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Original Research Article

MUCOCUTANEOUS FINDINGS OF PATIENTS ON HAEMODIALYSIS

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Abstract

Background: Cutaneous and mucosal disorders are a common issue among patients undergoing long-term haemodialysis. Aim: To assess the frequency and nature of cutaneous lesions in patients with chronic kidney disease who received maintenance haemodialysis. **Materials and Methods:** We conducted a thorough examination of 40 patients with chronic kidney disease on haemodialysis, including assessments of cutaneous, hair, nail, and mucosal changes. When necessary, we performed diagnostic measures such as scraping and biopsy of the lesions. **Result:** Our results showed that all patients included in the study had at least one cutaneous manifestation attributable to CRF, with xerosis being the most prevalent finding followed by pallor, pruritus, infections, AV shunt dermatitis, pigmentary changes, purpura, ecchymoses, and perforating disorders. Hair changes such as diffuse alopecia, brittles, lustreless hair, and sparse body hairs were also observed. Oral changes including candidiasis, angular cheilitis, gingivitis, fissured tongue, and lichen planus. Nail changes were also present, including leukonychia, dystrophic nails, onychomycosis, subungual hyperkeratosis,and half and half nails. **Conclusion:** At least one cutaneous manifestation is found in all CRF patients. Factors such as diagnostic tests and early treatment can influence some disorders.

INTRODUCTION

The skin serves as a crucial diagnostic tool for systemic diseases, including renal diseases. Irrespective of the underlying cause, chronic kidney disease often results in specific changes that may manifest long before clinical renal failure.[1] Cutaneous disorders are a common manifestation of chronic kidney disease and end-stage renal disease. Studies have reported that 50-100% of patients with renal disease exhibit at least one dermatological disorder, with skin changes observed in 79% of patients.[2,3]These skin disorders can significantly impact patients' quality of life, negatively affecting their mental and physical health. This study aims to investigate cutaneous manifestations in patients with chronic kidney disease undergoing haemodialysis, comparing findings with previous studies and identifying newer complications in the general population, given the increasing prevalence of kidney disease.

MATERIALS AND METHODS

This prospective, multi-centric, cross-sectional, descriptive study was conducted in the department of Dermatology and Urology, at Jawahar Lal Nehru Medical College and Hospital, Bhagalpur, Bihar and Narayan Medical College and Hospital, Sasaram, Bihar. The study was approved by the institutional research and ethical committee. This study was conducted over a period of 12 Months from September 2021 to September 2022. An informed and written consent was obtained from all the participating subjects prior to the commencement of the study.

The present study was conducted on patients suffering from chronic kidney disease who were receiving haemodialysis and required treatment at the skin OPD.

The study group comprised 40 patients undergoing haemodialysis. The diagnosis of chronic kidney disease was established based on clinical features and confirmed by serum urea and creatinine levels. A detailed medical history was obtained, including the duration of chronic renal failure, duration of

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dialysis, duration of skin ailment, onset of changes in relation to the diagnosis of chronic renal failure and initiation of dialysis, and improvement observed following dialysis. Specific investigations, such as skin biopsy, culture and sensitivity for bacterial infections, Gram's stain, potassium hydroxide mount, and fungal culture, were performed where indicated, with informed consent. Routine investigations for monitoring renal functions were also recorded.

Statistical analysis was performed using the Chi-square test or Fisher exact test, and the collected data were analyzed using SPSS software version 11.2. Continuous data were presented as mean±standard deviation. A p-value less than 0.05 were considered statistically significant.

RESULTS

A total of eighty patients, comprising of 25 males and 15 females, underwent examination. The majority of the patients were aged between 44 and 55 years, with the youngest patient being 21 years old and the oldest being 68 years old. The duration of chronic renal failure was up to several years. [Table 1] illustrates the diverse causes that resulted in renal failure.

No patients tested positive for hepatitis or human immunodeficiency virus. The dermatologic examination revealed that 98 % of the patients exhibited at least one type of cutaneous manifestation. Among the 50 patients studied, xerosis was the most common cutaneous manifestation, affecting 33 of the patients, followed by pallor (n=28), pruritus (n=25), infections (n=16), AV shunt dermatitis (n=8), pigmentary changes (n=6), purpura and ecchymoses (n=4), and perforating disorders. [Table 2]

Hair, nail, and mucosal changes were observed in 10, 15 and 10 subjects, respectively. The predominant hair disorder was diffuse alopecia, which was observed in 4 patients. The most prevalent nail disorder was leukonychia, affecting 5 subjects, while half-and-half nails were observed in 1 case. Among the mucosal disorders, candidiasis was the most common, affecting the subjects. [Table 3]

The cutaneous manifestations of CKD were found to vary based on the severity of the condition, age of the patients, and the total number of dialysis sittings, as indicated in Table 4-6. Notably, patients who underwent less than 50 dialysis sittings exhibited a higher severity of pruritus compared to those who underwent more than 100 sittings.

Acquired perforating dermatosis, a rare manifestation of CKD, was observed in 02 patients. Biopsies taken from lesion skin in patients with CKD and perforating dermatosis revealed a broad crater in the epidermis with degenerated collagen in the dermis and trans epidermal elimination. Additionally, the present study identified a unique finding of digit gigantism secondary to AV fistula in two patients, which is an exceedingly rare occurrence [Table 4]

Table 1: Causes of CKD

Cause	Total patients
Diabetic glomerulonephritis	17
Chronic glomerulonephritis	11
Chronic interstitial nephritis	15
IgA nephropathy	03
PCKD	02
Pyelonephritis	01
Renovascular disease	01
Total =	50

Table 2: Cutaneous manifestations in CKD patients on dialysis

Clinical features	Total patients
Xerosis	33
Pallor	28
Pruritus	25
Pigmentary changes	6
Perforating disorder	1
Infections	16
Purpura and ecchymosis	4
AV shunt dermatitis	8

Table 3: Hair, nail and mucosal changes in CKD patients on dialysis

Hair changes	Total patients (n=10)
Diffuse alopecia	7
Brittle and Lusterless Hair	2
Sparse body hairs	1
Nail changes	Total patients (n=15)
Leuconychia	5
Dystrophic nails	4
Onychomycosis	3
Subungual hyperkeratosis	2

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Half and half nail	1
Mucosal changes	Total patients (n=10)
Candidiasis	5
Angular cheilitis	2
Gingivitis	1
Fissured tongue	1
Lichen planus	1

Table 4: Comparison of cutaneous manifestations in patients having mild, moderate and severe CKD

Cutaneous manifestations	Mild CKD	Moderate CKD	Severe CKD
Xerosis	3	12	19
Pallor	3	11	16
Pruritus	1	8	17
Pigmentary changes	1	2	4
Perforating disorders	0	0	1
Infections	4	6	8
AV shunt dermatitis	1	3	5
Purpura and ecchymoses	1	1	3
Hair changes	2	3	6
Nail changes	1	4	5
Oral mucosal changes	2	6	8

Table 5: Cutaneous manifestations on the basis of age of the patient

Cutaneous manifestations	<30 years	30–60 years	>60 years
Xerosis	2	23	5
Pallor	2	22	2
Pruritus	2	17	5
Pigmentary changes	2	5	2
Perforating disorders	0	1	1
Infections	1	12	1
Purpura and ecchymoses	1	2	3
AV shunt dermatitis	2	6	2
Hair changes	2	8	1
Nail changes	3	9	3
Mucosal changes	1	7	2

Table 6: Cutaneous manifestations in patients based on the number sitting

Cutaneous manifestations	<50 sitting	51-100 sitting	>100 sitting
Xerosis	6	10	11
Pallor	5	6	10
Pruritus	9	6	5
Pigmentary changes	2	2	4
Perforating disorders	-	-	2
Infections	7	4	3
AV shunt dermatitis	2	2	4
Purpura and ecchymoses	1	2	2
Hair changes	2	3	6
Nail changes	2	4	3
Oral mucosal changes	3	5	4

Xerosis was the most common cutaneous finding. Pallor of skin due to anemia was observed in 33 cases, and hyperpigmentation in 13 of patients. Pruritus was observed in 8 cases and ecchymosis in 5 cases. Among infections, fungal infections were more common than bacterial infection. Among nail findings, half and half nails or Lindsay's nails were seen in highest number of cases, followed by longitudinal ridging. Other findings were leuconychia, onycholysis, Beau's lines, koilonychias, Mee's lines, and Meuhrcke's lines.

Hair changes such as sparse scalp hair and lusterless hair were seen. Few oral changes such as angular cheilitis, uremic breath, and rare iatrogenic manifestations like gynecomastia and A-V shunt dermatitis were observed a few patients. There was no significant association between biochemical parameters and various cutaneous findings (p>.05). There was no significant association between the duration of dialysis and cutaneous manifestations (p>.05).

DISCUSSION

In the present study, xerosis was observed in highest of patients undergoing haemodialysis, making it the most common finding. This finding is consistent with previous studies by Udaykumar et al and Gurucharan et al, but differs from the results reported by Hajheydari et al and Tawadeet al.[4-7] The incidence of xerosis was found to increase with the severity of chronic kidney disease (CKD) and the total number of dialysis sessions. Specifically, the incidence was 06, 10 and 11 in patients who

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underwent less than 50, 50-100, and more than 100 dialysis sessions, respectively. Xerosis was more frequently observed in patients with moderate and severe CKD, with an incidence of 12 and 19 subjects respectively, compared to mild CKD (n=3). This may be attributed to the severe impairment of sweat gland function, which appears to have a linear relationship with the severity of CKD. In the present study, pruritus was observed in 25 patients undergoing haemodialysis. The incidence of pruritus varied among patients with different numbers of dialysis sessions, with number of subjects being 9, 6 and 5 observed in those who underwent less than 50, 50-100, and more than 100 dialysis sessions, respectively. The incidence of pruritus was found to decrease significantly with an increase in the number of dialysis sessions, which may be attributed to the clearance of pruritogenic substances from the body. Previous studies by Pico et al, Gilchrist et al, and Hajheydari et al reported pruritus in 42%, 19.9%, and 38.6% of patients, respectively.[6,8,9] The abnormal pattern of cutaneous innervation in end-stage renal disease supports the neurogenic hypothesis of uremic pruritus.[10] Additionally, pruritus may be caused by increased serum histamine levels due to allergic sensitization to diverse dialyzer membrane components, as well as impaired renal excretion of histamine. Other possible causes of pruritus in CKD patients include increased serum levels of magnesium, albumin (due to inadequate excretion), and iron deficiency anaemia.[11] Pallor is a recognized diagnostic indicator of Chronic Kidney Disease (CKD).[12] In patients undergoing haemodialysis, 28 subjects exhibited pallor, a finding consistent with previous studies by Udaykumar et al and Dyachenko et al.[4,13] The severity of CKD was positively correlated with the incidence of pallor, with rates of 3, 11 and 16 subjects observed in mild, moderate, and severe cases, respectively. The underlying causes of pallor in CKD patients may include reduced erythropoietin production by the diseased kidney, shortened red cell lifespan, or blood loss during dialysis. These findings highlight the importance of monitoring for pallor as a potential indicator of CKD severity.[14] Pigmentary alterations were observed in 06 patients, which can be attributed to the accumulation of beta MSH (melanin stimulating hormone) in the tissues due to inadequate renal excretion in individuals with uremia. Pico et al and Dyachenko et al reported a diffuse pigmentation in extremely high number of patients. The study reports of Udaykumar et al and Hajheydari et al was also high compared to our study results but lower than Pico et al and Dyachenko et al. These findings suggest a significant association between uremia and pigmentary changes.[4,6,8,13]The prevalence of acquired perforating dermatosis was observed to be 01 patients undergoing haemodialysis. Previous studies conducted by Udaykumar et al, Hood et al, and Mortan et al reported a very high incidence in patients of Kyrle's disease and on dialysis.[4,15,16] In the current study, acquired perforating dermatosis was only observed in patients with severe chronic kidney disease and those who had undergone more than 100 dialysis sessions. A total of 16 patients were observed to have cutaneous infections, presenting with dermatophytic infections, viral infections, and bacterial infections. Udaykumar et al. reported a higher incidence of cutaneous infections in CKD patients on haemodialysis.[4] This increased susceptibility to infection may be attributed to the known diminished function and count of T and B lymphocytes, as well as reduced natural killer cell activity in CKD patients. Chargin and Keil have documented purpura as a common cutaneous complication of CKD, with a prevalence of 40% among their patients.[17] In the current study, purpura was observed in 04 patients. AV shunt dermatitis is a skin manifestation that is iatrogenic in nature and is observed at the site of AV fistula, which is created for haemodialysis. The present study has reported that 08 patients have exhibited AV shunt dermatitis. Udaykumar et al have previously reported almost half arteriovenous shunt dermatitis.[4] A certain percentage of patients exhibited nail changes, with leukonychia being the most common (n=5), followed by dystrophic nails at (n=4), onychomycosis at (n=3), subungual hyperkeratosis (n=2), and half and half nail (n=1). It is worth noting that Dayancheko et al reported a higher incidence of half and half nail in their study.[13]Attemeyer et al also reported nail disorders in a significant percentage of uremic patients.[18] The current study observed oral changes in 10 patients. The most frequently observed oral change was candidiasis (n=2). Other changes included angular cheilitis, gingivitis, fissured tongue, and lichen planus. A comparison with previous studies conducted by Hajheydari et al and Udaykumar et al shows higher incidence.[4,6] A proportion of (n=10) patients exhibited changes in their hair. Among these changes, diffuse alopecia was observed in maximum number of patients, while brittle and luster less hair was observed in 2and 1 patient respectively. Additionally, sparse body hair, primarily on the extremities, was observed in 1 patient. It is noteworthy that hair changes were not found to be correlated with the severity of CKD or the number of dialysis sessions. The most common complaint, as reported by Hajheydari et al, was diffuse hair loss.[6] In the present study, a unique finding was observed in two patients, namely digit gigantism. This was attributed to soft tissue hypertrophy resulting from the creation of an AV fistula at the wrist for haemodialysis. It is noteworthy that none of our patients exhibited rare findings such as uremic frost, calcinosis cutis, calciphylaxis, bullous dermatosis, nephrogenic fibrosing dermopathy, or gynaecomastia.

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CONCLUSION

All CKD patients exhibit at least one cutaneous manifestation, with xerosis being the most prevalent finding. The patients on haemodialys is presented with newer and more diverse cutaneous manifestation. Prophylactic and remedial measures can prevent or decrease adverse changes.

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