

Original Research Article

Cutaneous manifestations in patients with chronic kidney diseases on haemodialysis

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ABSTRACT

Background: Cutaneous and mucosal disorders are of the common problems in patients on long term haemodialysis. The aim of this study was to evaluate the frequency and nature of cutaneous lesions among patients with chronic kidney diseases who received maintenance haemodialysis.

Methods: Eighty patients with chronic kidney diseases on haemodialysis were studied. All of the patients were fully examined for cutaneous, hair, nail and mucosal changes. Diagnostic measures such as scraping and biopsy of the lesions was carried out, where necessary.

Results: The patients were 30 females and 50 males with a mean age of 47.6 years. The duration of haemodialysis was 36±11 months. All patients included in this study had at least one cutaneous manifestation attributable to CRF. The most prevalent findings were xerosis (66.2%) followed by pallor (57.5%), pruritus (51.25%), infections (33.75%), AV shunt dermatitis (16.25%), pigmentary changes (13.75%), purpura, ecchymoses (8.75%) and perforating disorders (2.5%). Hair changes were diffuse alopecia (16.25%), brittle hair (3.75%) and sparse body hairs (1.25%). Oral changes were candidiasis (10%), angular cheilitis (3.75%), gingivitis (2.75%), fissured tongue (2.75%) and lichen planus (1.25%). Nail changes were leukonychia (10%), dystrophic nails (7.5%) onychomycosis (6.25%), subungual hyperkeratosis (5%) and half and half nails (1.25%).

Conclusions: At least one cutaneous manifestation is found in all CRF patients. The etiology of CRF does not affect the cutaneous, hair or nail abnormalities. Factors such as diagnostic climate and early treatment influence some disorders such as xerosis, pruritus and infections.

Keywords: Chronic kidney disease, Digit gigantism, Haemodialysis

INTRODUCTION

The skin acts as an important diagnostic window to systemic disease which is true for renal diseases. Chronic kidney disease regardless of its cause often produce specific changes which can develop long before renal failure manifests clinically.¹ Cutaneous disorders are the common manifestation of chronic kidney disease or end stage renal disease. Nunley reported that 50-100% of patients have at least one dermatological disorder, while Bencini et al noticed skin changes in 79% of patients.^{2,3} Skin disorders associated with CKD can markedly affect

patients quality of life with negative impact in their mental and physical health. The present study has been designed to see the cutaneous manifestations in patients of chronic kidney disease on haemodialysis, comparing findings with previous studies and find newer complications in general populations as kidney patients are increasing day by day.

METHODS

The study was carried out on the patients suffering from chronic kidney disease, who was attending skin OPD,

nephrology ward for haemodialysis Command hospital Lucknow, Uttar Pradesh and skin OPD UPUMS Saifai, Etawah, Uttar Pradesh, India. The period of this study was from January 2012 to August 2016. The final study group consist of 80 patients on haemodialysis. The diagnosis of chronic kidney disease was made on the basis of clinical features, and confirmed by serum urea and creatinine level. A detailed history with regard to duration of CRF, duration of dialysis, duration of skin ailment, onset of changes with relation to diagnosis of CRF and starting dialysis and improvement noticed following dialysis was recorded. Specific investigations like skin biopsy, culture and sensitivity for bacterial infections, Gram's stain, potassium hydroxide mount and fungal culture were done where indicated, after informed consent. Routine investigations for monitoring renal functions were recorded.

Statistical analysis

Statistical analysis was done using Chi-square test or Fisher exact test. The collected data was analysed by using SPSS software version 11.2. Continuous data were demonstrated as mean±standard deviation. A p-value less than 0.05 was considered as significant.

RESULTS

Eighty patients (50 males and 30 females) were examined. Most of them were aged between 41 and 50 years; the youngest patient was aged 16 years and the oldest, 70 years. The duration of chronic renal failure varied from 1 month to several years. The various causes leading to renal failure are shown in Table 1.

Table 1: Causes of CKD.

Cause	Total patients	Percentage
Diabetic glomerulonephritis	35	43.75%
Chronic glomerulonephritis	22	27.5%
Chronic interstitial nephritis	17	21.25%
IgA nephropathy	02	2.5%
PCKD	02	2.5%
Pyelonephritis	01	1.25%
Renovascular disease	01	1.25%



Figure 1: Xerosis over lower extremities.



Figure 2: Diffuse hyperpigmentation over face.

None of the patient were positive for hepatitis and human immunodeficiency virus. Dermatologic examination revealed that 96% patients suffered from at least one type of cutaneous manifestation. Out of 80 patients, the most common cutaneous manifestation in our study was xerosis (66.2%) (Figure 1), followed by pallor (57.5%), pruritus (51.25%), infections (33.75%), AV shunt dermatitis (16.25%), pigmentary changes (13.75%) (Figure 2), purpura and ecchymoses (8.75%) and perforating disorders (2.5%) (Figure 3, Table 2).



Figure 3: Perforating disorder.

Table 2: Cutaneous manifestations in CKD patients on dialysis.

Clinical features	Total patients	Percentage (n=80)
Xerosis	53	66.2%
Pallor	46	57.5%
Pruritus	41	51.25%
Pigmentary changes	11	13.75%
Perforating disorder	02	2.5%
Infections	27	33.75%
Purpura and ecchymosis	07	8.75%
AV shunt dermatitis	13	16.25%
Uremic frost	-	-
Calcinosis cutis	-	-

Hair, nail and mucosal changes were seen in (21.2%), (30%) and (20%) respectively. The most common hair disorder was diffuse alopecia (Figure 4). In 16.25%

patients and the most common nail disorder was leukonychia (10%) and half and half nail were seen in (1.25%) (Figure 5). Of the mucosal disorder candidiasis (10%) was the most common (Table 3).

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

Hair changes	Total patients	Percentage (n=17)
Diffuse alopecia	13	76.47%
Brittle and lustreless hair	3	17.64%
Sparse body hairs	1	5.88%
Nail changes	Total patients	Percentage (n=24)
Leuconychia	8	33.3%
Dystrophic nails	6	25%
Onychomycosis	5	20.83%
Subungual hyperkeratosis	4	16.66%
Half and half nail	1	4.16%
Mucosal changes	Total patients	Percentage (n=16)
Candidiasis	8	43.75%
Angular cheilitis	3	18.75%
Gingivitis	2	12.5%
Fissured tongue	2	12.5%
Lichen planus	1	6.25%

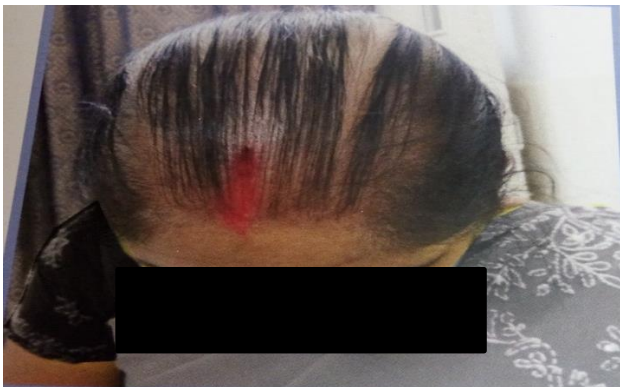


Figure 4: Diffuse alopecia.



Figure 5: Half and half nail.

Cutaneous manifestations were varying with the severity of CKD, age of the patients and total number of sittings of dialysis (Table 4-6). Severity of pruritus was more in patients with dialysis sitting less than 50 (23.75%) as compared to patients with dialysis sitting more than 100, pruritus decreased to (12.5%).

Some rare manifestations of CKD like acquired perforating dermatosis is seen in 2.5% of patients. Biopsies from lesional skin in patients with CKD with perforating dermatosis showed broad crater in epidermis with degenerated collagen in dermis with trans epidermal elimination (Figure 1). One unique finding of present study was digit gigantism secondary to AV fistula seen in two patients, which is the rarest of the rare finding (Figure 6).



Figure 6: Digit gigantism secondary to AV fistula.

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

Cutaneous manifestations	Mild CKD	Moderate CKD	Severe CKD
Xerosis	4 (5%)	19 (23.75%)	30 (37.5%)
Pallor	4 (5%)	17 (21.25%)	25 (31.25%)
Pruritus	2 (2.5%)	12 (15%)	27 (33.75%)
Pigmentary changes	1 (1.25%)	3 (3.75%)	7 (8.75%)
Perforating disorders	-	-	2 (2.5%)
Infections	6 (7.5%)	9 (11.25%)	12 (15%)
AV shunt dermatitis	1 (1.25%)	4 (5%)	8 (10%)
Purpura and ecchymoses	1 (1.25%)	2 (2.5%)	4 (5%)
Hair changes	3 (3.75%)	5 (6.25%)	9 (11.25%)
Nail changes	2 (2.5%)	6 (7.5%)	8 (10%)
Oral mucosal changes	3 (3.75%)	10 (12.5%)	12 (15%)

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

Cutaneous manifestations	<30 years	30–60 years	>60 years
Xerosis	2 (2.5%)	46 (57.5%)	5 (6.25%)
Pallor	2 (2.5%)	44 (55%)	2 (2.5%)
Pruritus	2 (2.5%)	34 (42.5%)	5 (2.5%)
Pigmentary changes	2 (2.5%)	07 (8.75%)	2 (2.5%)
Perforating disorders	0	1 (1.25%)	1 (1.25%)
Infections	1 (1.25%)	25 (31.25%)	1 (1.25%)
Purpura and ecchymoses	1 (1.25%)	3 (3.75%)	3 (3.75%)
AV shunt dermatitis	2 (2.5%)	9 (11.25%)	2 (2.5%)
Hair changes	2 (2.5%)	14 (17.5%)	1 (1.25%)
Nail changes	3 (3.75%)	18 (22.5%)	3 (3.75%)
Mucosal changes	1 (1.25%)	13 (16.25%)	2 (2.5%)

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

Cutaneous manifestations	<50 sitting	51-100 sitting	>100 sitting
Xerosis	12 (15%)	20 (25%)	21 (26.25%)
Pallor	9 (11.25%)	17 (21.25%)	20 (25%)
Pruritus	19 (23.75%)	12 (15%)	10 (12.5%)
Pigmentary changes	2 (2.5%)	2 (2.5%)	7 (8.75%)
Perforating disorders	-	-	2 (2.5%)
Infections	14 (17.5%)	7 (8.75%)	6 (7.5%)
AV shunt dermatitis	2 (2.5%)	4 (5%)	7 (8.75%)
Purpura and ecchymoses	1 (1.25%)	3 (7.5%)	3 (3.75%)
Hair changes	3 (3.75%)	8 (10%)	6 (7.5%)
Nail changes	4 (5%)	7 (8.75%)	5 (6.25%)
Oral mucosal changes	6 (7.5%)	10 (12.5%)	8 (10%)

DISCUSSION

Xerosis

Xerosis was the most common observation, seen in 66.2% patients in patients on haemodialysis in the present study. This was in agreement with Udaykumar et al, who reported xerosis in 79% patients and Gurucharan et al, in 90% patients; however, Hajheydari et al, reported xerosis in 22.8% patients and Tawade et al, in 46% patients.⁴⁻⁷ The incidence increased with severity of CKD and total number of dialysis. It was 15%, 25%, and 26.25% in

patients who underwent less than 50, 50-100 and more than 100 dialysis respectively. Xerosis was more frequent in moderate and severe CKD with incidence of 23.75% and 37.5% as compared to mild CKD 5%. This could be due to severe impairment of sweat gland function, which may have a linear relationship with severity of CKD.

Pruritus

Pruritus was documented in 51.25% patients on haemodialysis, in the present study. The incidence of pruritus in patients with total number of dialysis varied. It was 23.75%, 15% and 12.5% in patients who underwent less than 50, 50-100 and more than 100 dialysis respectively. The incidence of pruritus decreased significantly with number of dialysis, this could be probably due to clearance of pruritogenic substances from the body. Pico et al, reported pruritus in 42%, Gilchrist et al, reported in 19.9% patients and Hajheydari et al, found in 38.6% patients.^{6,8,9} There is an abnormal pattern of cutaneous innervation in ESRD, which supports the neurogenic hypothesis of uremic pruritus.¹⁰ Pruritus has also been suggested due to increased serum histamine levels because of allergic sensitization to diverse dialyzer membrane components as well as impairing renal excretion of histamine. Other possible causes of pruritus are: increase serum levels of magnesium, albumin (due to inadequate excretion), and iron deficiency anaemia that are present in CKD patients.¹¹

Pallor

Pallor is one of the diagnostic sign of CKD.¹² Pallor was seen in 57.5% patients on haemodialysis. These results are comparable to the studies by Udaykumar et al who observed pallor in 60% patients and Dyachenko et al in 75.7% patients on haemodialysis.^{4,13} Pallor increased with the severity of CKD; being 5%, 21.25% and 31.25%, and in mild, moderate and severe CKD respectively. It is due to decreased erythropoietin by the diseased kidney, reduced red cell life span or blood loss during dialysis.¹⁴

Pigmentary changes

Pigmentary changes were seen in 13.75% patients. Pigmentary changes are due to accumulation of beta MSH (melanin stimulating hormone) in the tissues because of poor renal excretion in uremic patients. Pico et al reported diffuse pigmentation in 70% patients.⁸ Dyachenko et al in 75.7% patients, Udaykumar et al in 43% and Hajheydari et al in 66.3% patients.^{4,6,13}

Acquired perforating dermatosis

Acquired perforating dermatosis was found in 2.5% of patients on haemodialysis. Udaykumar et al reported Kyrles disease in 21% patients, Hood et al found in 4.5% patients, while Mortan et al reported 10% incidence of

acquired perforating dermatosis in patients on dialysis.^{4,15,16} In present study these were found only in the patients having severe CKD and in those patients who had undergone more than 100 dialysis.

Cutaneous infections

Cutaneous infections were seen in 33.7% patients, with dermatophytic infection in 16.25% patients, viral in 11.25% patients and bacterial infections in 6.25% patients. Udaykumar et al, has reported 55% incidence of cutaneous infections, with fungal 30%, bacterial 13% and viral infection 12% in CKD patients on haemodialysis.⁴ Increased susceptibility to infection could be due to known diminished T and B lymphocyte function and count and reduced natural killer cell activity in CKD patients.

Purpura

Chargin and Keil have reported the occurrence of purpura as one of the most frequent cutaneous complication of CKD, occurring in 40% of their patients.¹⁷ In present study purpura was seen in 8.75% patients.

AV shunt dermatitis

AV shunt dermatitis is an iatrogenic skin manifestation seen at the site of AV fistula which is created for haemodialysis. AV shunt dermatitis was seen in 16.2% patients in present study. Udaykumar et al reported arteriovenous shunt dermatitis in 8% patients.⁴

Nail changes

Nail changes were seen in 30% patients. The most common was leukonychia in 10% patients, followed by dystrophic nails in 7.5% patients, onychomycosis in 6.25% patients, subungual hyperkeratosis in 5% patients, half and half nail in 1.25% patients. Dayancheo et al reported half and half nail in 18.6% patients.¹³ Attemeyer et al has reported nail disorders in 71.4% uremic

patients.¹⁸ Udaykumar et al reported half and half nail in 21% patients, onychomycosis in 19% patients and subungual hyperkeratosis in 12% patients.⁴

Oral changes

In present study, oral changes were seen in 20% patients. The most common was candidiasis in 10%, followed by angular cheilitis in 3.75% patients, gingivitis in 2.75% patients, fissured tongue in 2.75% patients and lichen planus in 1.25% patients. As compared to other studies done on haemodialysis patients; Hajheydari et al has reported 23.8% incidence of mucosal changes; angular cheilitis seen in 1% patients and fissured tongue in 8% patients.⁶ Udaykumar et al has reported angular cheilitis in 12% patients.⁴

Hair changes

Hair changes were seen in 21.2% patients. Diffuse alopecia was seen in 16.25% patients, followed by brittle and lustreless hair 3.75%. The sparse body hair, which was most evident on the extremities, was seen in 1.25% patients. Hair changes were not correlated with the severity of CKD and number of sittings of dialysis. In previous studies done on haemodialysis; Udaykumar et al reported sparse body hair in 30% patients, sparse scalp hairs in 11% patients, brittle and lustreless hair in 16% patients.⁴ Hajheydari et al has reported most common complaint was diffuse hair loss that was seen in 10% patients.⁶

Miscellaneous changes

Digit gigantism were seen in two patients, which was a unique finding in present study. This was due to soft tissue hypertrophy secondary to AV fistula created at wrist for haemodialysis.

None of our patient had rare findings like uremic frost, calcinosis cutis, calciphylacix, bullous dermatosis, nephrogenic fibrosing dermopathy and gynaecomastia.

Table 7: Comparison of cutaneous findings between present study with the other published studies on hemodialysis.

Cutaneous manifestations	Present study	Udaykumar et al ⁴	Hajheydari et al ⁶
Pruritus	51.25%	53%	39%
Xerosis	66.2%	79%	23%
Pallor	57.5%	60%	-
Diffuse hyperpigmentation	13.75%	43%	66%
Acquired perforating dermatosis	2.5%	21%	-
Infections	33.7%	55%	-
Hair changes	21.2%	57%	38%
Nail changes	30%	59%	44%
Oral mucosal changes	20%	41%	24%

CONCLUSION

At least one cutaneous manifestation was found in all CKD patients. The most prevalent finding was xerosis followed by pallor, pruritus and pigmentary changes. With the advent of haemodialysis, the life expectancy of patients had increased giving time for more and newer cutaneous changes to manifest. Some prophylactic and remedial measures can prevent or decrease some of the adverse changes. These include emollients for xerosis; application of sunscreens and sun avoidance for pigmentary changes. Oral hygiene to prevent mucosal lesions; nutritional supplementation to prevent angular cheilitis and hair loss; and prompt recognition and treatment of fungal infections like onychomycosis and tinea pedis, which are increased in CRF.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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