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RESEARCH ARTICLE
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Clinicopathological correlation of cutaneous manifestations in chronic kidney disease

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ABSTRACT

Objective: To evaluate the frequency of dermatologic problems among patients with chronic kidney disease at private hospital.

Materials and methods: This is a cross sectional study done after obtaining the patient's consent. 95 patients attending the dermatology OPD who were diagnosed with chronic kidney disease with cutaneous manifestations are included in the study as per the following inclusion & exclusion criteria.

Results: Out of the 95 cases studied, 60 (63.2%) were males and 35 (36.8%) were females. Maximum CKD patients belonged to the age group between 51-60 years (41.1%). 38 patients (40%) had stage III and 30 patients (31.6%) had stage IV CKD. Out of the 95 CKD patients, 53(55.8%) were under maintenance hemodialysis. Among the cutaneous manifestations, majority of the patients(61%) had xerosis followed by skin infections (32.6%) and perforating dermatosis (16.8%). Skin biopsy done for clinic pathological diagnosis for 41 patients, out of which 29 (70.7%) patients has had positive clinicopathological relationship.

Conclusion: Early recognition of the cutaneous manifestation with the help of specific investigations can prevent or decrease some of the adverse cutaneous changes and reduce morbidity and thereby improving quality of life in these patients.

Keywords: *Perforating disorders, chronic kidney disease, Pruritus*

INTRODUCTION

CKD is defined as kidney damage or glomerular filtration rate less than 60 ml/min/1.73 m^2 for 3 months or more irrespective of the cause. Chronic kidney disease (CKD) is an irreversible deterioration in renal function classically developing over years. Cutaneous manifestations are common in chronic kidney disease and range from asymptomatic to life-threatening forms. They may occur before or after initiation of dialysis. Sometimes the cutaneous manifestation can be first clear sign of CKD. 50%–100% of patients with end-stage renal disease (ESRD) have at least one associated cutaneous change and can be classified as specific and non-specific. Acquired perforating disorders (APD), bullous dermatoses, calcifying disorders, and nephrogenic systemic fibrosis are included under specific manifestations of ESRD and Pruritus, xerosis, pigmentation disorders, and

half and half nails (Lindsay's nails) are included under non-specific manifesations.

Classification of skin manifestation in renal disease

The skin manifestations in renal disease may be classified into the following:

1. Signs of end-stage renal disease;
2. Signs associated with dialysis;
3. Inherited disorders involving both skin and kidneys;
4. Acquired disorders involving both skin and kidneys;
5. Signs in renal transplant recipients.

MATERIALS AND METHODS

This is a cross sectional study done in the Department of Dermatology, Saveetha Medical College from March 2020 to August 2021 after obtaining patients consent and ethical committee clearence. The collected data were analyzed with standard statistical packages using IBM SPSS version 23.0. The distribution of categorical variables was summarized as frequency with percentages and continuous variables were summarized as mean with standard deviation. Chi-square test or Fisher's exact test was performed to find the association between two categorical variables. The p value less than 0.05 was considered as statistically significant in all the statistical tests. 95 patients with cutaneous manifestations in chronic kidney disease are included in this study. Patients were selected according to inclusion and exclusion criteria. Detailed history including name, age, sex, address, contact number, marital status, occupation, history of medication were noted. Routine blood haemoglobin, complete blood count, urine routine, blood sugars, renal function test, electrolytes, serum calcium, phosphorus, uric acid, PTH was carried out whenever necessary. Woods lamp examination, tzanck smear, skin KOH mount and skin biopsy done wherever indicated.

RESULTS

TABLE 1: Age Distribution Of Ckd

Age	No of Patients	Percent
19-30	2	2.1
31-40	7	7.4
41-50	20	21.1
51-60	39	41.1
61-70	21	22.1
71-80	6	6.3
Total	95	100.0

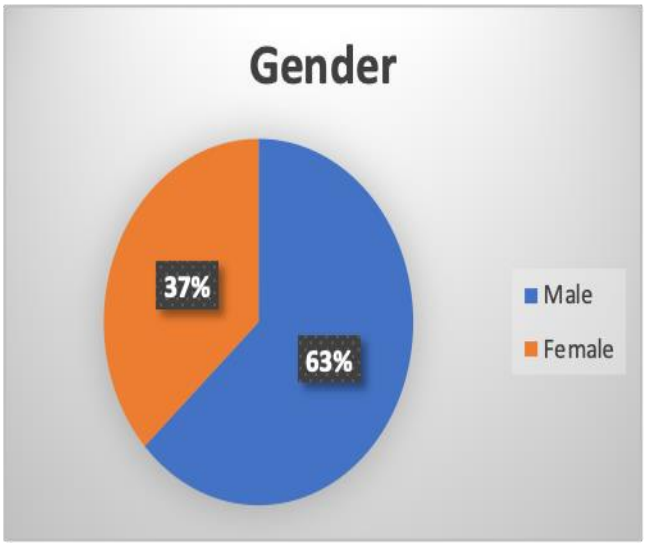

CHART 1: Sex Distribution Of Ckd

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TABLE 2: Ckd Stage Distribution Of Study Participents

CKD stage	Frequency	Percent
1	1	1.1
2	15	15.8
3	38	40.0
4	30	31.6
5	11	11.6
Total	95	100.0

TABLE 3: Duration Of Ckd

Duration	Frequency	Percent
ND	22	23.2
<1 yr	6	6.3
1-5 yrs	46	48.4
>5 yr	24	25.3
Total	25	100.0

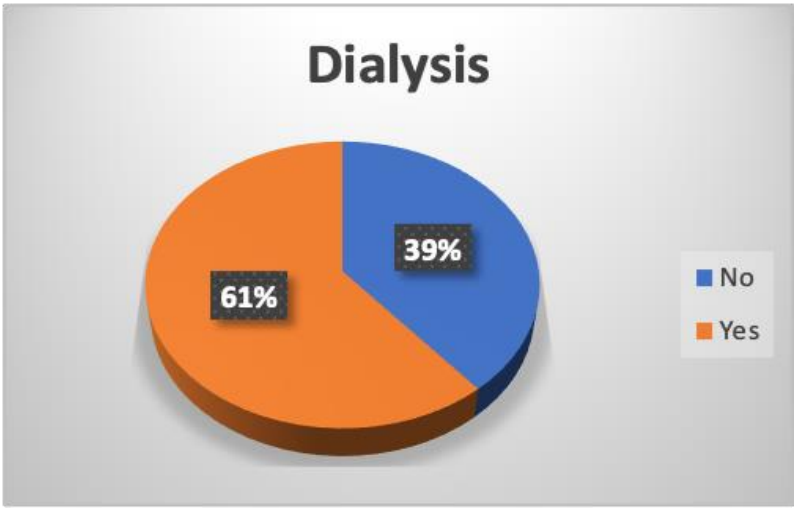

CHART 2: Dialysis Status Among Ckd Patients

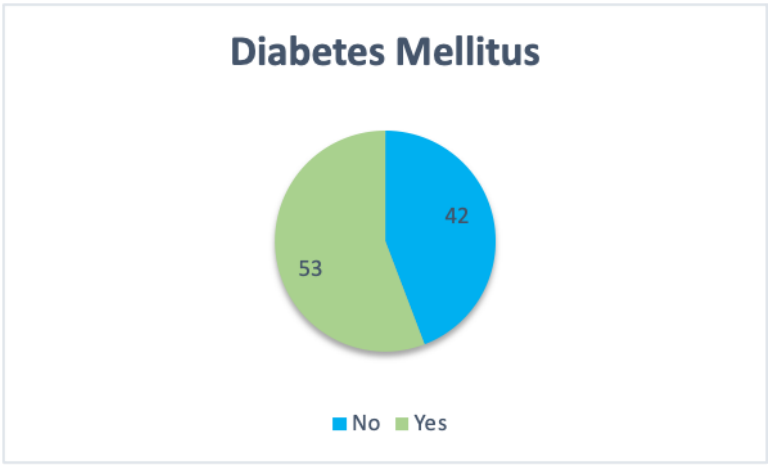

CHART 3: Diabetes Mellitus Among Ckd Patients

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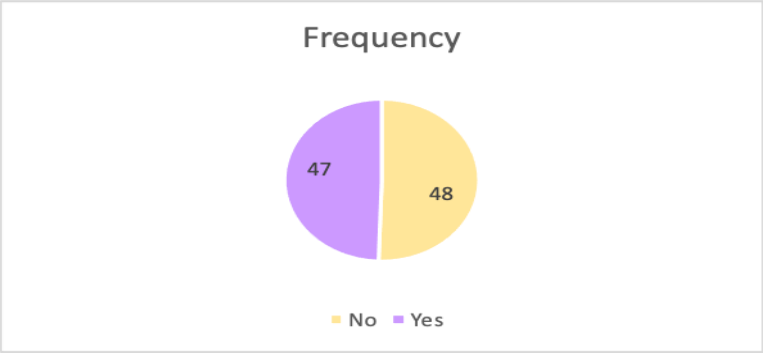

CHART 4: Hypertension Among Ckd Patients

TABLE 4: Cutaneous Features In Chronic Kidney Disease (One Or More Dermatosis Were Found In The Same Patient)

Cutaneous Manifestations	Total Cases	Percentage
Pruritus	90	94.7%
Xerosis	82	86.3%
Infections Bacterial Viral Fungal Total	 10 6 15 31	 10.5% 6.3% 15.8% 32.6%
Papulosquamous disorders	19	20%
Perforating dermatosis	16	16.8%
Vasculitis	4	4.21%
Mucosa	4	4.21%
Nail	21	22.1%
Hair	11	11.5%
Miscellaneous Trophic ulcer Stasis ulcer Eczema Prurigo nodularis	 3 1 7 5	 3.15% 1.05% 7.36% 5.26%

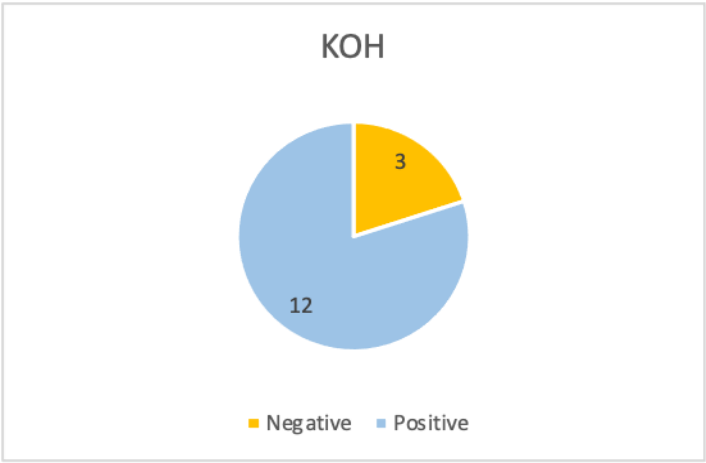

CHART 5: Status Of Koh Among Patients With Fungal Etiology

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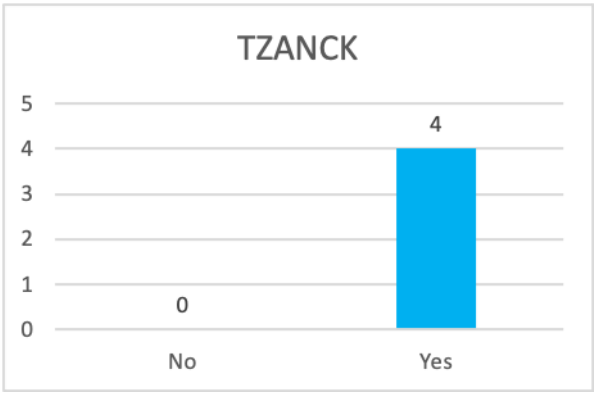

CHART 6: Status Of Tzanck Among Patients With Viral Infection

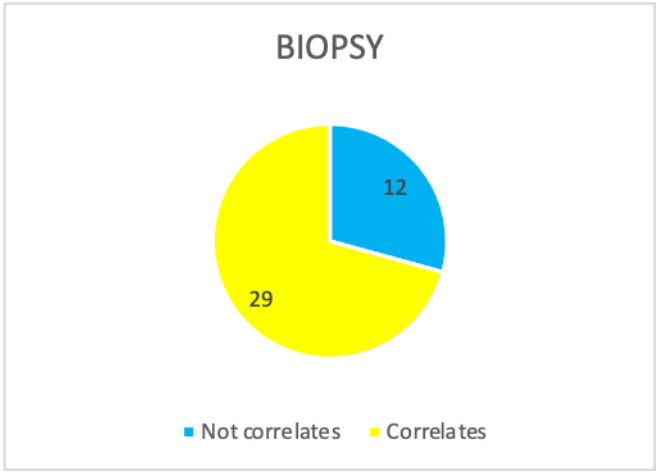

CHART 7: Clinicopathological Correlation Of Specific Cutaneous Manifestation Among Ckd Patients

DISCUSSION

The age of the participants in our study ranged from 19 to 80 years, of whom 39 (41.1%) patients belonged to the age group of 51 to 60 years [Table 1]. This is consistent with the study conducted by Levillard et al [1] and Asokan et al [2]. 60 (63.2%) were males and 35 (36.8%) were females [Chart 2]. A male preponderance was also noted in the study by Udayakumar et al [3], wherein 70% of the study population were males and the rest were females. This could be attributed to higher incidence of hypertension and diabetes, health-seeking behavior and self-reporting in men. In our study, stage distribution among CKD patient varied from 1.1 to 40% [Table 2]. Among which, cutaneous manifestations were more prevalent in Stage III CKD. Our study included patients with CKD who were newly diagnosed to patients with 10 years of duration [Table 3] and the maximum cases were seen between 1-5 years duration (63.2%). Dialysis dependency among CKD patient was found to vary between 38.9% to 61.1% [CHART 2] and 61.1% required dialysis. In our study, the most common etiology for development of CKD was diabetic mellitus in 53 patients (55.8%) [Table 6] followed by hypertension in 47 patients (49.5%) [Table 7] which is. This is similar to studies by Udayakumar et al [3] and Attia et al [4]. However, other studies such as those 54 conducted by Beheshti et al [5] and Deshmukh et al [6] have documented hypertensive nephropathy as the most common etiology for CKD.

Pruritus (94.7%) and xerosis (86.3%) were noted in most of our patients [TABLE 4]. Cutaneous infections were noted in 31 (32.6 %) of our study population, of which 10 patients (10.5%) cases had bacterial infections such as folliculitis, furunculosis and cellulitis. Viral infections were seen in 6 patients (6.3%) which included verruca vulgaris and herpes zoster. 15 patients (15.8%)

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had fungal infections, comprising of candidiasis, onychomycosis, dermatophytosis and pityriasis versicolor. Other studies such as Pico et al have also shown a higher incidence of cutaneous infections comparable to our study. Papulo squamous disorders like Psoriasis vulgaris, Lichen planus, Seborrheic dermatitis, Eczema, Pityriasis rubra was present in 20.21% CKD patients. Acquired perforating dermatoses was seen in 16 (16.8%) patients in our study, of which 13 cases were Kyrle's disease and 3 cases were of perforating folliculitis. There was no significant association between age, gender or duration of dialysis with development of APD. Udayakumar et al have reported a higher incidence (21%) of APD comparable to our study. It was found to be more prevalent in patients undergoing dialysis. There was no correlation between the severity of the disease, CKD stage and cutaneous manifestations in our study.

Nail changes were seen in 21 patients (22.1%) of our study patients [Table 4. The most common nail change seen was absent lunula and subungual hyperkeratosis seen in 5 patients each (23.8%). The characteristic nail changes of CKD like, half-and-half nail, beau's lines, melanonychia and onychodystrophy were seen in 4 patients (19%), 1 patient (4.8%), 4 patients (19 %) and 2 patients (9.6%) subjects respectively. However, there was no significant correlation between the age of the patient or duration of HD with nail changes. These observations were consistent with findings of Salem et al [7] who reported half and half- nails in 20%. Udayakumar et al and Dyanchenko et al [8] have reported half-and half-nails in 21% and 18.6% of their study population respectively. Hair changes were seen in 11 patients (11.6%) cases in the present study [TABLE 4] such as dry lusterless hair, diffuse alopecia and sparse body hair. Deshmukh et al [6] have reported hair changes in 25.71%. We did not encounter rarer manifestations like uremic frost, bullous dermatoses and nephrogenic systemic fibrosis in our study. This could be because majority of our patients were initiated on HD early in the disease process. Oral mucosal changes were seen in 4 patients (4.2%) of our study population [TABLE 4]. Mucosal lesions such as angular cheilitis, oral candidiasis and oral stomatitis were found in the study. Udayakumar et al have reported macroglossia with teeth markings in 35% patients and xerostomia in 31%, which is high compared to our study. They reported uremic fetor in 3 patients; however, none of our study patients had the same. We did not find a statistically significant correlation between the biochemical parameters and mucosal changes.

Out of 15 patients with clinical signs of dermatophytosis, 12 patients were KOH positive which comprises 80% [CHART 5]. Among 95 patients included in the study, only 4 patients had clinical signs of viral infections. All four patient were Tzanck smear test positive. Smear study revealed multinucleated giant cells [CHART 6]. Out of 10 patients who showed clinical features for bacterial infections, 7(70%) were tested positive and 3(30%) were negative. Among study population, 41 patients had cutaneous manifestation requiring biopsy for clinicopathological correlation. 29 patient's histopathological findings and clinical findings was compatible with each other, comprising 70.7% [CHART 7].

CONCLUSION

Chronic renal failure patients showed at least one cutaneous alteration, patient with end stage renal failure may present with an array of skin abnormalities. With the advent of hemodialysis, the life expectancy of these patients has increased, giving time for more and more newer cutaneous changes to manifest. Some prophylactic and early recognition of these cutaneous manifestation with the help of specific investigations can prevent or decrease some of the adverse cutaneous changes and reduce morbidity and thereby improving quality of life in these patients**.**

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