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ORIGINAL ARTICLE

Frequency of Nail Deformities in Patients with Chronic Kidney Disease Undergoing Hemodialysis

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ABSTRACT

Background: Nail disorders are common in patients with chronic kidney disease on maintenance hemodialysis. Even though there are some studies regarding nail disorders in peritoneal dialysis and renal transplant patients, to the best of our knowledge, sparse local data is present on nail disorders among maintenance hemodialysis patients.
Aim: To determine the frequency of nail disorders in patients with chronic kidney disease on maintenance hemodialysis.
Study design: Cross-sectional study
Place and duration of study: Dept of Nephrology, Sir Ganga Ram Hospital, Lahore from 1st February 2019 to 1st August 2019.
Methodology: Two hundred and ninety two cases were enrolled. The nails of the patients were inspected and shot by utilizing a 10-megapixelcamera. The photos were subsequently reviewed independently by two dermatologists and one nephrologist.
Results: There were 198 (67.8%) males and 94 (32.2%) females. The mean age was 47.3±12.4 years. The overall frequency of nail disorder in patients with chronic kidney disease on maintenance hemodialysis was 197(67.5%). According to nail disorders distribution, 119(40.8%) had half and half nail, while 56(19.2%) had splinter hemorrhage, 47(16.1%) had absent lunula, 16 (5.5%) had chromonychia, 15(5.1%) had Beau's line, 19(6.5%) had melanonychia and 52(17.8%) had onycholysis.
Conclusion: The frequency of nail problems in CKD patients treated by hemodialysis is 67.5%. This finding highlights the need for nail evaluation as a component of periodic examination in hemodialysis patients.
Key words: Chronic kidney disease, Haemodialysis, Nail disorders.

INTRODUCTION

Chronic kidney disease (CKD) results from the slowly developing loss of the excretory capacity of the kidneys. Diabetes mellitus and hypertension are among the central causes that lead patients to CKD ultimately requiring dialysis. In normal people, the glomerular filtration rate is somewhere in the range of 110 and 120 mL/min, however, this rate might tumble to 10 or even 5 mL/min in patients with advancing CKD when dialysis and kidney transplantation might be required.[1]

Nail abnormalities have been accounted for to happen in around 71.4% of uremic patients.[2] Among nail abnormalities absent lunula is the most frequent finding seen in 61% of patients. This condition is characterized by the absence of a crescent-shaped visible portion of the nail matrix.[3,4] Second nail anomaly seen in most CKD patients is onycholysis (42%), the nail becomes detached from its bed at the base and side.[5,4] Half and half nails also named "Lindsay nails" are found in up to one-third of patients submitted to hemodialysis and speak to a stamped characteristic of these patients. In half and half nails, the proximal half is white, whereas the distal part is reddish-brown.[4,6] Seventeen percent of CKD patients develop chromonychia, an anomaly in the colour of the surface of the nail plate or subungual tissues.[7] Blackish brown pigmentation of the nail is termed melanonychia seen in 9%of uremic patients.[8] Splinter hemorrhages are little spaces of blood under the nails that look like dainty, red to earthy coloured lines of blood under the nails. They run toward nail development, usually develop in 7% of patients.[9] Beau's lines present in 5% of patients are profound notched lines that run from one side to another on the fingernail or the toenail.[10] Leukonychia commonly called white nails or milk spots on nails is present in almost 4% of patients. Koilonychia is the condition in which the fingernails get to be lean and at last, get lifted at external edges. This condition is additionally called spoon nails. Muehrcke's lines show up as twofold white lines that run over the fingernails on a level plane. White groups go over the whole nail from side to side. The nail bed looks sound in between the lines. Both Koilonychia and Muehrcke's lines are present in almost 1% of CKD patients.[4]

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This study was designed to check the frequency of nail disorders in patients on thrice-weekly hemodialysis.

MATERIALS AND METHODS

This cross-sectional study was conducted after permission from Ethical Review Board in the Department of Nephrology, Sir Ganga Ram Hospital Lahore from 1st February 2019 to 1st August 2019. The sample size of 292 patients was estimated by a 95% confidence level with a 2.5% margin of error and by taking an expected percentage of Beau's Lines i.e., 5% in patients with CKD undergoing hemodialysis.[4] All patients were diagnosed cases of CKD stage 5 undergoing maintenance hemodialysis for at least 3 months. Acute kidney disease patients receiving hemodialysis were excluded from the study. After approval from the institutional ethical board of Fatima Jinnah medical university, informed consent and biodata were taken from each subject. The nails of the patients were inspected and shot by utilizing a 10-megapixel computerized camera. The photos were subsequently reviewed independently by two dermatologists and one nephrologist, and the final diagnosis was made when something like two of the three experts settled on its findings.

The data were entered and analyzed using SPSS-25. Data was stratified for age, gender, and duration of dialysis. For post-stratification, the Chi-square test was used. A p-value ≤0.05 was considered significant.

RESULTS

There were 198 (67.8%) males and 94(32.2%) females with mean age 47.3±12.4 years. There were 101(34.6%) subjects in the 20-40 years age group, while 141(48.3%) and 50(17.1%) were in 41-60 years and >60 years age groups respectively. According to the duration of dialysis distribution, 108(37%) were on dialysis for <1 year, while 84(28.8%) for 1-3 years, 77(26.4%) for 3-6 years and 23 (7.9%) were on dialysis for >6 years. The overall frequency of nail disorder in patients with chronic kidney disease on maintenance hemodialysis was 197(67.5%). According to nail disorders distribution, 119(40.8%) had half and half nail, while 56(19.2%) had Splinter hemorrhage, 47(16.1%) had absent lunula, 16 (5.5%) had Chromonychia, 15(5.1%) had Beau's line, 19(6.5%)

had Melanonychia and 52(17.8%) had Onycholysis. By stratification of nail disorder, it was concluded that there is an association between nail disorder and increased age (p=0.002) (Table 1). It was also concluded that there is an association between nail disorder and increased duration of dialysis (p=0.000001) (Table 2).

Table 1: Stratification of nail disorder for age groups

Age (years)	Nail Disorder		P value
	Yes (n=197)	No (n=95)	
20 - 40	67 (34%)	34 (35.8%)	0.002
40-60	86 (43.6%)	55 (57.8%)	
> 60	44 (22.4%)	6 (6.4%)	

Table 2: Stratification of nail disorder for duration of dialysis

Duration of dialysis	Nail Disorder		P value
	Yes (n=197)	No (n=95)	
< 1 years	16 (8.1%)	92 (96.8%)	0.0001
1–3 years	81 (41.1%)	3 (3.2%)	
3–6 years	77 (39.1%)	-	
> 6 years	23 (11.7%)	-	

DISCUSSION

Dermatological disorders counting nail changes are the commonest complications of CKD. In our study, 67.5% of chronic kidney disease patients had at least one nail abnormality. In investigations distributed beforehand in the writing, these frequencies went from 52-82%[9]. The pathogenesis of these variations from the norm remains dubious: A few of them may be straightforwardly related to kidney harm, others appear to be related to its complications or effects of diverse treatments taken.[11]

Our results found a significant relationship between nail disorder and patients' age and duration of hemodialysis. This has also been described in other study[12]. Anemia and hypoalbuminemia are known intricacies of CKD and are recommended to be an etiological variable of nail changes.[13,14] A few pieces of research tracked down no critical connection between hypoalbuminemia and nail issues[15].

In our study, half and half nails are the most frequent finding (40.8%). Half and half nails coined the term Lindsay nails in 1967, described by a white shading of the proximal half of the nail and a red-earthy coloured hue of the distal portion of the nail. The two stains of the nails are dependably clear cut, don't vanish by applying pressure, and there is no inclination to change the design with the development of the nail. Chronic anemic condition enhances capillary thickness and connective tissue deposition under nails leading to proximal white discoloration whereas the brown colour of the distal half is due to enhanced melanin deposition.[16] Half and half nails are not specific to CKD but also present in various conditions like Crohn's disease, cirrhosis of the liver, and even in normal individuals. Literature showed the prevalence of this condition in 20-50% of CKD patients.[17] This abnormality seems to resolve after renal transplantation.[16]

Splinter hemorrhages accounted for 19.2% of cases in our study, likewise, other studies reported it in 11-20% of hemodialysis patients.[18] Splinter hemorrhages are minuscule blood clots under the nails, at first, they are generally plum-hued, however at that point obscure to brown or dark in a few days. There are various causes for splinter hemorrhages like trauma, systemic vasculitis, infective emboli, and cholesterol deposition in capillaries. Approximately 1 of every 10 patients has splinter hemorrhages.[19]

In our study 17.8% had onycholysis. This condition has additionally alluded to Plummer's nails when seen in hypothyroid patients, is a dermatological nail problem portrayed by the unconstrained distal partition of the nail plate from the free edge that extends proximally. This nail bed disorder is seen in various systemic diseases like hypothyroidism, psoriasis, chemotherapeutic agents, and fungal infection.[20] In CKD captopril and uremic toxins are linked to the development of Onycholysis.[21] Other studies reported 1.85% to 26.8% frequency of onycholysis among CKD patients[22]. Less frequent nail disorders include Chromonychia, Beau's line, and Melanonychia which have been documented in our study as well as in international literature.[9]

CONCLUSION

The frequency of nail problems in CKD patients treated by hemodialysis is 67.5%. This finding highlights the need for nail evaluation as a component of periodic examination in hemodialysis patients.

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