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Original Research Article

Cutaneous Manifestations of Chronic Kidney Disease

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Abstract

Background: Chronic kidney disease (CKD) is a progressive systemic disorder associated with multiple dermatological manifestations that significantly affect patients' quality of life.

Objectives: To study the spectrum and frequency of cutaneous manifestations in patients with chronic kidney disease.

Materials and Methods: This hospital-based observational study was conducted from February 2023 to November 2025 at Nirmala Hospital & Research Center, Jaipur. All diagnosed CKD patients were included. Patients with acute kidney injury or pre-existing primary dermatological disorders unrelated to CKD were excluded. Detailed clinical, dermatological, and laboratory evaluations were performed. Data were analyzed using descriptive statistics.

Results: A total of 327 CKD patients were studied (mean age 52.4 ± 11.6 years; male:female ratio 1.8:1). The most common etiology of CKD was obstructive uropathy (41%). Non-specific cutaneous manifestations were predominant. Pruritus (72.7%), hyperpigmentation (70%), and xerosis (67.8%) were the most frequent findings. Among specific lesions, acquired perforating dermatosis (8.5%) and porphyria cutanea tarda (3.2%) were observed.

Conclusion: Cutaneous manifestations are highly prevalent in CKD patients, with non-specific lesions being more common than specific dermatoses. Early identification and appropriate dermatological care should be integrated into routine CKD management.

Keywords: Chronic kidney disease; Cutaneous manifestations; Pruritus; Xerosis; Acquired perforating dermatosis; Porphyria cutanea tarda.

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Introduction

Chronic kidney disease (CKD) is defined as the presence of structural kidney damage or a sustained reduction in renal function persisting for three months or more, irrespective of the underlying etiology [1]. CKD is a major global health problem, affecting approximately 8–16% of the world population, and is associated with significant morbidity, mortality, and reduced quality of life [2]. Progressive decline in renal function leads to multisystem involvement, including cardiovascular, neurological, hematological, and dermatological complications.

Cutaneous manifestations are among the most common extra-renal features of CKD and are reported in nearly 50–100% of affected patients [3]. These dermatological changes may occasionally be the earliest clinical indicator of underlying renal dysfunction and can cause considerable physical discomfort and psychological distress. The pathogenesis of skin changes in CKD is multifactorial and includes accumulation of uremic toxins, metabolic and electrolyte imbalance, immune dysregulation, anemia, altered calcium–phosphate metabolism, and hormonal disturbances [4,5].

Cutaneous manifestations in CKD are broadly classified into non-specific and specific lesions. Non-specific manifestations are more common and include pruritus, xerosis, pigmentary changes, pallor, nail and hair abnormalities, and purpura [6]. Uremic pruritus is one of the most distressing symptoms in CKD patients and has a significant

negative impact on sleep quality and overall well-being [7,8]. Xerosis and pigmentary alterations are also frequently observed and contribute to chronic skin discomfort [9].

Specific cutaneous manifestations, though less frequent, are clinically important and include acquired perforating dermatosis, porphyria cutanea tarda, calciphylaxis, calcinosis cutis, nephrogenic systemic fibrosis, eruptive xanthomas, and uremic frost (10–13). The present study was undertaken to evaluate the prevalence and spectrum of cutaneous manifestations in patients with chronic kidney disease attending a tertiary care hospital in Jaipur.

Materials and Methods

Study Design: Hospital-based observational study.

Study Period: February 2023 to November 2025.

Study Setting: Nirmala Hospital & Research Center, Jaipur, India.

Study Population: All patients diagnosed with chronic kidney disease during the study period.

Inclusion Criteria

- Patients of any age and gender diagnosed with CKD
- Patients willing to participate in the study

Exclusion Criteria

- Acute kidney injury
- Pre-existing primary dermatological diseases unrelated to CKD

Methodology

All enrolled patients underwent:

- Detailed clinical history
- General physical and systemic examination
- Complete dermatological examination
- Laboratory investigations including renal function tests
- Radiological investigations where indicated

Cutaneous manifestations were categorized into:

- Non-specific skin lesions
- Specific skin lesions

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using descriptive statistical methods.

Continuous variables were summarized as mean ± standard deviation along with their range, while categorical variables were expressed as frequencies and percentages.

Owing to the observational nature of the study and its primary objective of describing the prevalence and distribution of cutaneous manifestations in chronic kidney disease, no inferential statistical tests were applied.

Results

Table 1.:Demographic Profile of CKD Patients (n = 327)

Variable	Category	Number (n)	Percentage (%)
Age (years)	Range	15–73	
	Mean ± SD	52.4 ± 11.6	
Age distribution	<45 years	63	19.3
	45–60 years	193	59.0
	>60 years	71	21.7
Gender	Male	210	64.2
	Female	117	35.8

Male: Female ratio: 1.8:1

Table 2: Etiology of Chronic Kidney Disease

Etiology	Percentage (%)
Diabetic nephropathy	32%
Hypertension	12%
Chronic interstitial nephritis	9%
Chronic glomerulonephritis	5%
Adult polycystic kidney disease	1%
Obstructive uropathy and others	41%

Table 3: Distribution of Cutaneous Manifestations in CKD Patients (n = 327)

Cutaneous Manifestation	Number (n)	Percentage (%)
Pruritus	238	72.7
Xerosis	222	67.8
Hyperpigmentation	229	70.0
Pallor	115	35.0
Yellowish discoloration	81	24.7
Acquired ichthyosis	12	3.6
Nail changes	130	39.7
Hair changes	131	40.0
Acquired perforating dermatosis	28	8.5
Porphyria cutanea tarda	10	3.2

Discussion

Cutaneous manifestations are common in patients with chronic kidney disease (CKD) and represent a significant source of morbidity. In the present study, non-specific dermatological manifestations were more frequent than specific dermatoses, a finding consistent with earlier reports [1,3,6]. These manifestations arise due to the systemic effects of uremia, metabolic imbalance, immune dysregulation, and hormonal disturbances associated with progressive renal dysfunction. Pruritus was the most common cutaneous complaint, affecting 72.7% of patients. Similar prevalence has been reported in previous studies, highlighting uremic pruritus as one of the most distressing symptoms in CKD [1,7,8]. The exact pathogenesis remains unclear; however, immune dysregulation, altered cytokine levels, opioid receptor imbalance, and accumulation of uremic toxins have been implicated [4,7,8]. Persistent pruritus significantly impairs sleep quality and overall well-being.

Xerosis was observed in 67.8% of patients, comparable with findings from other studies [6,9]. Reduced sweat and sebaceous gland activity, dehydration, and eccrine gland atrophy are considered important contributory factors [6,10]. Xerosis often worsens pruritus, thereby increasing patient discomfort.

Pigmentary changes were seen in 70% of patients. Pallor was mainly attributable to anemia, while yellowish discoloration resulted from deposition of urochromes and carotenoids in the skin [1,3]. Hyperpigmentation is believed to result from increased melanin synthesis due to elevated melanocyte-stimulating hormone levels in CKD [10].

Nail and hair changes were observed in 39.7% and 40% of patients, respectively, and are likely related to uremia, nutritional deficiencies, hormonal imbalance, and chronic illness [6,10]. Among specific dermatoses, acquired perforating dermatosis (8.5%) and porphyria cutanea tarda (3.2%) were noted, findings consistent with earlier reports in CKD populations [11–13].

Conclusion

Cutaneous manifestations are highly prevalent in patients with chronic kidney disease, with non-specific lesions such as pruritus and xerosis being the most common. Early recognition and appropriate dermatological management should form an integral part of comprehensive CKD care to improve patient quality of life.

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