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Re-Evaluation the Frequency of Cutaneous Manifestations in Patients on Hemodialysis

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Abstract

Background Hemodialysis patients experience frequent and various cutaneous manifestations. Chronic renal failure (CRF) is a clinical state, which results in declining of kidney functions.

Objective To evaluate the frequency and nature of cutaneous lesions associated with CRF patients on hemodialysis.

Methods Fifty patients with chronic renal failure on hemodialysis in Al-Kadhimiya Teaching Hospital, Dialysis Center from the period of February 2012- May 2012 were conducted in this case series study.

Results All patients included in this study had at least one cutaneous manifestation related to chronic renal failure. The most frequent findings were pruritus (100%), pallor (100%), xerosis (100%), hyperpigmentation (74%), petechae (40%), ecchymosis (30%) and wrinkles (30%). Nail changes were half and half nail (76%), koilonychias (48%) and splinter hemorrhage (28%). Oral changes were xerostomia (88%) and ulceration (52%). Other manifestation like hair changes (42%) was seen.

Conclusion Chronic renal failure is associated with various cutaneous manifestations caused by hemodialysis or the disease itself. The most frequent findings; pruritus, pallor and xerosis. The early diagnosis of cutaneous changes may decrease the morbidity and eventually lead to the improvement of life quality in these patients.

Keywords Chronic renal failure, hemodialysis, cutaneous manifestations.

Introduction

Chronic renal failure (CRF) is a progressive loss of renal function over period of months or years through five stages, each stage is a progression through an abnormally low and deteriorating glomerular filtration rate [(1)]. End stage renal disease (ESRD) is a progressive and irreversible renal damage for more than three months duration [(1)].

Hemodialysis is one of the therapeutic modalities which can improve the quality of life in patients with ESRD [(1)]. In hemodialysis, blood is allowed to flow through special filters that remove wastes and extra fluids. Hemodialysis help to control blood pressure and keep the proper balance of chemicals like potassium and sodium in the body [(1)].

Cutaneous manifestations occurring in patients with chronic renal failure are those of full-blown end stage renal disease (ESRD) although cutaneous findings may appear in patients with moderate kidney disease. Persistent cutaneous complaints such as xerosis and intractable pruritus may allow searching for underlying renal dysfunctions [(2)].

Nearly all patients with ESRD have at least one cutaneous manifestation [(3)] these include:

Pruritus: It is a very frequent complaint affecting about 50-90% of ESRD patients [(3)], it tend to

become more severe with deteriorating renal function [3].

The mechanism of pruritus associated with ESRD related to xerosis, atrophy of sweat and sebaceous glands, secondary hyperpara-thyroidism, iron deficiency anemia and neuropathy [3]. Hemodialysis is useful in lowering the magnesium concentration.

- **Xerosis cutis:** It is very common in patients with ESRD and those on hemodialysis due to atrophy of sweat glands [4]. It increase the susceptibility to infections and this is aggravated by delayed wound healing of the skin [5].
- **Alteration in cutaneous pigmentation**: Macular hyperpigmentation of the palm, soles and mucous membrane [4].
- **Ecchymosis and petechae:** ESRD affect hemostatic process in the body by affecting platelets function and aggregation resulting in bleeding disorders; as ecchymosis, petechae and subsequent pallor, which are common in patients with ESRD and those on hemodialysis [1].
- **Skin infections:** ESRD is a state of immunosuppression that leads to various types of infections whether viral, bacterial or parasitic infections [1]. Infections with exotic agents as pseudomonas or even tuberculosis may occur [6,7]. Impaired immunity seen even before dialysis. The immune defect is mainly lymphopenia, decreased B-cell activity, and alteration of the T-cell subset and activity [7,8].
  - **Nail disorder:**
  - ❖ **Half and half nail:** is more common in patients on hemodialysis, it is characterized by proximal white discoloration and distal red/brownish color due to edema of the nail bed and capillary network, the nail plate is unaffected [4].
  - ❖ **Koilonychia:** It is more common in fingernail, but occasionally seen in toenail. It affects patients on hemodialysis as they are subjected for bleeding with resultant iron deficiency anemia [4].
  - ❖ **Splinter hemorrhage:** It is extravasation of blood from the longitudinally oriented blood vessels of the nailbed [4].
  - ❖ **Onycholysis**: Distal separation of the nail plate from the underlying nail bed.
  - ❖ **Muehrckes lines:** Narrow, white transverse bands occur in pairs due to hypoalbuminemia
- **Oral changes:** Ulceration of the mucous membrane, xerostomia, metallic taste or unpleasant mouth odor and loose teeth is common in ESRD patients and those on hemodialysis [4].
- **Premature aging of the skin:** As actinic elastosis which leads to extensive wrinkling at the neck (cutis rhomboidalis nuchae) and leads to telangiectasia [9].
- **Poor wound healing:** As a result of reduced cutaneous blood flow which proportionate with the duration of dialysis [10].
- **Raynaud's syndrome:** Because of increase susceptibility of to low temperature associated with ESRD and become more sever on dialysis [11,12].
- **Duputrens contacure:** It occurs due to cutaneous calciphylaxis [11,12].

The goal of our study is to Re-evaluate the frequency and nature of cutaneous lesions associated with chronic renal failure patients on hemodialysis.

Methods

A case series study was conducted in Al-Kadhimiya Teaching Hospital, Dialysis Center from the period of February 2012-May 2012. Fifty patients comprised 27 (54%) males and 23 (46%) females with chronic renal failure (CRF) were studied. Their age range from 25-70 with a mean±SD of (47.16±12.1) years, on regular hemodialysis were enrolled in the study. Each patient was subjected to hemodialysis for 3-4 hours in 2-3 sessions per week.

Especial questionnaire was performed including: name, age, sex, onset of skin manifestations, duration, and frequency of hemodialysis. All patients were examined thorough dermato-logical examination including skin, hair, nail and mucous membrane.

Results

The most frequent finding were pruritus 50 (100%), pallor 50 (100%), xerosis 50 (100%), hyperpigmentation 37 (74%), petechae 20 (40%), ecchymosis 15 (30%) and wrinkles 15 (30%) as seen in table 1.

Table 1. Number and percentage of patients with cutaneous manifestations on hemodialysis

Skin manifestations	Males		Females		Total	
	No.	%	No.	%	No.	%
Pruritus	27	54	23	23	50	100
Xerosis	27	54	23	23	50	100
Pallor	27	54	23	23	50	100
hyperpigmentation	20	54.1	17	17	37	100
Petechiae	13	65	7	7	20	100
Ecchymosis	9	60	6	6	15	100
Wrinkles	12	80	3	3	15	100

Nail changes were half and half nail 38 (76%), koilonychias 24 (48%) and splinter hemorrhage 14(28%). Other manifestations were hair changes 21 (42%). Oral changes were xerostomia 44 (88%) and ulceration 26 (52%) as noticed in table 2.

Table 2. Number and percentage of changes in skin appendages and oral changes in patients on hemodialysis

Changes		Males		Females		Total	
		No.	%	No.	%	No.	%
Nail changes	Half and half nail	25	65.8	13	34.2	34	100
	Koilonychias	15	62.5	9	37.5	24	100
	Splinter hemorrhage	10	71.4	4	28.6	14	100
Hair changes		8	38.1	13	61.9	21	100
Oral changes	Xerostomia	21	47.7	23	52.3	44	100
	ulceration	9	34.6	17	65.4	26	100

The onset of cutaneous manifestations in relation to hemodialysis were 27 (54%) patients after hemodialysis, 15(30%) patients during hemodialysis and 8 (16%) patients before hemodialysis (Table 3).

Table 3: Onset of symptoms in relation to hemodialysis

Onset of symptoms	Males		Females		Total	
	No.	%	No.	%	No.	%
After	12	44.4	15	55.6	27	100
With	6	40	9	60	15	100
Before	5	62.5	3	37.5	8	100

The response to hemodialysis in relieving cutaneous manifestations was 18(36%) patients responding to hemodialysis and 32(64%) patients with no response.

Discussion

Pruritus was the most prevalent cutaneous manifestations seen in 100% patients. Its frequency ranged from 19-90% in previous studies [13,14]. It is one of the most characteristic symptoms of CRF [15]. It does not necessarily subside with dialysis although it improves with kidney transplantation [14]. The exact etiology for pruritus is unknown, however it associated with the degree of renal insufficiency (urine output of < 500 mL) [16]. Hypervitaminosis A may be a cause as result for regular ingestion of fat soluble vitamins (Vit A) for the replacement of what is lost within dialysis making the patients in increased risk for accumulation and toxicity secondary to impaired excretion [17]. Xerosis is another possible cause for pruritus [5]. Neural theory is also suggested to be a possible cause for pruritus in CRF patients, as neuron-specific, enolase positive fibers may sprout throughout the epidermis in uremic patients as these nerves ending reaches the stratum basale [18]. Another possible cause is increased serum histamine levels due to allergic sensitization to various dialyzer membrane components and due to impaired renal excretion of histamine, so UVB radiation is effective in uremic patients by suppressing histamine-releasing factors in the sera of uremic patients, also in reducing vitamin A level in the epidermis. Increased serum levels of magnesium and albumin, iron deficiency anemia are considered other possible mechanisms for pruritus in chronic renal failure patients [19].

Xerosis was found in 100% patients in comparing other study were (46-90) % [20,21]. Atrophy of the sweat glands is a possible cause, although high dose diuretics regimens also implicated [21].

Pallor was seen in100% in comparing to 60% in other study done on CRF Indian patients [22]. Pallor is due to anemia mainly due to inadequate erythropoietin production, iron deficiency, folic acid or vitamin B12 deficiency and decreased erythrocyte survival [4].

Hyperpigmentation were seen in 74% in comparison to other studies as 63% [23]. Diffused hyperpigmentation in sun-exposed areas was noticed due to increase melanin in the basal layer and due failure of the kidneys to excrete beta-melanocyte stimulating hormone (B-MSH) [24].

Petechae was seen in 40% and ecchymosis was seen in 30% in comparing to 20% in other study [22]. The causes are could be a defect in the primary hemostasis like increased vascular fragility, abnormal platelets function and the use of heparin during [25].

Wrinkles were seen in 30% when compared to 16% [13]. The cause may be due to early actinic elastosis especially in patients undergo long term hemodialysis [26].

Half and half nails was found in 76% while found in 21% and 20% [22,27]. The cause still unclear and could be attributed to renal dysfunction or due to medication or to the procedure of hemodialysis [27]. Koilonychia found in 48% while it found in 17% and splinter hemorrhage was found in 28% in comparison to 7% in other studies [13].

Hair changes were found in 42% in form of diffuse thinning which is possibly due to the use of heparin or associated hypothyroidism in comparison to 10-30% in other studies [22].

Xerostomia was found in 88% of patients in comparing to 31% in other studies [22]. It could be due to mouth breathing and dehydration [22].

Ulceration of the oral mucous membrane was found in 52% in comparing to 29% in other studies [22]. The cause is due to possible candidal infections, which are due to associated xerostomia [28], and also due to cigarette smoking [29].

We conclude that cutaneous manifestations are frequent in patients with chronic renal failure. They cause high degree of morbidity and tend to be very refractory to treatment. It seems that long periods of pre-existing renal insufficiency, which cause typical skin changes of its own, aggravate the lesions in the dialyzed patients. Early diagnosis of cutaneous changes may decrease the morbidity and eventually lead to the improvement of life quality in these patients.

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