intensity of itchiness, was significantly higher in PD patients (PD 2.11 ± 2.32 vs. HD 1.65 ± 2.28, $P = 0.013$) compared with HD patients. The intensity of uremic pruritus was independently related with serum albumin levels ($\beta = -0.143$, $P = 0.006$) in HD patients and total weekly Kt/V ($\beta = -0.176$, $P = 0.028$) in PD patients.

Conclusion: Our data demonstrate the difference in prevalence, intensity, and risk factors of uremic pruritus between HD and PD patients. These findings suggest that careful consideration for uremic pruritus might be needed in end-stage renal disease patients according to the dialysis modality.

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Introduction

Uremic pruritus is a common and disabling complication that affects the quality of life in end-stage renal disease (ESRD) patients undergoing hemodialysis (HD) and peritoneal dialysis (PD) [1–5]. The prevalence of uremic pruritus has been reported from 22% to 84% in HD patients [2–9].

The degrees of intensity and the spatial distribution of uremic pruritus are influenced by multiple factors and vary over time [3,6]. Although its pathogenesis is not well understood, factors such as uremic burden (i.e., increased inflammation), secondary hyperparathyroidism, iron-deficiency anemia, neuropathy, and neurophysiological factors or allergic sensitization may contribute to the development of uremic pruritus [2–9]. Severe uremic pruritus negatively affects the quality of life and is associated with a poor outcome in HD patients [3].

The uremic burden may differ between HD and PD patients [10], which may make a difference in clinical characteristics of uremic pruritus between patients on HD and PD. Therefore, it may be postulated that clinical characteristics of uremic pruritus may be different between patients on HD and PD. A previous study reported a higher prevalence of uremic pruritus in PD patients than in HD patients [11]. However, the study is limited by a relatively small sample size.

In this study, we determined the differences in the prevalence and the clinical characteristics of uremic pruritus in patients with uremic pruritus undergoing PD and HD from the Clinical Research Center registry for ESRD, a multicenter cohort study in Korea.

Methods

Study population

Patients were selected from the Clinical Research Center registry for ESRD, which is a multicenter, observational, prospective cohort study on patients with ESRD in Korea. Adult patients (aged > 18 years) with ESRD undergoing PD or HD were included from 31 medical centers in Korea. The study was performed between April 2009 and April 2015. Only patients who had completed a questionnaire about uremic pruritus were included. A total of 648 patients from 9 medical centers were included in the final analysis. Of these, 425 patients were undergoing HD and 223 were undergoing PD. Demographic and clinical data were collected at enrollment. The study protocol was approved by the medical ethics committees of all participating hospitals. Written informed consent was obtained from all patients before inclusion.

Pruritus assessment

A survey was used to measure uremic pruritus by 2 scoring systems. A detailed scoring system modified by Pauli-Magnus [12] was used to assess the characteristics of pruritus including intensity, scratching activity, pruritus distribution, and the frequency of pruritus-related sleep disturbances. The visual analog scale (VAS) was used to assess the subjective intensity of itchiness. A survey was done by trained investigators. These parameters were graded as follows:

1. Pruritus scoring system modified by Pauli-Magnus

Severity: A slight itchy sensation without the need to scratch received 1 point. The necessity to scratch, but in the absence of excoriations received 2 points. Scratching accompanied by excoriation received 4 points. Finally, pruritus causing total restlessness received 5 points.

Distribution: Itching at fewer than 2 locations received 1 point, at 2 locations 2 points, and generalized itching 3 points. The scores for pruritus severity and distribution were recorded and multiplied separately based on those from the morning and afternoon. A maximum of 30 points could be achieved.

Sleep disturbance: Each arousal from sleep due to itching received 2 points (maximum 10 points). Every nighttime scratching episode that led to excoriations received 1 point (maximum 5 points). The final score was obtained by adding the sleep disturbance score and the severity–distribution product. There was a maximum of 45 points.

2. Visual Analog Scale

In addition to the pruritus scoring system modified by Pauli-Magnus, we assessed uremic pruritus using the VAS. The VAS has been previously used to assess itching intensity in clinical trials [13,14]. Patients were asked to grade their itching intensity on a 10-cm VAS (0 = no pruritus to 10 = unbearable pruritus). Patients without uremic pruritus were defined by a score of 0.

Data collection

The following baseline demographic and clinical data were recorded: age, sex, height, weight, body mass index (BMI), causes of ESRD, comorbidities, systolic blood pressure (BP), diastolic BP, laboratory investigations, and therapeutic characteristics. Blood samples were drawn to measure serum hemoglobin, albumin, creatinine, blood urea nitrogen, potassium, total cholesterol, calcium, phosphorous, high-sensitivity C-reactive protein, intact parathyroid hormone, and β2-microglobulin.

Statistical analysis

Continuous variables with normal distributions are expressed as means ± standard deviations. Those without normal distributions are presented as medians and interquartile ranges. Student *t* tests were used to compare continuous variables. Categorical variables are presented as numbers with percentages. The Pearson chi-square test was used to compare the categorical variables. Univariate and multivariate logistic regression analyses were used to assess the clinical factors associated with uremic pruritus in HD patients. Multivariate logistic regression analysis was adjusted for significant or nearly significant ($P < 0.05$) predictors of uremic pruritus in univariate logistic regression analysis including BMI and serum albumin levels. To achieve adequate confounder control, important covariates known to be influential based on prior studies and clinical insight were retained in the multivariate logistic regression model, regardless of their statistical significance. These covariates included age, sex, and diabetes mellitus (DM).

Survival curves were estimated by the Kaplan–Meier method and compared by the log-rank test according to the presence of uremic pruritus. A P value < 0.05 was considered