Received: 02 Feb 2024 | **Accepted:** 04 Nov 2024 **Genel Tıp Derg. Volume** 34/**Issue** 6 (December), 900-903
DOI: 10.54005/geneltip.1430557

CASE REPORT

Unilateral Koilonychia with Rapid Response to Combined Treatment with Vitamin B12 and Folic Acid: A Case Report

B12 vitamini ve folik asit kombinasyonu tedavisine hızlı yanıt veren unilateral koilonişi: Olgu Raporu

[1]Metin ÖZASLAN

[1]Dermatology Clinic, Konya Numune Hospital, Konya, Türkiye

Correspondence

Metin ÖZASLAN
Dermatology Clinic, Konya Numune Hospital, Konya, Türkiye

E-Mail: metinozaslanx@gmail.com

How to cite ?

Özaslan M. Unilateral Koilonychia with Rapid Response to Combined Treatment with Vitamin B12 and Folic Acid: A Case Report. Genel Tıp Derg. 2024;34(6):900-903

ABSTRACT

Introduction: Koilonychia, also called a spoon-shaped nail, is a nail deformity characterized by the concavity of the nail plate. The diagnosis of koilonychia is based on clinical findings. Koilonychia can be idiopathic, genetic, or acquired due to related causes such as anemia, malnutrition, trauma, or thyroid hormone dysregulation.
Case: A 20-year-old woman presented with deformity of the nails on her right hand for two weeks. The patient stated that her hands had been intermittently exposed to chlorine bleach (sodium hypochlorite of 5.25%) for household cleaning for about three months. Dermatologic examination revealed thinning, fragility, concavities in the distal part of the nails, and orangish discoloration in the second to fifth nails on the right hand. These findings were compatible with koilonychia. Examination of the left-hand nails was normal. A vitamin B12 level of less than 100 ng/L and a folate level of 3.59 ng/mL were detected. A clinical diagnosis of sodium hypochlorite–induced koilonychia was performed. The patient was recommended to stop contact with chlorinated bleach and stop household cleaning. The following medications were started: 1000 mcg/mL cyanocobalamin administered by intramuscular injection once a week and 5 mg/day folic acid administered orally. No topical treatment was applied to the nails. After one month, it was observed that the koilonychia regressed.
Discussion: Our case is valuable in terms of the association of vitamin B12 and folic acid deficiencies with unilateral koilonychia and the rapid improvement of koilonychia due to vitamin B12 and folic acid replacement. In conclusion, this preliminary observation suggests that it is required to check vitamin B12 and folic acid levels in patients with unilateral koilonychia and the replacement of vitamin B12 and folic acid in cases of deficiency may be part of the treatment for koilonychia.

Keywords: Folic acid deficiency, Nails, Nail abnormality, Vitamin B12 deficiency

ÖZ

Giriş: Koilonişi, tırnak plağının konkavitesi ile karakterize bir tırnak deformitesidir. Tanı klinik bulgulara dayanır. Koilonişi idiyopatik, genetik, veya anemi, malnütrisyon, travma, tiroid hormon düzensizliği gibi edinsel nedenlerle ortaya çıkabilir.
Olgu: Yirmi yaşında kadın hasta sağ el tırnaklarında iki haftadır olan şekil bozukluğu nedeniyle başvurdu. Hasta ev temizliği amacıyla ellerinin yaklaşık üç aydır aralıklı olarak klorlu çamaşır suyuna (sodyum hipoklorit %5.25) maruz kaldığını ifade etti. Dermatolojik muayenede sağ el 2-5.tırnaklarda incelme, frajilite, tırnakların distalinde konkavlaşma, ve turuncumsu renk değişikliği gözlendi. Mevcut bulgular koilonişi ile uyumlu değerlendirildi. Sol el tırnaklarının muayenesi normaldi. B12 vitamini seviyesi 100 ng/L'nin altında ve folat seviyesi 3.59 ng/mL olarak tespit edildi. Hastaya klinik olarak sodyum hipoklorite bağlı koilonişi tanısı konuldu. Hastaya klorlu çamaşır suyu ile teması kesmesi ve ev temizliğine ara vermesi önerildi. Haftada bir kez siyanokobalamin 1000 mcg/ml intramüsküler enjeksiyonla ve folik asit 5 mg/gün ağızdan tedavileri başlandı. Tırnaklara herhangi bir topikal tedavi uygulanmadı. Bir ay sonra koilonişinin gerilediği gözlendi.
Tartışma: Vakamız, B12 vitamini ve folik asit eksikliğinin unilateral koilonişi ile birlikteliği ve B12 vitamini ve folik asit replasmanına bağlı olarak koilonişinin hızla düzelmesi açısından değerlidir. Sonuç olarak, bu ön gözlem unilateral koilonişi hastalarında B12 vitamini ve folik asit düzeylerinin kontrol edilmesi gerektiğini ve eksiklik durumunda bu vitaminlerin replasmanının koilonişi tedavisinin bir parçası olabileceğini düşündürmektedir.

Anahtar kelimeler: Folik asit eksikliği; Tırnaklar; Tırnak anormallikleri; Vitamin B12 eksikliği

Introduction

Koilonychia, also called a spoon-shaped nail, is a nail deformity characterized by the concavity of the nail plate. Its diagnosis is based on clinical findings. Koilonychia can be idiopathic, genetic, or acquired due to related causes such as anemia, malnutrition, trauma, or thyroid hormone dysregulation (1). It may also be associated with dermatoses such as psoriasis and lichen planus, or systemic disorders such as Reynaud's disease, systemic lupus erythematosus, and diabetes mellitus. There is no specific treatment other than the removal of the underlying cause (2). In this case, we describe a dramatic response to vitamin B12 and folic acid replacement in a 20-year-old woman with unilateral koilonychia on the right hand.

Peer-Review: Double anonymized - Two External
Plagiarism Checks: Yes - intihal.net
Complaints: geneltip@selcuk.edu.tr

Selcuk University Press
Genel Tıp Dergisi | e-ISSN: 2602-3741
https://dergipark.org.tr/tr/pub/geneltip
https://yayinevi.selcuk.edu.tr/

Case

A 20-year-old woman presented with deformity of the nails on her right hand for two weeks. The patient stated that her hands had been intermittently exposed to chlorine bleach (sodium hypochlorite 5.25%) for household cleaning for about three months. The patient was right-handed and had no history of mechanical trauma, familial nail disorder, chronic disease, or drug use. The patient had applied henna to the affected nails, thinking that it would improve the deformity. Dermatologic examination revealed thinning, fragility, concavities in the distal part of the nails, and orangish discoloration in the second to fifth nails on the right hand. These findings were compatible with koilonychia. There was also transverse leukonychia on the first fingernails of both hands. Examination of the left-hand nails was normal (Figures 1a and 1b).

Figure 1 (a). Thinning, fragility, concavities in the distal part of the nails, and orangish discoloration in the second to fifth nails on the right hand. **Figure 1 (b).** Side view of the koilonychia. **Figure 1 (c).** Dermoscopic image of the affected nail.

Dermoscopic examination revealed horizontal splitting distal to the second to fifth nails of the right hand and punctate brown-gray discoloration (thought to be due to henna) on the cuticles and distal free edges of the second to fifth nails of the right hand (Figure 1c). The patient had no symptoms of psoriasis or lichen planus, and the oral mucosa examination was normal. Laboratory tests including hemogram, sedimentation, renal and liver function tests, ferritin and iron level tests, iron-binding capacity, and thyroid hormone level tests were within normal limits. Chest radiography and electrocardiogram were also normal. A vitamin B12 level of less than 100 ng/L and folate level of 3.59 ng/mL were detected (reference ranges of 197–771 ng/L and 3.8–16 ng/mL, respectively). A clinical diagnosis of sodium hypochlorite–induced koilonychia was made. The patient was recommended to stop contact with chlorinated bleach and to stop household cleaning. The following medications were started: 1000 mcg/ml cyanocobalamin administered by intramuscular injection once a week and 5 mg/day folic acid administered orally. No topical treatment was applied to the nails. After one month, it was observed that the koilonychia regressed (Figure 2). The patient stated that she did not stop household cleaning until the one-month follow-up visit while reducing the frequency of exposure to chlorinated bleach from twice a week to once a week. No signs of koilonychia were observed for the following six months.

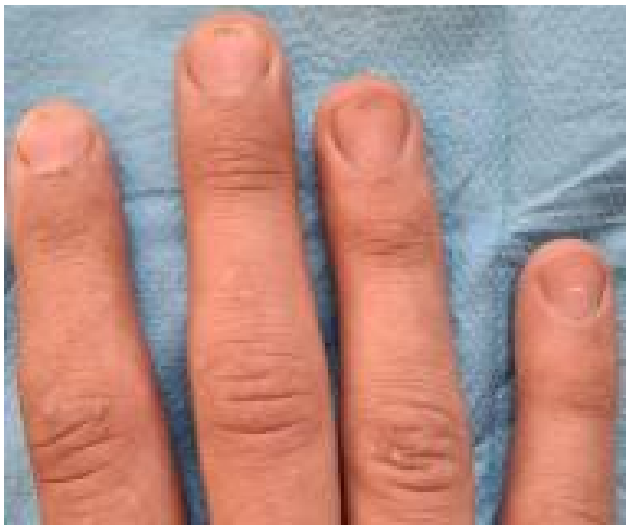

Figure 2. Improvement in nail appearance after one month.

Discussion

The patient's occupation has an important role in the etiology of koilonychia. The textile industry, industries requiring high contact with certain chemicals, and

industries requiring frequent hand washing may be particularly affected by koilonychia. Mechanical trauma such as nail biting and exposure to chemicals such as acids, alkalis, solvents, and motor oils may cause koilonychia (2). Alkaline chemicals can cause koilonychia as they disrupt the integrity of the nail plate; the attractive effect of connective tissue bundles extending from the subungual tissue to the nail plate causes the nail to become spoon-shaped (3). Sodium hypochlorite is an easily accessible alkaline chemical that is frequently used for bleaching and surface disinfection. It is known to cause urticaria, irritant dermatitis, and allergic contact dermatitis (4). The corrosive effect of sodium hypochlorite (5.25%) on nails has been previously demonstrated by Hartnett et al. (5). According to the results of this in vitro study, the free edge of the fingernails dissolved within six hours following submersion in bleach. Since our patient was right-handed, the primary exposure of the right hand to sodium hypochlorite may explain this case of unilateral koilonychia. It has also been reported that the predominant involvement of the first three fingernails may be a sign of occupational koilonychia (2, 6). In our case, although the second to fifth nails of the right hand was affected by koilonychia, the nail deformity was more severe in the second and third nails than in the last two nails, consistent with the relevant literature. Our patient did not have any symptoms associated with dermal exposure to sodium hypochlorite. This may be because the turnover time of the nail plate (months) is longer than that of the skin (days) and repetitive damage is less tolerated in the nail plate than in the skin.

Treatment of the underlying cause and avoidance of occupational or traumatic factors are recommended for the treatment of koilonychia. An effective response to topical tazarotene (0.1%) gel has been reported in an occupational case of unilateral koilonychia with subungual hyperkeratosis (6). Our case was treated with a combination of vitamin B12 and folic acid, and no topical treatment was applied. Vitamin B12 and folic acid are critical for DNA synthesis, protein synthesis, and keratinocyte proliferation (7, 8). Deficiencies in vitamin B12 and folic acid deficiencies are known to be associated with skin and nail hyperpigmentation, stomatitis, and cheilitis (9). However, none of these symptoms were present in our case. Although koilonychia secondary to vitamin B12 deficiency has been previously described (2), to our knowledge, koilonychia accompanied by folic acid deficiency has not been reported in the existing literature. One of the factors responsible for the pathogenesis of koilonychia is the deficiency of sulfur-containing amino acids (2). Vitamin B12 and folic acid play an important role in the metabolism of methionine and cysteine, the best-known sulfur-containing amino acids. Methylcobalamin, an active form of vitamin B12, and folic acid as a methyl group donor are essential for the functioning of the enzyme methionine synthase, which is involved in the synthesis of methionine from homocysteine (10). In our patient, vitamin B12 and folic acid deficiency may have triggered koilonychia by disrupting the metabolism of sulfur-containing amino acids. In our case, it is not clear which of the two supplements contributed to the improvement of the patient's condition, especially in the nails, or whether there was a synergistic effect.

Our case is valuable in terms of the association of vitamin B12 and folic acid deficiencies with unilateral koilonychia and the rapid improvement of koilonychia due to vitamin B12 and folic acid replacement. In conclusion, this preliminary observation suggests the need to check vitamin B12 and folic acid levels in patients with unilateral koilonychia and that replacement of these vitamins in cases of deficiency may be part of the treatment for koilonychia.

Teaching Points:

1. Koilonychia, also called a spoon-shaped nail, is a nail deformity characterized by the concavity of the nail plate, which may occur due to idiopathic, genetic, or acquired causes. Acquired koilonychia may be associated with anemia, avitaminosis, dermatologic and systemic disorders, mechanical trauma, or exposure of the nails to chemicals such as acids, alkalis, and solvents.

2. Treatment of the underlying cause and avoidance of occupational or traumatic factors are recommended for the treatment of koilonychia.

3. In patients with unilateral koilonychia, vitamin B12, and folic acid levels should be checked, and the replacement of vitamin B12 and folic acid in cases of deficiency may be part of the treatment for koilonychia.

Author contributions

The author confirms sole responsibility for the following: literature search, drafting the case, editing, and writing

the manuscript.

References

1.Gupta I, Tyagi M, Dayal S, Singh J. Unilateral koilonychia secondary to chemical depilatory product. Skin Appendage Disord 2021;7(1):25-8.

2.Walker J, Baran R, Vélez N, Jellinek N. Koilonychia: an update on pathophysiology, differential diagnosis, and clinical relevance. J Eur Acad Dermatol Venereol 2016;30(11):1985-91.

3.Balestri R, Rech G, Girardelli CR, Piraccini BM, La Placa M. Acute koilonychia of fingernails due to lye. Skin Appendage Disord 2017;2(3-4):183-4.

4.Chung I, Ryu H, Yoon SY, Ha JC. Health effects of sodium hypochlorite: review of published case reports. Environ Anal Health Toxicol 2022;37(1):e2022006-0.

5.Hartnett KM, Fulginiti LC, Di Modica F. The effects of corrosive substances on human bone, teeth, hair, nails, and soft tissue. J Forensic Sci 2011;56(4):954-9.

6.Hagman JH, Ginebri A, Mordenti C, De Simoni I, Chimenti S. Treatment of occupational koilonychia with tazarotene gel. Acta Derm Venereol 2003;83(4):296-7.

7.S Addor FA. Nutrient supplementation influence on keratinocytes' metabolism: an in vitro study. Surg Cosmet Dermatol 2012;4(2):150-4.

8.Mahmood L. The metabolic processes of folic acid and vitamin B12 deficiency. J Health Res Rev 2014;1:5-9

9.Aşkın Ö, Uzunçakmak TKÜ, Altunkalem N, Tüzün Y. Vitamin deficiencies/hypervitaminosis and the skin. Clin Dermatol 2021;39(5):847-57.

10.Brosnan JT, Brosnan ME. The sulfur-containing amino acids: an overview. J Nutr 2006;136(6 Suppl):1636S-1640S.