THE RELATIONSHIP OF DERMATOLOGICAL FINDINGS WITH SERUM IL-31 AND UDP-GLUCOSE CERAMIDE GLUCOSYLTRANSFERASE AMONG CHRONIC KIDNEY DISEASE PATIENTS

Beyhan Güvercin[1], Kübra Kaynar[2], Deniz Aksu Arıca[3], Birgül Kural[4], Şükrü Ulusoy[2],
Muammer Cansız[2], Leyla Baykal Selçuk[3], Ayşe Şentürk[4], Gamze Çan[5].
Karadeniz Technical University, School of Medicine,
[1]Department of Internal Medicine, [2]Department of Nephrology, [3]Department of Dermatology,
[4]Department of Biochemistry, [5]Department of Public Health, Trabzon, Turkey.

INTRODUCTION

Cutaneous disorders are seen in chronic kidney disease (CKD) patients with increasing duration and severity of renal disease. The aim of this study was to compare dermatological manifestations in patients with various stages of CKD and relationship of these manifestations with T cell cytokine that has been known to induce severe pruritus: IL-31 and ceramide (which play an important role in moisturizing epidermis) metabolizing enzyme: UDP glucose ceramide glucosyltransferase (UGCG).

As far as we know there is no data regarding the relationship of chronic kidney disease with dermatological manifestations and serum IL-31, UGCG levels. Therefore the present study was designed to explore the possible role of UGCG and IL-31 on dermatological symptoms and signs of CKD patients.

MATERIAL AND METHOD

145 patients with mean age of 46 ± 17 years were recruited into this study. Study groups were:

Group 1, Hemodialysis group (consisting of 30 patients on chronic hemodialysis programme for 49 ± 44 months),

Group 2, Peritoneal dialysis (PD) group (26 patients on chronic peritoneal dialysis programme for 43 ± 37 months),

Group 3, Kidney transplant group (30 patients with functioning kidney allografts-average lifespan of which were 34 ± 50 months-with a mean serum creatinine levels of 1.48 ± 0.99 mg/dL),

Gruop 4 CKD group (29 patients with CKD stage 1-5 with a mean creatinine levels of 4.56 ± 2.56 mg/dL),

Group 5 control group (30 healthy individuals with serum creatinine levels of 0.67 ± 0.25 mg/dL).

Serum IL-31, UCGC levels of all of the groups were measured using ELISA methodology. Dermatological manifestations of the patients were evaluated by clinical dermatologists.

SPSS 13.0 programme was used for statistical comparisons. Results were given as numbers and percentages for categorical variables, and those were presented as mean, median and standard deviation for countable variables. Normal distribution of the groups were analysed with one sample Kolmogorov Smirnov test. When normal distribution were found two independent groups were compared with Student-t test, when normal distribution were not present Mann Whitney U test were used to compare. When normal distribution were present three or more independent groups were compared with One way ANOVA, otherwise Kruskal Wallis test was used. Posthoc comparisons were done with Bonferroni test. Correlations were made with Spearman test and chi square test. The findings were considered statistically significant if $p<0.05$.

RESULTS

Demographic findings of the groups were shown in table 1. Groups were not homogenous with respect to age, gender, glomerular filtration rate (GFR), duration of chronic kidney disease ($p<0.05$). The goups were different with respect to xerosis, pigmentation and alopecia (table 2). Laboratory results of all of the groups were demonstrated in table 3. When all the data evaluated it was found that itching was significantly and inversely correlated with glomerular filtration rate, serum hemoglobin (Hb) and albumin (alb) levels ($p<0.05$) (table 4). When groups were analysed presence of puriritis was significantly higher in group 2 compared to control group; while it was significantly lower in group 3 compared to group 1, 2 and 4 ($p<0.05$) (table 2).

There was no significant difference with respect to serum IL-31, UGCG levels between the groups (Table 3). However patients in group 4 with nail longitudinal ridges were observed to have significantly higher IL-31 levels compared to those without longitudinal ridges in their nails (table 5). In addition patients in group 2 with pruritus were found to have significantly lower UGCG levels compared to those without pruritus ($p<0.05$). Lastly patients in group 4 with xerosis were found to have significantly lower UGCG levels compared to those without xerosis ($p<0.05$) (table 6).

Table 1- Demographic Results of the Groups

Variable	Group 1	Group 2	Group 3	Group 4	Group 5
Age (years)	58 ± 16	37 ± 14	40 ± 11	57 ± 15	34 ± 12
Duration of CKD months	113 ± 92	89 ± 52	132 ± 98	39 ± 45	
GFR ml/min			58 ± 22	24 ± 29	117 ± 22
Gender M/F	20/10	16/10	15/15	20/9	5/25

Table 2- Dermatological Findings of the Groups * :$p<0.05$

Findings %	Group 1	Group 2	Group 3	Group 4	Group 5
Xerosis	83.3	46.2	30	44.8	3.3 *
Pigmentation	43.3	50	43.3	37.9	3.3*
Alopecia	53.3	42.3	23.3	17.2	13.3 *
Pruritus	33.3	38.5	6.7	26.7	10 *

Table 3- Laboratory Results of the Groups * :$p<0.05$

Variable mean ± SD		Group 1	Group 2	Group 3	Group 4	Group 5
Hb	g/dL	11.2 ± 1	10.8 ± 1.6	12.6 ± 2	11.1 ± 1.5	12.9 ± 1.4 *
BUN	mg/dL	57 ± 11	56 ± 20	22 ± 12	65 ± 28	12 ± 4 *
Creatinine	mg/dL	9.1 ± 2.4	9.5 ± 3.5	1.4 ± 0.9	4.5 ± 2.5	0.6 ± 0.2 *
Phosphorus	mg/dL	5.1 ± 1.6	5.7 ± 2.2	3.2 ± 0.9	4.3 ± 1	3.4 ± 0.2 *
Albumin	g/dL	4.1 ± 0.6	3.6 ± 0.4	4.2 ± 0.4	3.7 ± 0.6	4.3 ± 0.3 *
iPTH	pg/mL	282 ± 194	487 ± 561	159 ± 60	260 ± 181	
IL-31	pg/mL	0.79 ± 1.15	0.59 ± 0.67	0.90 ± 0.89	0.83 ± 0.69	1.42 ± 2.09
UGCG	ng/mL	21 ± 9.5	22 ± 11.3	19.9 ± 10.4	16.4 ± 6.8	19.4 ± 9.9
Ferritin	ng/mL	643 ± 332	323 ± 310	16 ± 0	118 ± 161	24 ± 13 *

Table 4 Significant Correlations with Itching

Pruritus	GFR Median (min-max)	Hemoglobin Median (min-max)	Hematocrit Median(min-max)	BUN Median	Albumin Median
Present	11 (7-76)	10.9 (8-13)	32 (24-41)	59 (20-122)	3.5 (2-5)
Absent	43 (6-139)	11 (7-16.5)	34 (21-49)	50 (6-102)	4.1 (2-5)
p value	**0.024**	**0.002**	**0.002**	**0.007**	**0.001**

Table 5 Significant Comparisons Between IL-31 and Nail Longitidunal Ridges

Nail Longitudinal Ridges	Group 1 IL-31 median	Group 2 IL-31 median	Group 3 IL-31 median	Group 4 IL-31 median	Group 5 IL-31 Median
Present	0.43 (0.01-5.08)	0.28 (0.01-0.89)	0.02 (0.01-3.17)	**0.92 (0.46-2.29)**	1.02 (0.02-11.5)
Absent	0.38 (0.01-3.92)	0.48 (0.01-3.25)	1.25 (0.01-2.63)	**0.5 (0.04-2.52)**	0.77 (0.01-2.4)
p value	0.8	0.31	0.63	**0.02**	0.3

Table 6 Significant Comparisons Between UGCG and Dermatological Findings

		Group 1 UGCG median	Group 2 UGCG median	Group 3 UGCG median	Group 4 UGCG median	Group 5 UGCG median
Pruritus	Present	18.3 (9.3-45.4)	**15.6 (1-29.4)**	19 (13-25.2)	13.5 (8.7-22)	39.8 (16-41)
	absent	20.3 (6.4-37.7)	**25.4 (5.1-42.7)**	16.4 (5.9-39.5)	15.4 (8.8-40.5)	15.5 (7-41)
	p value	0.79	**0.04**	0.86	0.18	0.06
Xerosis	Present	19.6 (6.3-45.4)	17.1 (5.1-40.9)	25.2 (8.1-39)	**13.8 (8.7-17.1)**	20.4 (20.4)
	Absent	16.1 (8.4-30.8)	24.5 (1-42.7)	16.3 (5.8-39.5)	**16.7 (10-40.5)**	16 (7-41)
	p value	0.35	0.3	0.23	**0.01**	0.45

DISCUSSION

In this particular study, we found that the most commonly seen dermatological sign was xerosis (51.3%) followed by pigmentation (43%). Although there are studies showing the relationship of pruritus with serum IL-31 levels, we did not found this correlation in our study. Instead prevalence of pruritus was found to be linearly correlated with kidney disease chronicity, degree of anemia and malnutrition, while IL-31 might play a role in nail longitudinal ridges development. There are no studies showing the effect of UGCG in skin manifestations of CKD patients as far as we know. In this study, we found that UGCG levels were significantly lower in the presence of pruritus and xerosis among PD patients and CKD patients respectively. So we think that UGCG might be protective from pruritus and xerosis in CKD patients.

DOI: 10.3252/pso.eu.53era.2016