

DERMATOLOGICAL FINDINGS IN SUBJECTS WITH END STAGE RENAL DISEASE

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Abstract

Background: The aim of this study was to investigate the incidence of various cutaneous manifestations in patients undergoing dialysis. **Materials and Methods:** A hospital-based cross-sectional study was conducted, which included 100 consecutive cases of end stage renal disease (ESRD) on haemodialysis for a minimum period of one month. Cases were classified as ESRD based on the Cockcroft-Gault formula, abnormal urinary imaging, and urinary abnormality. A complete mucocutaneous examination was performed on all patients, and investigations, including renal function tests (RFT) and serum electrolytes, were conducted. **Result:** The study revealed that 98% of cases had at least one cutaneous finding attributable to ESRD. The highest number of cases was observed in the age group of 55-65 years. Xerosis was the most common finding, followed by pallor, hyperpigmentation, edema, pruritus, and ecchymosis. Fungal infections were more common than bacterial infections. In nail half and half nails and longitudinal ridging were frequently observed. Hair changes, such as sparse scalp hair and lustreless hair were also observed. Oral changes, such as angular cheilitis, uremic breath, and macroglossia were present. **Conclusion:** Dermatological manifestations increase with the duration of renal disease. Our collaborative approach between dermatologists and nephrologists facilitated early diagnosis and management of these comorbidities significantly enhance the quality of life of patients.

INTRODUCTION

The incidence of patients suffering from End Stage Renal Disease (ESRD) and undergoing regular haemodialysis has experienced an exponential increase in recent years. According to studies, the prevalence of chronic kidney disease (CKD) in India is reported to be 17.3%.^[1] Patients with ESRD undergoing dialysis commonly exhibit mucocutaneous manifestations. A previous study conducted by Udaykumar et al. reported that all patients with ESRD on hemodialysis exhibited at least one skin manifestation.^[2] Certain skin changes may also be observed in patients with CKD prior to the progression to ESRD. In rare cases, skin manifestations may be the initial indication of kidney disease.^[3] The skin manifestations may be attributed to the fact that dialysis is currently not as efficient as a normal kidney and cannot replace its endocrine function, resulting in electrolyte imbalance and the accumulation of uremic

substances. Some of the manifestations may also be a result of dialysis and the use of immunosuppressive drugs. The objective of this study was to analyze the mucocutaneous manifestations in patients with ESRD undergoing hemodialysis. The study aimed to correlate the biochemical parameters of renal function tests and cutaneous findings in patients with end stage renal 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 October 2021 to October 2022. An informed and written

consent was obtained from all the participating subjects prior to the commencement of the study.

The study subjects included 50 consecutive cases of end-stage renal disease at CKD stage 5 who had undergone haemodialysis for a minimum of one month. The cases were classified as ESRD and included in the study based on the Cockcroft-Gault formula, abnormal urinary imaging, and urinary abnormality.

A detailed history was taken from each patient regarding the duration of renal failure, the duration of dialysis, and the onset of skin lesions. A complete mucocutaneous examination was performed on all patients, and the findings were recorded in a pre-structured proforma. Renal function tests (RFT) and serum electrolytes were conducted on all patients, and other relevant investigations, such as potassium hydroxide (KOH) mount, Gram stain, and skin biopsy, were performed as necessary. Patients who had undergone renal transplantation, peritoneal

dialysis, or had serious comorbidities, such as malignancy, were excluded from the study.

Statistical analysis was conducted using the Chi-square test to identify associations between various cutaneous manifestations. Biochemical values were expressed as the mean, and the unpaired t-test was used to explore the relationship between cutaneous findings and biochemical parameters. A p-value of less than 0.05 was considered significant.

RESULTS

Ninety-eight percent of the patients enrolled in this study exhibited at least one cutaneous manifestation. Of the 50 patients, 13 were female and 37 were male. The age range of the patients was 18-68 years, with a mean age of 48.25 years. The majority of the patients belonged to the age group of 45-65 years. Diabetes mellitus (DM) was the most common cause of renal dysfunction, followed by hypertension and glomerulonephritis. [Table 1]

Table 1: Etiology of Chronic renal failure

Etiology	Male	Female	Total cases
Diabetes	17	6	23
Hypertension	15	3	18
Glomerulo nephritis	1	1	2
Polycystic kidney disease	2	1	3
Obstruction	2	0	2
Others	2	2	4

The duration of dialysis ranged from 1 to 10 years, with a mean duration of 20.52 months. The observed cutaneous manifestations and their incidence are summarized in [Table 2]

Table 2: Skin manifestations and their incidence

Manifestation	Number of cases
Xerosis	34
Pallor	33
Hyper pigmentation	13
Pruritus	8
Ecchymosis	5
Fungal infection	6
Bacterial infection	2
Viral infection	1
Half and half nails	11
Longitudinal ridging	10
Mee's lines	1
Muehrcke's lines	1
Koilonychia	1
Absence of lunula	3
Beau's lines	4
Leukonychia	8
Onycholysis	4
Macroglossia	1
Lusterless hair	4
Diffuse alopecia	4
Papules with keratotic plug	1
Angular cheilitis	2
Uremic breath	1
SEB keratosis	1
IGH	1
Gynaecomastia	1

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, koilonychia, 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

End-stage renal disease is a clinical condition characterized by an irreversible loss of endogenous renal function. The most commonly encountered cutaneous manifestation in ESRD is xerosis, which was observed highest number of cases, consistent with previous studies reporting an incidence ranging from 46-90%.^[2-4] Xerosis is graded into grade 0, grade 1, and grade 2 based on Morton's grading system, with 6 cases classified as grade 2 xerosis in our study.^[5] This condition may be correlated with decreased sweating and lowered levels of lipids in the skin surface, possibly due to a decrease in the size of the eccrine duct.^[2,6] Pallor of the skin due to anemia was observed in 33 patients, consistent with previous findings. Anemia in ESRD may be attributed to anoxia and decreased erythropoiesis due to reduced erythropoietin secretion by the kidney.^[7] Skin hyperpigmentation is another common finding in ESRD patients, observed in 13 of cases in our study, which may be attributed to the accumulation of Melanocyte Stimulating Hormone due to kidney failure.^[6,8] Pruritus is a distressing cutaneous symptom seen in patients on dialysis, affecting the quality of sleep and daily activities in most cases. Recent studies have reported a decline in the incidence of pruritus in ESRD patients. The occurrence of reduced pruritus may be attributed to improved dialysis techniques.^[9] Uremic pruritus is defined as pruritus that arises before or after dialysis and cannot be explained by any other disease process. The presence of pruritogenic substances such as Histamine may be responsible for this condition.^[10] Nail changes, including Lindsay's nails and longitudinal ridging were observed in significant number of cases, consistent with previous studies.^[2] Lindsay's nails, also known as half and half nails, are characterized by a white proximal part and a reddish-pink distal part that does not fade under pressure. An increase in the prevalence of bacterial, viral, and fungal infections has been reported among ESRD patients, possibly due to decreased immune surveillance, B cell activity, and altered T lymphocyte activity.^[11] In our

study, fungal infections were observed in higher number of cases compared to bacterial infections. Dermatophyte infections were the most common fungal infections, followed by onychomycosis. Hair changes, such as sparse scalp hair and luster less hair were also observed. Dry, luster less hair may be due to decreased sebum secretion. Rare iatrogenic manifestations, such as gynecomastia and arteriovenous shunt dermatitis, were reported in one case each.^[12]

CONCLUSION

The prevalence of cutaneous findings in end stage renal disease is diverse. Our collaborative approach between dermatologists and nephrologists facilitated early diagnosis and management of these comorbidities significantly enhance the quality of life of patients.

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