

A CLINICAL STUDY OF CUTANEOUS MANIFESTATIONS OF CHRONIC RENAL FAILURE PATIENTS ON HAEMODIALYSIS

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ABSTRACT: AIM OF THE STUDY: To study the different clinical patterns of cutaneous lesions in chronic renal failure patients undergoing haemodialysis. To study the distribution of lesions seen more often in both the skin and nails. To study the epidemiology of patients with cutaneous manifestations with CRF on haemodialysis in relation to age, sex and predisposing factors. **PATIENTS AND METHODS:** The study was conducted at Kempegowda Institute Of Medical Sciences, Bangalore between November 2009 and April 2011 for a period of 18 months. This prospective and Descriptive study included 100 patients with CRF who were undergoing dialysis. Of the 100 patients, 61 were Males and 39 were Females and the age ranged from 16 years to 70 years, with the majority of them in the age group of 41 to 60 years. The predominant cause of CRF was Diabetic Nephropathy (50%) followed by Chronic Glomerulonephritis (24%) and Chronic Interstitial Nephritis (19%). **RESULTS:** The predominant cutaneous manifestations included Xerosis (50%), Pruritis (38%), Cutaneous Pigmentation (36%), Nail Changes (42%), and Mucosal Changes (20%) Pallor (23%), Cutaneous Infections (27%) and Perforating Dermatoses (6%). The most common Nail Change was Leukonychia, observed in 22 patients and the most common cutaneous infection was fungal infection observed in 16 patients. The Nail Changes documented in the study included Leukonychia (22%), Dystrophic Nails (6%), Onychomycosis (8%), Half & Half Nails (5%), Clubbing (2%), Paronychia (2%), Beau's Lines (1%) and Mee's Lines (1%). The cutaneous findings specific to CRF including Perforating Dermatoses (6%), Calcinosis Cutis (2%), Beau's Lines (1%), Mee's Lines (4%) and Gynecomastia (1%) were also documented in the study. The incidence of Pruritus, Xerosis and Diffuse Hyperpigmentation increased as the severity of CRF increased. The incidence of xerosis, diffuse hyperpigmentation and nail Changes was significantly more in patients undergoing more than 100 dialysis. **CONCLUSION:** The incidence of pruritus decreased significantly as the total number of dialysis is increased to more than 100, as compared to those with less than 50 dialysis. The incidence of pruritus, xerosis and diffuse hyperpigmentation increased as the severity of CRF increased.

INTRODUCTION: Cutaneous disorders are common manifestation of patients with Chronic Renal Failure (CRF) or End-Stage Renal Disease (ESRD). Nunley¹ reported that 50–100% of patients have at least one dermatological disorder. Pico et al² assessed the prevalence of dermatologic problems among one-hundred and two patients with chronic renal failure undergoing dialysis. All patients examined had at least one cutaneous lesion with the most prevalent disorder being hyperpigmentation.

It has been proposed that many of the cutaneous disorders experienced by patients undergoing dialysis have little to do with the uremic syndrome and are related to the underlying pathologic process that induced the renal disease.¹ On the contrary, others proposed that changes in

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skin histology were more related to the severity and duration of the renal failure and less with its underlying etiology.^{3,4} The present study is focussed on the cutaneous manifestations of renal failure patients on haemodialysis.

MATERIALS & METHODS: The study was conducted prospectively between November 2009 to April 2011 on 100 patients diagnosed to have chronic renal failure who were undergoing haemodialysis. The patients in this study included both admitted patients and those attending nephrology OPD at Kempegowda Institute of Medical Sciences, Bangalore.

After obtaining clearance and approval from the institutional ethical committee, 100 cases were included for the study.

Informed written consent was obtained and the clinical data was recorded as per the proforma. Detailed history taking and complete clinical examination was done. Clinical photographs were taken at the same sitting. Relevant blood investigations were done for all patients including, Haemoglobin percentage, total WBC count, differential count, Blood urea, serum creatinine, serum electrolytes, Serum calcium and phosphorus, HIV 1&2.

Special investigations including tzanck smear, wet mount preparations from the scraping and microscopy, nail clippings and skin scrapings for fungal culture, skin biopsy for histopathology, pus swab for culture and sensitivity whenever required.

All patients were examined and relevant data collected at one sitting only.

Inclusion criteria: All cases of chronic renal failure diagnosed by the nephrologist depending on the clinical and biochemical parameters who were on haemodialysis were included in the study.

Exclusion criteria: Patients with acute renal failure, patients with chronic renal failure undergoing peritoneal dialysis and patients with chronic renal failure who had undergone renal transplantation.

Severity of CRF was graded based on serum creatinine values:

Mild CRF - serum creatinine 1.6 to 3.9 mg/dl

Moderate CRF - serum creatinine 4.0 to 6.9 mg/dl

Severe CRF- serum creatinine >7mg/dl

RESULTS: Out of 100 cases studied, 61 were males and 39 were females. The age group of patients studied ranged from 16 years to 70 years. Maximum number of patients in the study belonged to age group of 41- 60 years and the least number of patients (4) belonged to age group of less than 20 years.

The cause of CRF was diabetic nephropathy in 50, chronic glomerulonephritis in 24, chronic interstitial nephritis in 19, pyelonephritis and renovascular disease in 1 each and Ig A nephropathy in 3 and polycystic kidney disease in 2 patients. The duration of the disease ranged from 2 weeks to 23 years.

The duration since the patient was undergoing haemodialysis ranged from 15 days to 10 years with majority of patients (66) undergoing dialysis for less than 6 months, 23 patients between 6 months and 1 year, 12 patients between 1 and 2 years, 5 patients between 2 and 3 years and 10 patients for more than 3 years. Out of the 100 patients studied, 49 underwent dialysis for less than

50 sittings, 32 underwent dialysis for more than 100 sittings, and remaining 19 had 51-100 sittings of dialysis.

Majority of the patients (47) in our study had severe CRF with serum creatinine values more than 7mg/dl at the time of examination. 42 patients had moderate CRF (serum creatinine 4 to 6.9mg/dl) and 11 patients had mild CRF (serum creatinine 1.6 to 3.9mg/dl).

Cutaneous manifestations: Out of the 100 patients with CRF on haemodialysis, 99 had at least one cutaneous finding and 1 patient had none.

The most common cutaneous manifestations in our study were xerosis (50) and least common finding was bullous dermatoses (none). Other cutaneous manifestations included pruritus (38), cutaneous pigmentation (36), nail changes (42), mucosal changes (20), pallor (23), cutaneous infections (27), perforating dermatoses (04), hair abnormalities (04) and calcinosis cutis (2).

Xerosis was the most common cutaneous finding in our study, observed in 50 patients. 38 patients had generalised xerosis. It was confined to upper limb in 6, lower limb in 4 and face in 2 patients. Pruritus was documented in 38 patients, generalised in 30 and localised in 8 patients. Diffuse hyperpigmentation was observed in 36 patients in our study. Calcinosis cutis was observed in 2 patients.

Nail changes observed in this study included leukonychia, onychomycosis, dystrophic nails, half & half nails & melanonychia, Paronychia, clubbing, mee's lines and beau's lines.

Other associated cutaneous findings included linear melanocytic nevi, acrochordon, dermatosis papulosa nigra, pyogenic granuloma, lichen simplex chronicus, milia, comedones, decubitus ulcer, vitiligo, fixed drug eruption, arteriovenous fistula dermatitis, keloid, purpura, gynecomastia, periorbital edema, leg ulcer and idiopathic guttate hypomelanosis.

Cutaneous manifestations in relation to severity of CRF were as follows:

Eleven patients had mild CRF. Cutaneous manifestations in this group included pruritus in 3, xerosis in 3, pallor in 3, and cutaneous infections in 7, nail changes in 1 and diffuse hyperpigmentation in 1 patient.

Forty two patients had moderate CRF in the study. Cutaneous manifestations in this group included pruritus in 14, xerosis in 22, pallor in 6, cutaneous infections in 12, nail changes in 15, perforating dermatoses in 3, diffuse hyperpigmentation in 13, mucosal changes in 11 and hair abnormalities in 2 patients.

Forty seven patients had moderate CRF in the study. Cutaneous manifestations in this group included pruritus in 21, xerosis in 25, pallor in 14, cutaneous infections in 8, nail changes in 29, perforating dermatoses in 3, diffuse hyperpigmentation in 22, mucosal changes in 9 and hair abnormalities in 4 patients.

Cutaneous manifestations associated with number of dialysis:

Forty nine patients underwent less than 50 sittings of dialysis. Cutaneous manifestations in this group included pruritus in 29, xerosis in 17, pallor in 10, cutaneous infections in 16, nail changes in 14, perforating dermatoses in 1, diffuse hyperpigmentation in 10, mucosal changes in 7 and hair abnormalities in 3 patients.

Nineteen patients underwent 50 to 100 sittings of dialysis. Cutaneous manifestations in this group of patients included pruritus in 5, xerosis in 12, pallor in 5, cutaneous infections in 7, nail changes in 8, perforating dermatoses in 1, diffuse hyperpigmentation in 4, mucosal changes in 7 and hair abnormalities in 1 patient.

Thirty two patients underwent more than 100 sittings of dialysis. Cutaneous manifestations in this group included pruritus in 4, xerosis in 21, pallor in 8, cutaneous infections in 4, nail changes in 23, perforating dermatoses in 4, diffuse hyperpigmentation in 22, mucosal changes in 6 and hair abnormalities in 2 patients.

DISCUSSION: Cutaneous manifestations in patients with chronic renal failure on haemodialysis was found to be present in 99% of patients in the present study. This is comparable to other studies including the study conducted by Udaykumar et al⁵ and Pico et al² who had documented cutaneous disorders in all the patients (100%) in the study. Hajheydari et al⁶ had 94.1% patients suffering from cutaneous manifestations due to CRF.

Pruritus was documented in 38% of patients in the present study. The prevalence of pruritus in patients with respect of total number of dialysis varied. It was 59.1%, 26.5% and 12.5% in patients who underwent <50, 50-100 and >100 dialysis respectively. Pico et al² has recorded pruritus in 42%, Gilchrist⁷ has reported a prevalence of 19.90% and Hajheydan et al⁶ found 38.6% to have pruritus. The incidence of pruritus decreased significantly as the duration of dialysis increased probably due to clearance of pruritogenic substances by haemodialysis.

Xerosis was the most common finding in the present study documented in 50% of patients. The incidence increased as the duration of CRF and total number of dialysis increased. It was 34.6%, 63.1% and 65.6% in patients who underwent <50, 50-100 and >100 dialysis respectively. Tawade et al⁸ reported an incidence of 46% xerosis. Hajheydari et al⁶ had reported in 22.8% patients to have xerosis in their study. Xerosis was more frequent in severe and moderate CRF with an incidence of 53.1% and 52.3% respectively, as compared to mild CRF 27.2%. This could be due to severe impairment of sweat gland function, which may have a linear relationship with severity of CRF.

Diffuse hyperpigmentation was noted in 36% of patients in the present study. It increased with the severity of CRF, 9.1%, 30.9% and 46.8% in mild, moderate and severe CRF respectively. This could be due to increased activity of beta-MSH (Melanocyte Stimulating Hormone). The incidence of diffuse hyperpigmentation is significantly more in patients who underwent >100 dialysis (68.7%) when compared to those who underwent <100 dialysis (21%), probably due to more prolonged duration of CRF in the former group of patients. Pico et al² has reported diffuse pigmentation 70%, Udaykumar et al⁵ in 43%, Dyachenko et al⁹ in 75.7%, Hajheydari et al⁶ in 66.3% and 36% in the present study.

Acquired Perforating Dermatitis was found in 6% of patients in the present study. Hood et al¹⁰ has reported 4.5% and Mortan et al¹¹ has reported 10% incidence of Acquired Perforating Dermatoses in CRF patients who underwent dialysis. Patients with less than 50 sittings of dialysis had 2% incidence of Acquired Perforating Dermatoses, whereas it was 12.5% (significantly more) in the patient group who underwent more than 100 dialysis. This can be explained probably by prolonged duration of CRF in the latter group of patients.

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The incidence of nail changes in the present study was 48%. The most common nail change was Leukonychia (23%), followed by Onychomycosis (8%). Half & Half nails characteristic of CRF patients on haemodialysis was found in 5% of patients only. Attmeyer et al¹² has reported nail disorders in 71.4% uremic patients. The reported incidence of nail disorders in published literature ranges from 52% to 71% and comparable to the present study. Dyanchenko et al¹⁶³ has reported half & half nails in 18.6% patients.

Pallor was reported in 23% of patients in the present study, distributed almost equally in all groups of patients irrespective of the severity of CRF and number of dialysis. Dyachenko et al⁹ has reported pallor in 75.7% and Udaykumar et al⁵ has found 60% incidence of pallor which is significantly higher compared to present study. The cause of anemia may be decreased erythropoietin production by the diseased kidney or malnutrition or anemia of chronic disease.

Mucosal changes was found to present in 20% of patients in the present study. Hajheydari et al⁶ has reported 23.8% incidence of mucosal changes which is similar to the present study.

Cutaneous infections occurred in 27% of patients in the present study, with 16% fungal, 6% bacterial and 5% viral infections. Udaykumar et al⁵ has reported 55% incidence of cutaneous infections, with 30% fungal, 13% bacterial and 12% viral infections.

Miscellaneous cutaneous findings found in 25% of patients included two each of Decubitus Ulcer, Keloid, Dermatoses Papulosa Nigra and Melanocytic Nevus. Three patients had Acrocordon and one each had Lichen Simplex Chronicus, Milia, Acne, Pyogenic Granuloma, Keratolysis Exfoliativa, Vitiligo, Arteriovenous (AV) Fistula Dermatitis, Fixed Drug Eruption, Gynecomastia, Non Palpable Purpura, Periorbital Oedema And Traumatic Leucoderma. A.V fistula dermatitis was an iatrogenic skin manifestation found at the site of A.V fistula which was created for haemodialysis.

Gynecomastia, a rare finding in CRF was found in one patient in our study. None of our patients had other rare manifestations of CRF like Uremic Frost, Bullous Dermatoses and Nephrogenic Systemic Fibrosis.

The cutaneous manifestations in relation to predisposing factors for CRF were similar. The frequency of xerosis, pruritus, diffuse hyperpigmentation and nail changes were comparable in all groups of patients with different predisposing causes, including diabetic nephropathy, chronic glomerulonephritis and chronic interstitial nephritis.

The incidence of various cutaneous findings is widely variable from one study to another. The incidence of xerosis ranged from 23% to 79% and it was 50% in the present study. The incidence of pruritus ranged from 32% to 53% and it is 38% in the present study. The incidence of diffuse hyperpigmentation varied from 22% to 66% and it was 36% in the present study. The incidence of nail changes and mucosal changes in the present study are comparable to other studies, whereas incidence of pallor and infection is less in the present study when compared to others.

CONCLUSION: In patients with CRF on haemodialysis; xerosis, nail changes, pruritus and diffuse hyperpigmentation were the predominant cutaneous manifestations. The distribution of cutaneous manifestations in relation to age groups, sex and predisposing factors were comparable. The incidence of nail changes, xerosis and diffuse hyperpigmentation increased as

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the duration of CRF and the total number of dialysis increases. The incidence of pruritus decreased significantly as the total number of dialysis is increased to more than 100, as compared to those with less than 50 dialysis. The incidence of pruritus, xerosis and diffuse hyperpigmentation increased as the severity of CRF increased.

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Diffuse hyperpigmentation over the face.



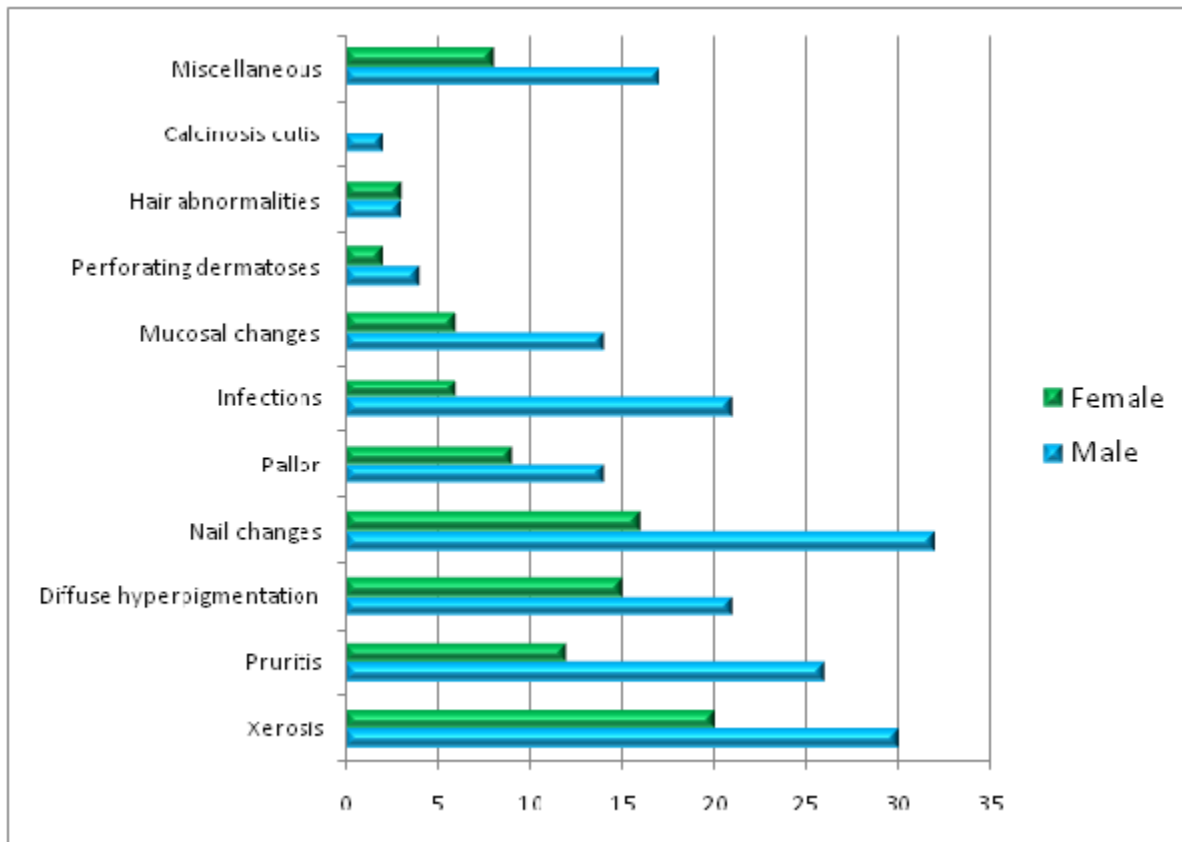
Half and half nails



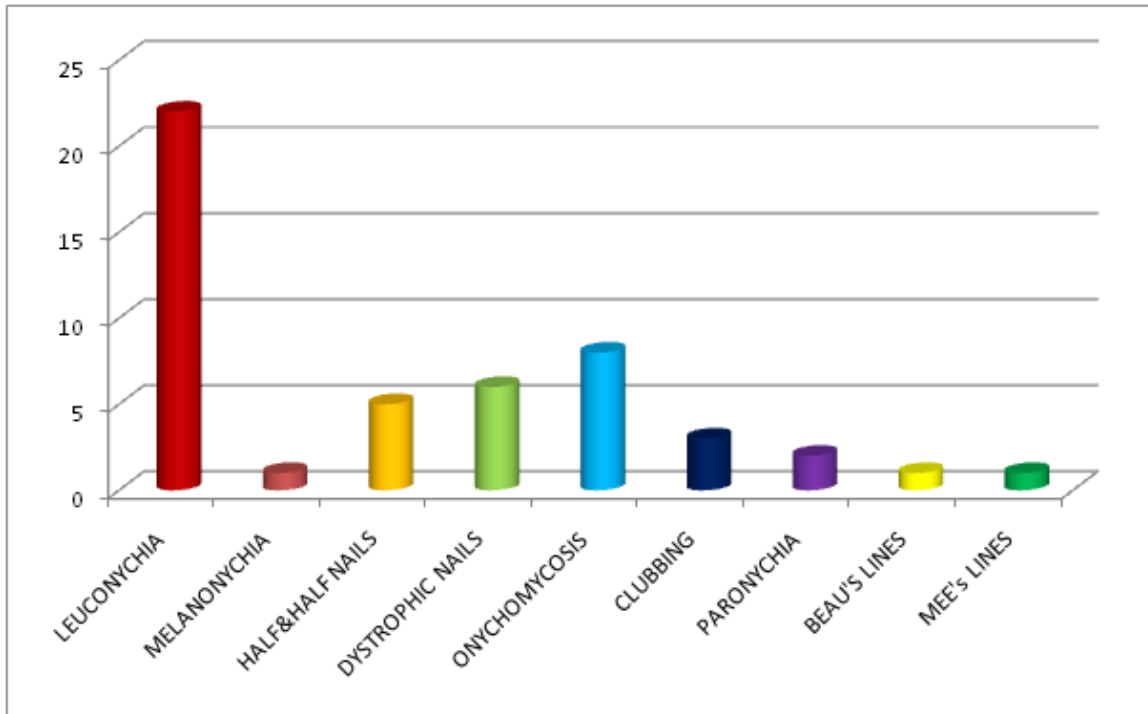
Oral candidiasis



Calcinosis cutis



Distribution of cutaneous manifestations in relation to sex of the patient



Types of nail changes documented in the study

Types of mucosal changes observed in the study

Mucosal changes	No. of patients (20)
Geographic tongue	01
Black hairy tongue	01
Candidiasis	04
Scrotal tongue	05
Lichen planus	01
Bald tongue	04
Fissured tongue	02
Tooth decay	02

Types of cutaneous infections in CRF patients on hemodialysis

Infections	No. Of patients (27)
Dermatophytosis	13
Folliculitis	03
Furuncle	02
Herpes labialis	02
Herpes zoster	01
Intertrigo	03
Verruca vulgaris	02
Leg ulcer	01

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