

## Nail changes in a young woman with chronic renal failure and hypothyroidism

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### Abstract

Nail changes are easily detected by physical examination, and may be useful to diagnose systemic disorders. Nail abnormalities associated with chronic renal failure include white nails, half-and-half nails, Terry's nails, onychomycosis, hyperpigmentation, splinter hemorrhages, dystrophies, hyperkeratosis, pincer nails, longitudinal ridging, brittle nails, onycholysis, Beau's lines, Muehrcke's lines, yellow nails and koilonychia. A woman with renal failure, hypothyroidism, and respiratory symptoms presented with Terry's nails, leukonychia, koilonychia and yellow nails. Comorbidities can enhance the diagnostic challenges.

A 27-year-old woman with chronic renal failure and hypothyroidism claimed of foamy urine and edema affecting her lower limbs, trunk and face. Nail changes were observed, like Terry's nails, koilonychia, yellow nails, transverse leukonychia, and onychodystrophy. Laboratory tests showed anemia, high serum levels of urea, creatinine, PTH, cholesterol and triglycerides; and low serum levels of vitamin D and albumin. Chest x-ray images were normal. After improvement of edema, an arteriovenous fistula was performed to initiate the hemodialysis. The concomitance of hypothyroidism might propitiate the development of less frequent nail abnormalities affecting patients with chronic renal failure, either dialytic or not.

**Keywords:** koilonychia, leukonychia, Lindsay's nails, Terry's nails, yellow nail syndrome.

## Introduction

Nail changes are easily observed signs during physical examination, and their characteristics may constitute a useful index to further identification of some important systemic disturbances (1-10). Diverse nail abnormalities occur in patients with chronic renal failure (CRF), and the absence of lunula - with white nails or with half-and-half nails represent the most frequent finding (5-7,10). Other changes include onychomycosis, hyper pigmentation, splinter hemorrhages, dystrophies, hyperkeratosis, clubbing, pincer nails, pitting, longitudinal ridging, brittle nails, onycholysis, Beau's lines, Muehrcke's lines, yellow nails and koilonychia (6,7,10). A woman with hypothyroidism, CRF, and respiratory symptoms is reported presenting with Terry's nails and leukonychia in the hand fingers, and koilonychia and yellow nails in all the foot fingers. At the best of the authors' knowledge, it is the first report of such diversity of nail changes in CRF.

## Case Report

A 27-year-old woman with CRF and controlled hypothyroidism presented with foamy urine and lower limb edema, which evolved to affect the trunk and face. She was in regular use of prednisone 5 mg/day, furosemide 40 mg/day, simvastatin 40 mg/day, amlodipine 10 mg/day and levothyroxine 75 µg/day. Physical examination showed BMI 19.56 kg/m<sup>2</sup>, pale mucosa (++) , ascites, edema in the eyelids as well as in the trunk and lower limbs (2+) as showed in Figure 1A. Diverse nail changes were observed, including Terry's nails, koilonychia, yellow nails, transverse leukonychia, and onychodystrophy (Figure 2). Laboratory tests (range: normal): hemoglobin 9.5 g/dl (range: 11.7-15.7); hematocrit 29.1% (range: 35-47); RDW 12.6% (range: < 15); MCV 88 fl (range: 80-100), MCH 29 pg (range: 26-34); MCHC 33 g/dl (range: 31-37); leukocytes 9.437/mm<sup>3</sup> (range: 4,000-10,000); platelets 564.000/mm<sup>3</sup> (range: 140,000-450,000); total cholesterol 542 mg/

dl (range: < 200); triglycerides 536 mg/dl (range: < 150); glucose 93 mg/dl (range: 70-99); creatinine 4 mg/dl (range: 0.5-0.9); urea 60.1 mg/dl (range: 16.6-48.5); albumin 1.73 g/dl (range: 3.5-5.2); PTH 148.6 pg/ml (range: 15-65); iron; 60 µg/dl (range: 37-145); ferritin; 93.8 ng/ml (range: 13-150); vitamin D < 4 ng/ml (range: 30-100); TSH 4.55 µU/ml (range: 0.27-5.0); free T<sub>4</sub> 0.78 ng/dl (range: 0.93-1.7); INR 0.96 (range: < 1.24); microalbuminuria 28 mg/l (< 30); urinalysis - proteins (3+), glucose (1+), and hemoglobin (2+). The chest x-ray images were unremarkable (Figure 1B), and the electrocardiogram was normal. There was a partial regression of the edematous status after increasing the diuretic dosage, and an arteriovenous fistula was performed in her left upper limb to initiate the sessions of hemodialysis.

## Discussion

Patients with CRF often show conspicuous disorders in the skin and in cutaneous adnexa, and nail changes may be seen in up to 82% of the cases (5,7). Although absent in the patient herein described, half-and-half nails or Lindsay nails are frequently associated with CRF and with hemodialysis (5,7). Koilonychia is reported in cases of anemia due to iron deficiency; but can also be hereditary or related with high altitudes, traumas, exposition to petrol and derivatives, hemochromatosis, Raynaud's disease, systemic lupus erythematosus (SLE), nail-patella syndrome, malnutrition, and protein-losing enteropathy, in addition to hypothyroidism and CRF (2,6,8-10). In hypothyroidism, the nails are often fragile and have a slow growing, and koilonychia and yellow nails are other described disorders (1,9). Transverse leukonychia, as Muehrcke's lines and Mee's lines, may be associated with hypoalbuminemia caused by hepatic insufficiency, malnutrition, and nephrotic syndrome; moreover, they are related to chemotherapy, arsenic intoxication, CRF, myocardial infarction, SLE, lymphoma, sickle cell anemia, and immunohemolytic anemia (4,9). Terry's nails are

more frequently described in patients with hepatic insufficiency, but may be observed in individuals with CRF as well (5,7,8). Therefore, they must be differentiated from the Lindsay's nails, especially in elder people with renal diseases, because the Terry's nails may also develop as an age-related phenomenon (5). Worthy of note is that classical discoloration of the Lindsay's nails can occupy up to 60% of the nail length, while the typical discoloration of the Terry's nails stops abruptly just 1 to 2 mm from the distal edge of the nail (5). In the present report, typical features of Terry's nails were observed in six of the hand fingers. Yellow nails, lower limb edema, and respiratory disturbances, including pleural effusion, can characterize the yellow nail syndrome (YNS) (1,3,7). This condition may be idiopathic, familiar or acquired, and is found coexisting with malignancies of breast, larynx, lung, endometrium, and gall bladder, in addition to lymphoma, sarcoma, and melanoma (1,7). Moreover, it has been described in association with thyroid disease, hypogammaglobulinemia, nephrotic syndrome, protein-losing enteropathy, obstructive sleep apnea, xanthogranulomatous pyelonephritis, ocular changes, rheumatoid arthritis, tuberculosis, and AIDS, in addition to patients with CRF undergoing or not dialysis (1,3,8). Elevated serum levels of parathormone (PTH) possibly played a role in the nail changes observed in the present case study (7). This young woman had absence of lunula and typical Terry's nails in four of the left hand fingers, and the nail of the hallux was normal. Leukonychia was found in three of the right hand fingers, and Terry's nails in the other two. Worthy of note, both koilonychia and yellow nails were bilaterally found in all the foot fingers. The association of YNS with CRF has been described (3,7), but without the occurrence of Terry's nails, which are usually seen in people with hepatic insufficiency, adult-onset diabetes mellitus, congestive heart failure, pulmonary tuberculosis, and Reiter's syndrome, and may be an age-related phenomenon (5,7). The patient had ten yellow nails,

bilateral pitting edema in the lower limbs, and upper respiratory disorder. In spite of the normal radiographic images of the chest, the triad of YNS could be considered in the present case study, because the thoracic changes can appear later in the course of this syndrome (1). Chronic iron deficiency is the main etiologic factor of koilonychia, but this condition may be related to systemic diseases like hypothyroidism, which is one of the comorbidities in this patient. Transverse leukonychia can be explained by the marked hypoalbuminemia disclosed in this case. YNS is more frequent among females (male/ female is 1:1.6) and in middle-aged individuals (1). This 27-year-old woman presented with the complete triad of the syndrome, as may be seen in one third of the cases (1). The time elapsed for the classical thoracic images to appear may be very long and the triad features can develop in a variable order (1). In the present case, accentuated pitting edema was observed in both legs, trunk and face, associated with hypoalbuminemia (1). Respiratory disturbances of YNS include asthma, bronchitis, sinusitis, bronchiectasis, recurrent pneumonitis and pleural effusions. The nail abnormalities of the YNS may not involve all digits (1); moreover, thickening, hardening, excessive convexity, transversal ridging, onycholysis, onychorrexia, paronychia, absence of lunules, and slow growth are described in this setting (1). Similar nail abnormalities have been described amongst elder people, and can propitiate diagnostic pitfalls in this age group (7); nevertheless, in the young woman herein described, the nail disorders seem to have a more significant role. Accurate inspection of the nails is important, because changes in color or shape can enhance the suspicion index about systemic conditions, which contributes to the early diagnosis and prompt treatment (5).

## Conclusion

Nail changes may be useful diagnostic clues, because the nails are a common site for reper-

cussion of many systemic disorders. The CRF with or without hemodialysis can evolve with well-known or less common nail changes. The associa-

tion of comorbidities, as hypothyroidism, can give origin to infrequent nail abnormalities, which propitiate additional diagnostic challenges.

**Conflicts of interest:** None declared.

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