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Cutaneous manifestations in patients with chronic renal failure on hemodialysis

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ABSTRACT

Background: Chronic renal failure (CRF) associated with many cutaneous manifestations starts from xerosis, dark pigmentation, to life threatening severe uncontrolled itching. Cutaneous problems with CRF having different and newer manifestations after hemodialysis interventions.
Aim: To assess the prevalence of cutaneous manifestations including hair and nails in chronic renal failure (CRF) patients on hemodialysis .
Materials and Methods: One hundred patients of CRF undertaking hemodialysis were examined for various cutaneous presentations.
Results: cutaneous manifestations seen in eighty six patients. The commonest finding was xerosis (81%),had wide range of clinical presentation with pruritus (56%) produced distress symptoms skin color changes presented commonly as pallor (65%), and cutaneous hyperpigmentation (53%) manifesting physical and psycological disturbance s respectively. Othera skin problem found peculiar to chronic renal failure are acquired perforating dermatoses of kyrles diease (20%); prevalence of cutaneous infections especially dermatophytosis and other superficial fungal infections (28%), pyoderma(10%) and viral (13%) infections; other important cutaneous manifestation are purpura (10%); and eczema(2%). The nail changes sharing significant presentations in majority of renal failure patients which included half and half nail (20%),as important clinical marker followed by koilonychia (16%), onychomycosis (16%), onycholysis (11%), Mees' lines (7) Hair changes also contributing significant clinical finding as sparse body hair (27. Wide array of oral mucosal changes presented mainly as macroglossia (36%), xerostomia (28%), ulcerative stomatitis (27%), and uremic odour(7%).
Conclusions: CRF had a significant cutaneous changes mainly as xerosis, pruritus acquired perforating dermatoses, uraemic odour and hyperpigmentation. These changes served as clinical clue in diagnosis and therapeutic management. These changes were attributed by disease (CRF) as well as hemodialysis. Management aimed as alleviation of sufferings and improve life quality.

1. Introduction

Recognition of earlier cutaneous changes of CRF improves the life quality hemodialysis significantly reduce the symptoms mainly xerosis and pruritus. Thus reducuing stress. In a study by Pico et al., 82% patients with CRF had cutaneous manifestations,[1] while Bencini et al. contributed only in 79% of patients.[2] Our study was aimed to find the occurenceof new and existing skin manifestations in CRF patients undertaking hemodialysis.

2. Materials and Methods

One hundred successive patients of CRF undergoing hemodialysis were examined for cutaneous manifestations in a tertiary care hospital. CRF Patients undergoing

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Peritoneal dialysis were not included. The patients data collected routinely as demography with special attention to cutaneous manifestations as well as hair and nail. A detailed history of CRF duration and its impact with hemodialysis was noted to assess significant improvement of cutaneous changes and life quality. Informed consent obtained for Specific investigations done according to requirement incuded Skin biopsy, Dermascopy, and relevant investigations where indicated. The important clinical marker xerosis and its severity was assessed by Morton modified version Grading: grade 0 (smooth skin), grade 1 (rough skin) and grade 2 (rough skin with scaling).

Statistical analysis was done using Chi-square test. The odds ratio of onychomycosis, macroglossia and acquired perforating disorder (APD) in diabetes mellitus were estimated using logistic regression analysis with SPSS Software.

3. Results

One hundred CRF patients (65 males and 35 females) were examined. Predominant age group were lies between 41 and 55 years; the youngest one was aged 12 years and the oldest, 79 years. The onset and duration of CRF had wide range from to 2 years to 9 years. Etiology of CRF was shown in Table 1. significant anaemia of chronic kidney disease were noted. Twelve patients had a anaemia with hemoglobin level of less than 4.9 g%, 54 had 5.2-7.5 g%. Hepatitis-B and Hepatitis C infections were seen in Eight and one patient respectively. In our study majority of patients around 86% showed cutaneous manifetations. CRF and skin manifestations are elaborately mentioned with specific causes are shown in Table 2.

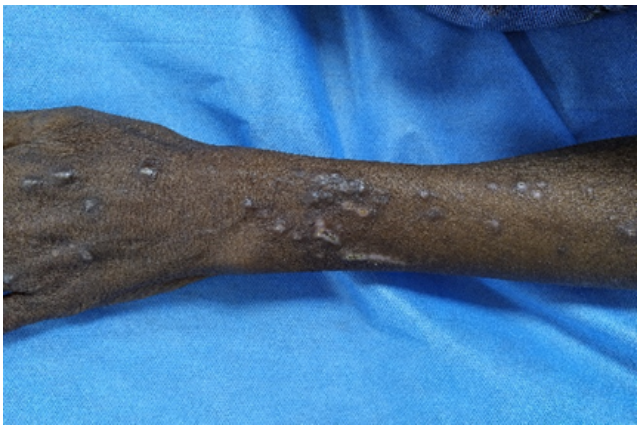

Fig. 1: Perforating dermatoses

ADPKD, Autosomal dominant polycystic kidney disease; CGN, Chronic glomerulonephritis; CIN, Chronic interstitial nephritis; SLE, Systemic lupus erythematosus

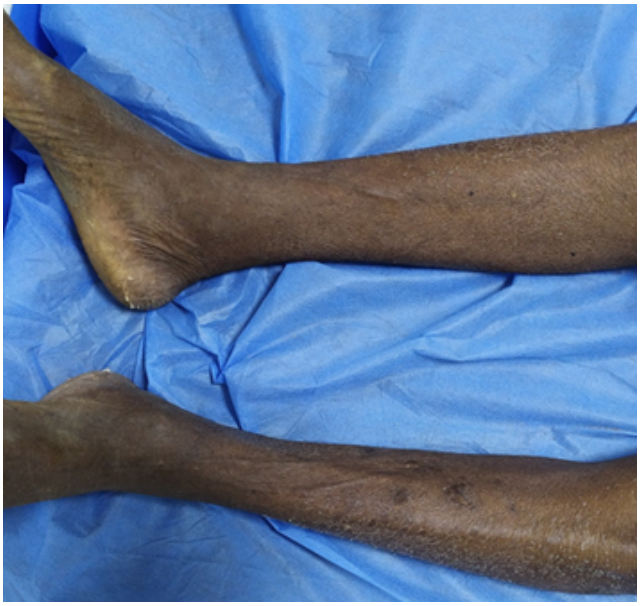

Fig. 2: Xerosis

4. Discussion

4.1. Xerosis

Xerosis [Figure 1]. was the commonest cutaneous abnormality (86%), as noticed in previous reports (46-90%).[3–5] This was classified as mild (59%) moderate (20%)and severe (7%), while four and three patients had congenital icthyosis and atopic dermatitis from childhood. Lichen spinulosus like lesion were seen in (25)patients. Xerosis was noticed mainly over the extremities and back. Trunk showed rough scaling. Patient on hemodalysis shown improvement in 6 whereas 60 has no improvement. Diabetic induced CRF shown mild to severe xerosis. Severe xerosis is a clinical marker of diabetes with CRF. Xerosis is one of the known Diabetic complication.[5]

4.2. Pruritus

Pruritus is one of the most important and distressing cutaneous symptoms of CRF.[1,6,7] It is the commonest symptom in CRF. but It is mild or asymptomatic in acute renal failure generally it is reduced after renal transplantation.[7] Its prevalence among hemodialysis patients having wide ranges from 19-90%[1] In our study, 60% of patients are having pruritus. There are 50% (30)patients having no improvement with hemodialysis where as 13 % (8) showed marked improvement Around 11% (7) patients had uncontrolled pruritus and frequent exacerbation. In Diabetics, pruritus was found mild to severe[3] There is multifactorial cause for CRF. However, oliguria (urine output of <400 ml) served as important predisposing factor;[1,2] apart from that secondary hyperparathyroidism; hypermagnesemia, hypercalcemia, hyperphosphataemia,

Table 1: Etiology of CRF

Cause	Male	Female	Total
ADPKD	3	0	3
CGN	7	5	12
CIN	12	13	25
Diabetes	28	10	38
Hypertension	12	4	16
Obstruction	2	1	3
Pyelonephritis	2	1	3
SLE	0	3	2

HTN, Hypertension; DM, Diabetes mellitus; CIN, Chronic interstitial nephritis; CGN, Chronic glomerulonephritis

Table 2: Skin manifestations with causes of CRF

Cutaneous Manifestations	DM	CIN	CGN	HTN	Others	Total
Xerosis-mild	25	10	6	10	8	59
Xerosis-moderate	15	1	1	2	1	20
Xerosis- severe	5	-	-	1	1	7
Pruritus-mild	19	12	6	4	4	53
Pruritus-severe	6	1	-	-	-	7
Bacterial infection	8	1	2	1	3	15
Fungal infection	14	6	7	3	2	32
Viral infection	6	1	1	1	1	10
Purpura	4	2	1	1	0	8
Kyrle's disease	13	7	0	0	1	21
Pallor	22	18	6	8	11	65
HyperPigmentation	16	17	4	5	6	48
Yellowish skin	8	1	2	1	1	13

HTN, Hypertension; DM, Diabetes mellitus; CIN, Chronic interstitial nephritis; CGN, Chronic glomerulonephritis

Table 3: Statistical analysis

Onychomycosis (%)						Macroglossia (MG) (%)				Acquired perforating disorder (APD)			
Diabetic	Total	Onychomycosis	Odds ratio	95% CI	p value	MG	Odds ratio	95% CI	p value	APD (%)	Odds ratio	95% CI	p value
No	58	12.9	1	-	0.049	10.7	1	-	0.029	8.1	1	-	0.002
Yes	42	27.9	2.832	1.11-9.82	-	28.1	2.90	1.10-8.70	-	32.6	4.52	1.78-17.01	-

Table 4: Nail changes with causes of CRF

	DM	CIN	CGN	HTN	Others	Total
Koilonychia	8	5	1	0	5	19
Mees' line	4	1	0	1	1	7
Half and half nail	15	5	0	1	3	24
Subungual hyperkeratosis	11	4	0	2	2	19
Onychomycosis	13	2	2	1	1	19
Onycholysis	8	2	1	2	1	14

HTN, Hypertension; DM, Diabetes mellitus; CIN, Chronic interstitial nephritis; CGN, Chronic glomerulonephritis

Table 5: Oral changes with causes of CRF

	DM	CIN	CGN	HTN	Others	Total
Angular cheilitis	8	1	1	1	4	15
Xerostomia	18	6	1	1	7	33
Ulcerative stomatitis	14	5	2	3	1	25
Macroglossia	13	10	3	2	5	33
Uremic breath	6	1	1	0	2	10

HTN, Hypertension; DM, Diabetes mellitus; CIN, Chronic interstitial nephritis; CGN, Chronic glomerulonephritis

hypervitaminoses A[8] and iron deficiency anemia.[3] pruritogenic substance deposition likely cause for pruritus in CRF.[9] Dialyser membrane and its parts stimulating hypersensitivity reactions further contributing high serum histamine levels In CRF there is reduced renal excretion of histamine leads to worsening of pruritus. The effective treatment for renal pruritus is NBUVB Therapy .[8] It acts by reducing histaminergic factors in the CRF patient serum[10] and decreasing vitamin A levels in the epidermis. Other options to control renal pruritus are Oral cholestyramine and oral ondansetron, Erythropoietin Injections, Topical capsaicin cream[8] Recent evidence suggests oral Gabapentin giving better improvement in pruritus.[11]

4.3. Pigmentary changes

Two types of pigmentary changes were noted and they are Hyperpigmentation (seen in 48% of patients) and a yellowish tinge to the skin (15%). It was noticed Sun-exposed areas had higher prdilection for hyperpigmentation was seen in 28%. In our study whers as others reported with a range of 20-22%.[1,3] Hyperpigmentation mainly attributed by increasing levels of Beta-melanocyte-stimulating hormone (β-MSH).[12] A yellowish tinge to the skin was seen in 13% of our patients while others reported in 40%[1] darker complexion skin contributing reduction in prevalence of yellowish tinge to skin. It is because of carotenoids, lipochromes and urochromes deposition in the dermis[13,14]

4.4. Pallor

Pallor of the skin is important clinical marker of chronic renal failure, was noted in 65% of patients, due to Fitzpatrick type IV to V skin. The hemoglobin level was less than 8 g% in 64% of the patients. It gives a clue and adds significant mortality in CRF patients.[9]

4.5. Acquired perforating disorders (APD)

Perforating disorders is the trans-epidermal elimination of altered dermal substances.[15] They are Reactive perforating collagenosis, perforating folliculitis and Kyrle's disease [Figure 2]. Observed in CRF.[16] Hyperpigmented and hyperkeratotic follicular papules present in CRF patients.[16] labelled as APD. It has been observed that patients on hemodialysis shown 4.5-17%[1,4,16] by other studies. In our study Kyrle's disease seen in 21 patients (21%); and also noticed 16 patients had hemodialysis of lesser duration(<6 months). In Diabetics, APD observed commonly (P=0.002, [Table 3]). Xerosis, pruritus, excoriation, trauma predisposing APD in CRFpatients.[13] The pathognomonic sign of the Keratotic pits over palms and soles had observed in hemodialysis patients.

4.6. Purpura

Purpura observed in 9 (8%) patients. wheres as singh et al reported 20%.[17] Increased vascular fragility, capillary leak, anticoagulants usage for dialysis contributing purpura in CRF patients.[18]

4.7. Nail changes [Table 4]

Nail changes observed are half and half nails(24%), koilonychia (18%), subungual hyperkeratosis (14%), onycholysis (10%), Mees' lines (7%), and splinter hemorrhages (5%). Half and Half nails are non blanchable red, pink in their distal half and white in the proximal half.[19] This changes were more prevalent in diabetic patients (p = 0.029; [Table 4]). Other studies observed with a prevalence of 16-50.6%.[1,4]

4.8. Hair abnormalities

Telogen effluvium, dry lustreless hair in scalp and body parts were noted.[3] In our study, sparse body hair 40 patients, diffuse alopecia 11 and dry, lusterless hair 18 patients were observed. Less sebum, anaemia were contributing for dry lustreless hairs.[20] Kint et al, published a sudden acute diffuse alopecia after dialysis was reported in 5 patients.[21]

4.9. Oral mucosal changes [Table 5]

Oral mucosal changes observed in 90% patients with CRF.[22] macroglossia was seen in 33% patients whereas Mathewet al reported in 92% of CRF patients.[23] Xerostomia observed in 33 patients (33. Ulcerative stomatitis, seen in 25 patients, developed mainly when blood urea level >150mg%.[22] It was mainly due to mouth breathing andoliguria and dehydration. Angular cheilitis was noted in 15 patients. Ten patients had uremic fetor it is an ammoniacal odor caused by a salivary high urea concentration . taste alteration observed due to fungal infections and high urea concentration in CRF patients.[22,24]

4.10. Cutaneous infection

Cutaneous infections are common in CRF Patients. In our study superficial fungal infections more common than other infections. Bencini et al. have reported the occurrence of superficial fungal infection in CRF patients 67%.[2] In our study, Fifty-seven skin infections (32 fungal,15 bacterial and 10 viral), were noticed in 30 patients. The superficial fungal infections of 32 nos were distributed in 30 patients (30%). It was observed that onychomycosis (19%) commonest presentation in CRF with Diabetic19%), which was significant association (p = 0.039; [Table 3]) in the diabetic group. In Dermatophytoses, Tinea pedis was the most common presentation[1] In our study tinea corporis was more common. In CRF patients prevalence of superficial fungal infections attributed by impaired cell

mediated immunity.[1] Pityriasis versicolor observed in 10 patients (10%). Bacterial infections, seen in 13 patients, and were common in diabetics. The viral infections noticed were verucca vulgaris (6%), herpes labialis (2%) and herpes zoster (2%).

Hard nodules of skin in CRF patients manifested as part of Metastatic calcification due to secondary or tertiary hyperparathyroidism.[19] Increased parathormone PTH stimulates of calcium pyrophosphate deposition in the dermis, adipose tisssue or capillaries and arterioles.[13] livedo reticularis also observed in one patient due to calcification of vessel walls and its sequale calciphylaxis susceptibility of precancerous and cancerous skin problems were increased in CRF patients due to immunosuppression, sun exposure and xerosis. Bencini et al observed the prevalence of 4.5%.[2,3] Basal cell carcinoma is the commonest form of malignant skin cancer seen in CRF patients .Actinic keratoses a precancerous skin lesion seen more commonly in sun-exposed areas less frequently progressed to squamous cell carcinoma in skin and may progress to squamous cell carcinoma.

Nephrogenic fibrosing dermopathy (NFD), rare cutaneous progressive thickening and induration of skin resembles scleromyxedema in clinical and histopathologically.[13] There is no effective treatment for NFD. But this patients mainly managed with frequent hemodialysis along with regular dialysis. It is presented as pruritic dermal plaques usually over extremities with sparing of Head and Neck area. The histopathology of NFD are fibroblasts proliferation in the dermis and subcutaneous tissue with increased dermal and septal collagen and mucin.[13]

4.11. Miscellaneous conditions

Other cutaneous finding were observed) acrochordons (22), prurigo nodularis (18), icthyosis, idiopathic guttate hypomelanosis (10), scabies (5) vitiligo(3), plantar keratoderma (3), chronic eczema of leg (2), seborrheic dermatitis of the scalp (2). The causal association with renal failure cannot be established in all miscellaneous conditions.

5. Conclusion

In our study all participants on haemodialysis showed atleast one cutaneous and mucosal manifestation and they are prominent in chronic kidney disease grade V. With the advent of Hemodialysis, the life quality of CRF patients much improved. Prophylactic preventive measures can reduce adverse effects of cutaneous symptoms. These include moisturisers for xerosis; antihistaminics, NBUVB Therapy. Sun protection by physical and chemical for prevention of pigmentary changes and cutaneous malignancies; oral hygiene to prevent oral mucosal changes; nutritional supplementation to prevent vascular fragility, angular cheilitis and hair loss. Early recognition of cutaneous manifestations in CRF will improve outcome and reduce patient sufferings.

6. Source of Funding

None.

7. Conflict of Interest

None.

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