Original article

A study of cutaneous manifestations in chronic kidney disease patients on hemodialysis

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Article history
Received 09 August 2017
Revised 25 August 2017
Accepted 31 August 2017
Early online 24 November 2017
Print 31 January 2018

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Abstract
The prevalence of chronic kidney disease (CKD) has increased at an alarming rate over the past few decades. The patients with CKD have an array of cutaneous manifestations which have been further increased upon by hemodialysis as hemodialysis prolongs life expectancy which further provides time for cutaneous disorders to manifest. The present study was done in the department of dermatology at our tertiary centre. The aim of this study was to evaluate the pattern of cutaneous disorders in patients of CKD on hemodialysis and to assess any correlation between kidney disease severity and skin manifestations. 120 patients with CKD on hemodialysis were taken up for study. The study was carried out for a period of six months from July 2016 to December 2016. A detailed history, clinical examination of skin, hair and nails was done. Appropriate investigations were carried out wherever necessary. Out of 120 patients, 86 were males and 34 were females. Maximum patients were in the age group of 41-60 years. Diabetes was the main reason for CKD in 59 patients and hypertension in 22 patients. Pruritis was seen in 72 patients. Xerosis was seen in 51 patients followed by pigmentation in 30 patients. These skin findings were found more in patients with severe and chronic kidney disease.

Key words: Chronic kidney disease, Cutaneous changes, Hemodialysis, Pruritis, Xerosis

DOI: 10.5455/jmas.274268

Material and methods
A total of 120 patients were taken up for the study over a period of six months from July 2016 to December 2016 at a tertiary centre of north India.

Inclusion criteria: Patients with CKD for more than 6 months duration

Exclusion criteria: Hemodialysis being conducted for less than twice a week as these patients had relatively recent onset kidney disease. Patients on hemodialysis secondary to end stage renal failure (ESRF) following graft dysfunction. History of renal

Chronic kidney disease (CKD) is a condition characterised by progressive loss of kidney function over a period of months and years. There has been an increase in the prevalence of CKD over the last decade owing to the rising incidence of various diseases like hypertension, diabetes. Hemodialysis has emerged as one of the therapeutic modalities which have drastically improved the life expectancy of patients with CKD. Long standing kidney disease leads to skin dysfunction which results in various skin manifestations. Hemodialysis further aggravates skin disorders.
transplantation, malignancy, previous diagnosed case of skin and nail disorders.

All patients’ age, sex, reason for CKD, concurrent drug intake was noted. A detailed clinical history regarding duration of CKD, duration and frequency of dialysis, duration of skin ailments, new changes after starting dialysis and improvement in previous lesions post dialysis was taken. A detailed clinical examination of the skin, hair, nails and mucosa was done. Routine investigations like hemogram, liver function test (LFT), renal function test (RFT) were done. Relevant investigations like histopathological examination, potassium hydroxide (KOH), culture and sensitivity of bacterial and fungal infections, Gram stain were done wherever necessary.

The data was analysed and interpreted using appropriate statistical methods.

Results

A total of 120 patients were taken up for study. Out of these, 86 were males and 34 were females. The youngest patient was 15 years old and the oldest was 82 years old. Maximum patients were in the age group of 41-50 years followed by 51-60 years as shown in figure 1. Duration of CKD ranged from 2 months to 12 years. In 38 patients the duration of CKD was less than 5 years. In 60 patients it was between 5-10 years and in 22 patients it was more than 10 years. And duration of dialysis ranged from 5 months to 6 years. The most common reason for CKD was found to be diabetes (59 patients) followed by hypertension which is seen in 22 patients. Other causes are shown in table 1. In 20 patients, hemoglobin (Hb) was <6 and in 100 patients it was <10. Serum urea levels were between 50-100 mg/dl in 32 patients and >100mg/dl in 88 patients. In 41 patients serum creatinine levels were between 1 and 5; and in 75 patients it was >5. All patients had cutaneous manifestations, either single or multiple (Table 2). The most common cutaneous manifestation was pruritis seen in 72 (60%) patients followed by infections (70, 58.3%) and xerosis seen in 51(42.5%) patients. Among infections, fungal infections were seen in 50, bacterial infections in 12 and viral infections in 8. Other manifestations were hyperpigmentation (30, 25%), kyrle’s disease (4), bullous dermatosis (6), uremic frost (13), calciphylaxis (10) and pigmented purpuric dermatosis (1) (Table 2). Nail changes included half and half nails (36) (Fig 2), onychomycosis (14), onycholysis (16), subungual hyperkeratosis (12), koilonychias (18), beau’s lines (2). Hair findings were seen in 39 patients out of which 21 developed sparse body hair, 12 patients complained of alopecia and in 4 patients the hair became dry, lustreless. Development of mucosal abnormalities was also seen as shown in table 3. In 31 patients, skin manifestations were iatrogenic resulting from hemodialysis. These ranged from arterio-venous (AV) shunt dermatitis, infection or phlebitis.

| Table 1: Showing etiological reasons for CKD |
|---------------------------------------------|
| Reason for CKD                             | No. of patients |
| Diabetes                                   | 59             |
| Hypertension                               | 22             |
| Chronic glomerulonephritis                 | 10             |
| Chronic interstitial nephritis             | 12             |
| Polycystic kidney                          | 3              |
| SLE                                        | 2              |
| Pyelonephritis                             | 1              |
| Undiagnosed                                | 11             |

| Table 2: Showing skin manifestations among patients with CKD on hemodialysis |
|----------------------------------------------------------|
| Skin manifestations          | No. of patients |
| Pruritis                    | 72             |
| Infections                  | 70             |
| Xerosis                     | 51             |
| Hyperpigmentation            | 30             |
| Uremic frost                 | 13             |
| Calciphylaxis                | 10             |
| Bullous dermatosis           | 6              |
| Kyrle’s disease              | 4              |
| Pigmented purpuric dermatosis| 1              |
| Iatrogenic manifestations    | 31             |

Fig 1. Showing age distribution among CKD patients
Table 3: Showing hair, nail and oral changes

| Manifestations                  | No. of patients |
|--------------------------------|-----------------|
| Half and half nails             | 36              |
| Koilonychia                     | 18              |
| Onycholysis                     | 16              |
| Onychomycosis                   | 14              |
| Subungual hyperkeratosis        | 12              |
| Beau’s lines                    | 2               |
| Sparse body hair                | 21              |
| Alopecia                        | 8               |
| Dry lustreless hair             | 6               |
| Acute alopecia post dialysis    | 4               |
| Macroglossia                    | 42              |
| Xerostomia                      | 31              |
| Angular chelitis                | 25              |
| Uremic fetor                    | 20              |

Fig 2. Half and half nails

Discussion

All 120 patients presented with either one or more of cutaneous symptoms which was well in accordance with other studies. Another study by Geeta et al found cutaneous manifestations in 95% of the patients of CKD on hemodialysis. Various other studies showed the frequency of skin involvement in 95-100% patients. The most common cutaneous manifestation was pruritis in our study seen in 72 patients (60%). Another study also showed pruritis in 65.71% of the patients whereas two other studies showed pruritis in 19-90% of the patients. Various other studies reported increased urea and creatinine levels as cause of pruritis but no such correlation was found in our study. Infections were the second most common cutaneous manifestation seen in 70 (58.3%) patients (50 fungal, 12 bacterial and 8 viral). Two other studies also reported a similar incidence of infections at 67% and 70% whereas another study reported it at 30%. The most common infections were tinea cruris, onychomycosis, pityriasis versicolor, furunculosis, herpes zoster. It has been seen that there is decreased lymphocyte count in patients of CRF leading to impaired cellular immunity. Xerosis was seen in 42.5% of the patients whereas another study reported it in 79% of the patients. It was seen that xerosis was more common in diabetics and in our study diabetes was the most common reason of CKD. One study revealed lower levels of stratum corneum hydration as the cause of xerosis but another study implicated reduction in the size of eccrine glands as the cause. Hyperpigmentation was seen in 30 (25%) patients which was similar to various other studies. Failure of the kidneys to secrete beta-melano-stimulating hormone resulting in increased deposition of melanin in the skin has been implicated for this. Pallor was seen in 20 (16.6%) of the patients and all these patients had a hemoglobin < 6gm/dl. In 10.8% (13) of the patients, uremic frost was seen and all these had urea levels > 200mg. These findings were well in accordance to various other studies. The reason for the uremic frost has been found to be eccrine deposition of urea crystals over the skin surface but with the advent of modern hemodialysis techniques the incidence had decreased. Other less common cutaneous manifestations seen were calciphylaxis (10), bullous dermatosis (6) and Kyrle’s disease (4). Nail changes were seen in 58 patients and some of the patients had more than one changes. Among the nail changes half and half nails were seen in 36 (30%) patients. Another study reported an incidence of 21% with half and half nails whereas another study reported an incidence of 16.0-50.6% of the patients. Hair changes were seen in 32.5% of the patients whereas another study reported it at 25.71% of the patients. Sparse body hair was seen in 21 patients and 12 patients with alopecia. 6 Patients were seen with dry lustre less hair attributed to decreased secretion of sebum. Mucosal changes were seen in 98.3% of the patients well in accordance with previous other studies. Macroglossia was seen in 42 patients similar to another study. Xerostomia was seen in 31 and angular chelitis in 25 patients. Xerostomia is attributed to mouth breathing and dehydration. Uremic fetor was seen in 20 patients. Uremic fetor is an ammoniacal odor caused by a high concentration of urea in the saliva and its breakdown to ammonia.
Conclusion

Pruritis, infections and xerosis were the most common cutaneous manifestations in our study. Early recognition and adequate prophylactic measures such as application of moisturisers, nail hygiene, oral hygiene, sun protection for pigmentation can help reduce the cutaneous morbidity in patients of CKD on hemodialysis.

Acknowledgement: None

Conflict of interest: None

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