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CASE REPORT

Acquired Nail Hypertrophy Due to Nickel Contact Allergy with Dermoscopic findings: A Case Report and Literature Review

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Abstract: Nickel stands as one of the prevalent contact allergens, but acquired nail hypertrophy presenting as ACD due to nickel exposure is infrequent. Here we report a case of acquired nail hypertrophy stemming from ACD due to nickel, displaying an uneven coloration, along with nail grooves, deck distortion damage, small surface pits and ecchymosis beneath the damaged deck. The patient limited nickel contact and recovered after 11 months of follow-up.

Keywords: allergic contact dermatitis, nail, hypertrophy, nickel

Introduction

Nickel stands as one of the prevalent contact allergens contributing to delayed-type hypersensitivity reactions on the skin globally. Nickel allergic contact dermatitis (ACD) typically manifests as pompholyx, eczema, erythema multiforme-like lesions, and lichenoid reactions. Infrequent clinical patterns include granuloma-annulare-like reactions, vitiligo-like lesions, lymphomatoid contact dermatitis, sycosis barbae-like dermatitis, and vasculitis. Acquired nail hypertrophy presenting as ACD due to nickel exposure is infrequent, here we report a case of acquired nail hypertrophy stemming from ACD due to nickel.

Case Presentation

A 34-year-old female garment worker without a history of atopic conditions reported experiencing fingernail thickening over the past 8 months. Small pinpoint-sized blisters appeared around the nail beds, accompanied by sudden thickening of the distal nail plates initially. The nail hypertrophy persisted despite undergoing treatment with topical steroids, systemic antiallergic medication, and glucocorticoids for over a month, and the lesions gradually extended to the proximal nail fold. (Figure 1A).

The patient denied any history of nail trauma, paronychia, psoriasis, chronic actinic dermatitis, hyperthyroidism, autoimmune diseases, tumors, liver or kidney dysfunction, familial psoriasis, keratosis follicles or consanguineous marriages. Dermoscopic examination revealed thickening and roughness of the distal 1/3-1/2 of most fingernail plates, displaying an uneven yellowish-brown to blackish-brown coloration, along with transverse nail grooves, deck distortion damage, small surface pits, and ecchymosis beneath the damaged deck (Figure 1D and E). Patch testing was performed according to the ESCD guideline using the European baseline local supplementary and perfume series, showed a positive reaction (2+) to nickel sulfate 5%, characterized by erythema and papules in the local area (Figure 1F).

The patient was diagnosed as nickel allergic contact dermatitis, Recommendations included avoiding the use of stainless steel cookware, tableware, or drinking utensils. Furthermore, she was advised to temporarily change her work position and modify her diet by reducing or eliminating foods containing nickel, such as tea, nuts, seafood, canned goods, and beans. Improvement in her fingernails was observed after 4 months (Figure 1B), with complete recovery achieved after 11 months of follow-up (Figure 1C).

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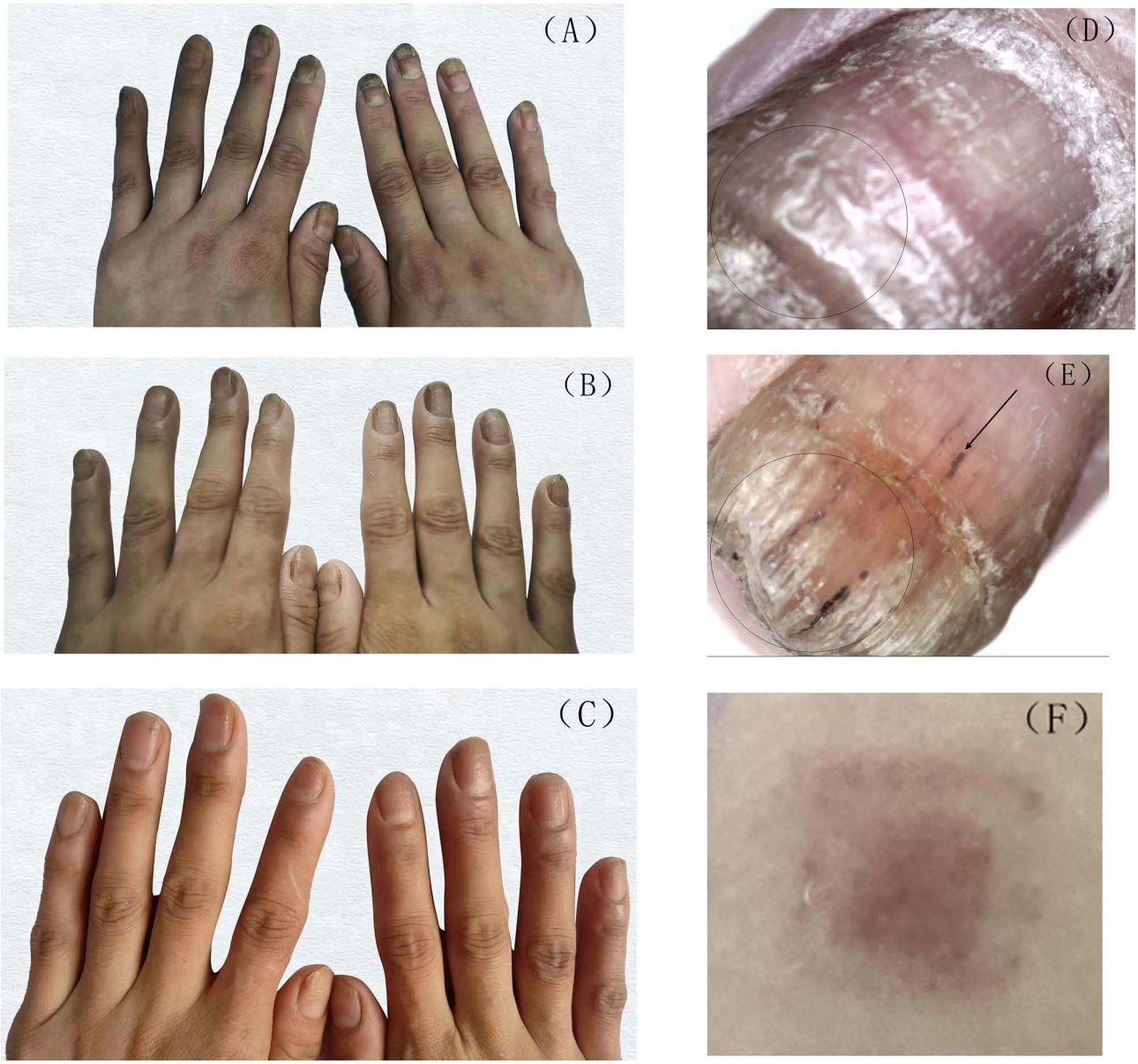

Figure 1 (**A**) Multiple fingernails hypertrophy before treatment. Chronic vesicular lesions involving the proximal nail fold of the fingers and thumbs. (**B**) Nail hypertrophy improved after 4 months follow-up. (**C**) Fingernails hypertrophy improved after 11 months follow-up. Dermatological examination of thumb deck (**D**) and finger deck (**E**) before treatment: A transverse groove (black arrow). Distal deck hypertrophy and distortion damage (black circle), subungual hemorrhage was discovered. (**F**) Patch test in 48 hours: Erythema, and papules were seen in local area.

Discussion

Nickel allergic contact dermatitis extensive usage spans various industries, encompassing specialized occupations,[1] devices used for Congenital heart disease,[2] intraoral appliances jewelry, earlobe rash, diet, watches, shirts, pants, minerals, printing and dyeing agents, surgical implants and filling materials.[3,4] Significantly higher estimations of M1 macrophages, activated mast cells, neutrophils, activated NK cells, $CD4^+$ memory T cells upon nickel exposure,[5] Differential diagnosis entails irritant and allergic contact, mycosis, psoriasis, pachyonychia congenita and yellow nail syndrome. The patient denied history of prior clinical disease or poisoning, the patient exhibited a positive reaction to nickel in patch testing, with negative results in direct microscopic examination for fungi. Improvement in nail lesions occurred after changing occupations and avoiding nickel-containing foods over an 11-month period, further corroborating the link between the patient's nail anomaly and nickel exposure.

We hypothesized that the patient's regular exposure to dyeing agents and metal buttons at work contributed to her condition. It is reported that 3.7% of positive reactions to nickel were related to occupation, which decreased significantly from 7.9% in 1994–1996 to 1.9% in 2013–2014.[4] The main barrier for nickel penetration is the stratum corneum (SC), through which a lag time of 50 hours has been described,[6] nickel may persist in the nail folds longer than other parts of the hands due to the anatomical structure. Brief and repeated contact with nickel in her workplace environment likely lead to skin deposition and the development of chronic hand eczema.[7] Early eczema-like changes around the distal nail folds may lead to nail dystrophy and Destruction of SC. Persistent allergies may have resulted from long-term exposure to metal buttons and dyeing agents. Previous studies have shown that even short but recurrent skin contact can result in nickel accumulation over time.[8] Prolonged contact with the skin, sweat and friction may induce subclinical maceration and release of nickel into the skin.[9] While Peters' indicated that the concentration of nickel in nails is primarily determined by the intensity rather than the duration of exposure.[10] For patients with nickel-associated ACD, an application of clear nail polish may allow them to avoid the allergic sequelae from contact with nickel-containing metal buttons.[11] The case highlights a rare manifestation of nickel contact allergy, specifically nail hypertrophy, reinforcing the need for clinicians to consider occupational exposure in dermatological diagnoses. Early recognition and management, including avoidance of nickel, led to a successful outcome. It also suggests the value of early intervention and potential preventive measures in high-risk environments. To our knowledge, no previous cases of nail hypertrophy as the primary manifestation from ACD of nickel has been reported in Asian. Limitations of the article is the single-patient nature of the case, the need for longer follow-up, and the potential variability in responses to nickel exposure based on individual sensitivity.

Consent for Publication

The publication of images was included in the patient's consent for publication of the case. Institutional approval was not required, because the patient was anonymous.

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Disclosure

The authors declare no conflict of interest.

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