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To Evaluate the Pattern of Various Dermatological Manifestations in Patients with CKD

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Abstract

Background: The chronic kidney disease (CKD) is defined as the presence of kidney damage or decreased level of kidney function for three months or more, irrespective of etiology. The aim of this study was to evaluate the frequency and nature of cutaneous lesions among patients with chronic kidney diseases

Methods: Cross-Sectional Study Was Conducted On 200 Consecutive Patients of CKD.

Results: Xerosis was the most common manifestation overall, seen in 75 (64.1%) males and 53 (75.9%) females, with an average of 69 %. The most common location was a limited distribution to extremities, especially on extensor aspect. According to modified version of Morton grading system, no xerosis (grade 0) was observed in 43 males and 21 females, grade 1 xerosis was observed in 43 males and 38 females, while grade 2 xerosis was observed in 32 males and 25 females. In some patients, ichthyosi form scaly lesions were appreciated. Pruritus was observed in 57 (28.5%) patients in our study. It was seen in 37(31.6%) males and 20 (24.1%) females. According to body surface area involvement, it occupied < 30% of BSA in 24.5.% patients,30-60% of BSA in 36.8% patients, while in 38.6% patients it has more generalized distribution involving > 60% of BSA

The most common localization of pruritus was a bilaterally symmetrical distribution over back. In 20 (35%) patients, it was of mild grade; in 44% (25) patients it was of moderate grade, in 12 (19%) patients it was of severe grade; while in 2% (1) patients it was very severe interfering with all daily routine activities, including sleep and daily chores. Diffuse hyper pigmentation over exposed areas was seen in 30 (25.6%) males and 24 (28.5%) females, with an average of 54 (27%). Pallor was seen in 14 (11.9%) males and 24 (28.5%) females, with an average of 38 (19%). Purpura was appreciated in 9 (7.6%) males and 16 (9.3%)

females, with an average of 25 (12.5%). Yellow pigmentation was seen in 12(9.4%) males and 5(6.0%) females, with an average of 17(8.5%). Gynecomastia was observed in 5 (2.5%) males in our study. Among specific manifestations, pseudoporphyria was seen in 5 patients with a percentage of 2.5%. It presented as tense vesicobullous eruption over sun-exposed sites, especially dorsum of hands. There was no hyper tricosis, atrophic scarring, hyper trichosis or milia over involved area. All patients were on frusemide therapy before onset of the lesions. Acquired perforating disorder was observed in 5 patients each with a percentage of 2.5%. All the patients had significant pruritus over involved area. Infective skin changes were seen in 69 (34.5%) patients, among which bacterial infections were the commonest observed in 37 (18.5%) patients.

Conclusion: One or more skin manifestations were seen 185 out of 200 patients with a percentage of 92.5%.

Keywords: CKD, Dermatological, Manifestation

Introduction

The chronic kidney disease (CKD) is defined as the presence of kidney damage or decreased level of kidney function for three months or more, irrespective of etiology. [1] Staging of CKD is done according to the kidney Disease Outcome Quality Initiative [K-DOQI] clinical practice guidelines is as follows.

Table 1: Staging System of CKD (K-Doqi practice guidelines)

Stage	GFR[ml/min]
1	>90
2	60-89
3	30-59
4	15-29
5	<15

The last stage (i.e. GFR< 15ml/min) is also known as ESRD.

There are many common causes of chronic kidney disease. The incidence and prevalence of chronic kidney disease is increasing in Indo-Asian than in Europe. [2]

The effects of chronic kidney disease are complex as it causes dysfunction of multiple organs. Skin often acts as a diagnostic window in CKD by presenting myriad manifestations. With increasing prevalence of CKD and newer advances in medicine leading to its better management in the form of hemodialysis, peritoneal dialysis and renal transplantation and consequential better quality of life and life expectancy, the diversity of dermatological manifestations is also broadening.

CKD presents in various forms in skin, nails, mucosa and hairs due to complex interplay of etiological factors, co morbidities, investigative and treatment modalities.

These manifestations can be either non-specific or specific to CKD.

Non -specific disorders include pigmentary disorders, pruritus, xerosis, acquired ichthyosis, and half-and-half nails. Specific disorders include acquired perforating dermatosis, calciphylaxis, bullous dermatoses, and nephrogenic systemic fibrosis.

A range of skin manifestations occurs in patients with ESRD: from the benign and asymptomatic ones to physically disabling and life threatening. Many of them have negative impact on quality of life. Their early recognition, prevention and treatment are essential in reducing morbidity and mortality.

Materials and Methods

Type of Study: Cross-sectional study. It was a non-interventional point source observational study

Sample Size: 200 consecutive patients of CKD

Inclusion Criteria: Patients of both sexes with CKD aged >18 years

Duration of chronic kidney disease >3 months

Exclusion Criteria: Age<18 years

Patients on peritoneal dialysis

Post renal transplantation patients

Patients of acute renal failure

Patients of known immunosuppression-including HIV, solid organ transplant, malignancy, genetic immune deficiency disorders

Method of Data collection

All patients attending outpatient departments, presenting chronic kidney disease with duration of at-least three months were included in the study. Patients were examined by investigator of the study for the diagnosis of dermatological manifestations. The diagnosis was confirmed by an experienced dermatologist.

Demographic profile of the patient including name, age, sex, residential address and disease characteristics like primary disease causing CKD, duration of CKD, stage of CKD, personal/family history of structural kidney defects and duration of hemodialysis with duration were included

Statistical Analysis

The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, version 15.0 for windows).

All Qualitative data were presented as frequency, percentage and proportions. All Quantitative variables were estimated using measures of central location (mean, median) and measures of dispersion (variance) Correlation between the nominal data were sought using spearman rank correlation coefficient. (rho coefficient). P-value of <0.05 was considered significant.

Results

The mean age was 44.7 ± 15.46 years (range 18-88). This study included 117 males (58.5%) and 83(41.5%) females with male to female ratio of 1.4:1.

Maximum number of patients in the study belonged to age group of 51-60 year 50(25%), followed by 41-50 years 48(24%) and minimum patients 3(1.5%) were in age group of 81-88 years

Table 2: Distribution of cases according to Age and Sex.

Age group in years	Males with percentage	Females with percentage
18-20	2(1.7)	6(7.2)
21-30	17(14.5)	5(6)
31-40	12(10.2)	16(19.2)
41-50	28(23.9)	20(17)
51-60	31(26.5)	19(16.2)
61-70	15(12.8)	13(15.6)
71-80	9(7.7)	4(4.8)
81-88	3(2.5)	0(0)

Most common etiology causing CKD was hypertension 83(41.5%), to be followed by diabetes mellitus 42(21%). The cause was unknown in 24 patients.

Table 3: Distribution of the Cases according to Etiology

Primary Etiology	Number of patients with percentage
Hypertension(Htn)	83(41.5)
Diabetes mellitus(DM)	42(21)
Obstructive uropathy(Obsturo)	15(7.5)
Chronic interstitial nephritis(CIN)	2(1)

Nephrotic Syndrome(NS)	4(2)
Polycystic Kidney Disease(PKD)	7(3.5)
Analgesic abuse(anal)	3(1.5)
Hepatorenal syndrome(HRS)	1(0.5)
Nephritic syndrome(nephritic s)	1(0.5)
Cardio renal syndrome(CRS)	1(0.5)
Renal tuberculosis(Renal tb)	1(0.5)
Lupus nephritis(SLE)	1(0.5)
Pregnancy induced hypertension(PIH)	1(0.5)
Plasmodium falciparum malaria(PF malaria)	1(0.5)
Diabetes mellitus +hypertension(DM/Htn)	3(1.5)
Unknown	24(12)
Hypertension/analgesic abuse(Htn/anal)	8(4)
Hypertension/ single kidney(Htn/single kidney)	2(1)

Xerosis was the most common manifestation overall, seen in 75(64.1%) males and 53(75.9%) females, with an average of 69 %. The most common location was a limited distribution to extremities, especially on extensor aspect. According to modified version of Morton grading system, no xerosis (grade 0) was observed in 43 males and 21 females, grade 1 xerosis was observed in 43 males and 38 females, while grade 2 xerosis was observed in 32 males and 25 females. In some patients, ichthyosiform scaly lesions were appreciated. Pruritus was observed in 57 (28.5%) patients in our study. It was seen in 37(31.6%) males and 20 (24.1%) females. According to body surface area involvement, it occupied <30% of BSA in 24.5. % patients,30-60% of BSA in 36.8% patients, while in 38.6% patients it has more generalized distribution involving >60% of BSA. The most common localization of pruritus was a bilaterally symmetrical distribution over back. In 20(35%) patients, it was of mild grade; in 44%(25) patients it was of moderate grade, in 12(19%) patients it was of severe grade; while in 2%(1) patients it was very severe interfering with all daily routine activities, including sleep and daily chores. Diffuse hyper pigmentation over exposed areas was seen in 30 (25.6%) males and 24 (28.5%) females, with an average of 54 (27%). Pallor was seen in 14 (11.9%) males and 24 (28.5%) females, with an average of 38(19%). Purpura was appreciated in 9 (7.6%) males and 16 (9.3%) females, with an average of 25 (12.5%). Yellow pigmentation was seen in 12 (9.4%) males and 5(6.0%) females, with an average of 17 (8.5%). Gynecomastia was observed in 5 (2.5%) males in our study.

Among specific manifestations, pseudoporphyria was seen in 5 patients with a percentage of 2.5%. It presented as tense vesicobullous eruption over sun-exposed sites, especially dorsum of hands. There was no hyper tricosis, atrophic scarring, hyper trichosis or milia over involved area. All patients were on frusemide therapy before onset of the lesions. Acquired perforating disorder was observed in 5 patients each with a percentage of 2.5%. All the patients had significant pruritus over involved area. Infective skin changes were seen in 69(34.5%)

patients, among which bacterial infections were the commonest observed in 37 (18.5%) patients.

Table 4: Non-Infective Skin Manifestations of Ckd

Manifestation	Sex-wise distribution of cases with percentage (%)		Total frequency with percentage (%)
	Male(n=117)	Female(n=83)	
Xerosis	75(64.1)	63(75.9)	138(69)
Pruritus	37(31.6)	20(24.1)	57(28.5)
Pallor	14(11.9)	24(28.5)	38(19)
Hyper Pigmentation	30(25.6)	24(28.5)	54(27)
Purpura	9(7.6)	16(19.3)	25(12.5)
Pseudoporphyria	2(1.7)	3(3.6)	5(2.5)
Acquired Perforating Disorder	5(4.3)	0(0)	5(2.5)
Drug Rash	1(0.85)	2(2.4)	3(1.5)
Yellow Pigmentation	12(9.4)	5(6.0)	17(8.5)
Gynecomastia	5(2.5)	NA	2.5
PPKD	0(0)	3(3.6)	3(1.5)
Finger Papules	1(0.85)	0(0)	2(1)
Necrobiosislipoidica	3(2.5)	0(0)	3(1.5)
Eczema	3(2.5)	0(0)	3(1.5)
Exfoliative Dermatitis	1(0.85)	1(1.2)	2(1)
Melasma	0(0)	1(1.2)	1(0.5)
Senile Comedons	5(4.3)	0(0)	5(2.5)
Seborrheic Keratosis	3(2.5)	7(8.4)	10(5)
IGH	7(5.9)	7(8.4)	14(7)

Discussion

Among cutaneous manifestations, xerosis was the most common finding, observed in 68% of patients of our study. It was of grade 1 in 81(59.5%) of patients, while in 55(40.5%) patients it was of grade 2(rough skin with scaling). According to body surface area involvement, it remained localized to < 30% BSA in 37 (27.2%) patients, 30-60% BSA in 42(30.9%) patients, while in 56(41.9%) patients it was of relatively generalized type occupying >60 % of BSA. The xerosis was most commonly localized to back, head and neck and extensor surface of extremities, alone or in patchy distribution involving all these areas. In some patients it was ichthyosis form in nature. The grades of xerosis were negatively correlated with the severity of CKD as indexed by estimated glomerular filtration rate (EGFR). This was in agreement with Udaya Kumar et al[3], who reported xerosis in 79% patients; however, Hajheydari et al,[4] reported xerosis in 22.8% patients and Tawade et al, [5] in 46% patients.

The higher prevalence of xerosis in our patients could be attributed to the poor socioeconomic status of our patients, leading to greater exposure to dust and detergents and poor use of emollients in general.

Pruritus was observed in 57 (28.5%) patients in our study. The most common localization of pruritus was a bilaterally symmetrical distribution over back, followed by patchy involvement of back and extensor aspect of lower legs, followed by patchy involvement of back, forearms and lower legs. In 35%(20) patients, it was of mild grade; in 44%(25) patients it was of moderate grade, in 19%(12) patients it was of severe grade; while in 2%(1) patients it was very severe interfering with all daily activities, including sleep and daily chores. 40 (70%) patients complaining of pruritus reported a nocturnal increase in severity of pruritus, while patients with severe to very severe grading of pruritus reported continuous pruritus throughout day and night. Regarding the quality of itch, the most common itch type was of a pricking sensation over involved area in 40% patients, followed by a tingling sensation in 30% patients, 8% patients described it as of a burning quality, while rest 22% of patients were unable to give any particular quality to their itch.

The provoking factors for pruritus were a dry skin (xerosis), and a cold, dry climate. In 84.2% of our patients, xerosis was associated with pruritus.

Udaya Kumar et al[3] reported 53 % prevalence of pruritus in their study, Pico et al[6], in 42%, Gilchrist et al[7], reported in 19.9% patients and Hajheydari et al[4], found in 38.6% patients. There are many theories regarding its origin: abnormal cutaneous innervations and histamine theory. Other possible causes of pruritus are increased serum levels of magnesium, hypo Albuminuria, and iron deficiency anemia.

The variations in rate of pruritus among different studies could be due to variation in primary etiology causing CKD, duration of CKD before presentation, prevalence and severity of anemia and xerosis in source population, and duration and frequency of hemodialysis as management form.

Grey brown hyper pigmentation over photo-exposed areas was observed in 27% patients in this study. It is seen due to accumulation of beta- melanocytic hormone in basal layer of superficial dermis due to its reduced excretion by kidneys. Pico et al [6] reported diffuse pigmentation in 70% patients, Hajheydari et al [4] in 66.3% patients. Udaya Kumar et al [3] in 43%. Hyperactive pigmented macules were observed in few patients with similar path mechanism. The variation in different studies of prevalence of hyper pigmentation may be explained by large variation in sample size, patient profile, racial differences in hyper pigmentation and differences in sun-exposure rates.

Pallor is a common finding in chronic kidney disease. It was seen in 19% patients in our study. It is due to decreased erythropoietin by the diseased kidney, reduced red cell life span or blood loss during dialysis. Udaya Kumar et al[3] observed pallor in 60% patients and Dyachenko et al[8] in 75.7% patients on hemodialysis.

A yellowish tinge of the skin was reported in 40% of patients by Pico *et al*.,[9] but we encountered yellowish discoloration in only 3 (1.5%) patients, probably because of the dark complexion of Indians, which masks this finding.

This has been explained by retained lipid soluble pigments such as lipo chromes and carotenoids, deposited in the dermis and subcutaneous tissue

Acquired perforating dermatosis was observed in 2.5% patients in our study. It was associated with severe generalized pruritus. Udaya Kumar et al[3] reported APD in 21% patients.

Conclusion

One or more skin manifestations were seen 185 out of 200 patients with a percentage of 92.5%.

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