

Nickel Allergy in an Adolescent Mimicking Angioedema

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Abstract

Nickel is the most common cutaneous contact allergen in children. Allergic contact dermatitis eruption is typically localized to the skin areas that come into contact with the allergen and usually presents as recurrent eczematous lesions on the sites of direct contact. We report an adolescent patient who had severe edema of the face mimicking angioedema after the application of boiled chickpea water and has been found to have allergic sensitization to nickel and cobalt. We want to emphasize the unusual presentation of allergic contact dermatitis and different sources of nickel exposure contrary to those already known.

Key words: Adolescent, Allergic contact dermatitis, Angioedema, Nickel, Patch test

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Introduction

The incidence of contact dermatitis among adolescents has been increasing.¹ Nickel is the most common cutaneous contact allergen in children.² Increased exposure to nickel and barrier dysfunction are the prominent risk factors for children.³

We present a case of allergic contact dermatitis with severe facial edema due to the application of chickpea water after sensitization from nickel.

Case

A 17-year-old female patient was referred to a pediatric allergy clinic because of edema on her face. Boiled chickpea water was used as a face mask all night long before going to sleep for one week to cure the acne on her face. She did not have any history of allergic disease. One year ago, she applied a clay mask on her face for the acne and then edema occurred on her face. She was diagnosed with cellulitis and hospitalized for treatment.

Physical examination revealed angioedema on her face prominent on the glabellar region and eyelids (Figure 1) and also acne on the cheeks, chin and between the eyebrows. Erythema was present on the eyelids. Urticaria was never present. There was no evidence of pruritus or acute eczematous dermatitis. No pathology was detected in ophthalmic examination. No laboratory abnormalities were detected, including complete blood count, acute phase reactants, complement component 1 (C1) esterase inhibitor and C4 level. Skin prick test with

common aeroallergens, chickpea, lentil, bean, tree nuts and peanut were performed with a negative result. The patch test was performed with the standard series; Thin-Layer Rapid Use Epicutaneous Test (T.R.U.E ®) and chickpea itself that was used by the patient to cure her acnes. The results of the patch tests were evaluated after 48 and 72 hours. A positive reaction to nickel and cobalt were observed at 48 hours. At 72 h, a strong reaction to nickel characterized by intense erythema and infiltration was noted. In addition, a weak reaction to cobalt was documented and a negative reaction to chickpea was observed. The patient was questioned about nickel-containing substances. In her daily life, she rarely wore a wristwatch or jewelry. She consumed all legumes, including chickpea, without any problems. Repeat open application test was performed with water containing no chickpea and angioedema was not observed. For the challenge with chickpea, an open application test with boiled chickpea water was applied locally on the patient's face. Applied chickpea water was prepared in the same way as the patient did previously. The chickpea was boiled in a metal coffee pot. Angioedema was observed on the face of the patient on the 7th day after the local application of chickpea water. The metal coffee pot that she used to prepare the face mask was examined with the dimethylglyoxime (DMG) nickel spot test that detects nickel release. A positive result was shown by observing pink color on the applicator proving DMG reaction with nickel salts (Figure 2).⁴ At last, an open application test with boiled chickpea water prepared in a glass pot was applied locally on the patient's face on repetitive consecutive days revealed mild angioedema.

Discussion

Nickel is the most frequent cause of contact allergy worldwide. The prevalence ranges between 8% and 10% in children and adolescents, and is more common in girls.⁵ The route of exposure through the skin occurs from metals containing nickel, household supplies and cosmetics, with systemic exposure being possible from foodstuffs, drinking-water and air.⁵ Nickel is naturally present in the soil and water, and frequently contaminates foods, especially plant foods. The amount of nickel in foods varies from place to place depending on the content of the soil where the food is produced.^{6,7} Some foods are high in nickel, such as cocoa and chocolate, nuts, grains and legumes.⁵

Sensitization to nickel can occur either by exogenous (skin contact) or endogenous exposure (oral, inhalation).⁸ Nickel skin penetration, absorption and deposition is of major importance for the development of allergies.⁵ Barrier dysfunction, friction and extent of the contact area, region of the body, skin thickness, occlusion, temperature, sex, race, age, humidity, and pH all effect the nickel skin penetration and deposition.⁵ In our patient, we suggest that high levels of nickel-containing substances such as clay and chickpea water applied to the face for a long time repetitively caused sensitization and allergy. Previously known as, dietary nickel or high nickel containing food consumption can elicit cutaneous flare-ups in nickel sensitized individuals. In this case we suggest that chickpea which is a potentially high nickel containing food caused hypersensitivity reaction by exogenous exposure like metals. Boiling the chickpea in a nickel releasing metal pot may have provided large doses of nickel penetration. Repeated applications seem to reinforce the hypersensitivity reaction also. Considering that homemade facial masks prepared with herbal essentials have become widespread among women recently, it is our prediction that foods containing nickel may also

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increase the risk of allergic reactions not only by systemic exposure but also through the skin contact. In her daily life, our patient rarely wore a wristwatch or jewelry and did not describe any clinical findings other than these reactions. Our patient had symptoms only after long-lasting exposure of substances with a high nickel content, like clay and chickpea water boiled in a metal coffee pot. Nickel allergy lasts for a lifetime; however, reactivity may change with time. For the same person, a 250-fold variation has been defined over the course of time.⁵

In sensitized individuals, ACD is typically localized to the skin areas that come into contact with the allergen. Skin findings of allergic contact dermatitis include localized primary eruptions (eczematous lesions on the area of the contact with substances containing nickel) or generalized secondary eruptions (eczematous or non-eczematous eruptions).⁸ Flare-up of the prior lesions and also unexposed areas (maculopapular rash, vasculitis-like lesions) as well as general symptoms (headache, fever, malaise) are the main features of the clinic.⁸ The presentation is rarely severe, including edema of the face, scalp, and ears, which can be mistaken for angioedema, as seen in our patient.⁸ In our patient's medical history, after the application of a clay face mask which contains nickel, a misdiagnosis of cellulitis was made due to edema of the eyes and glabella. This was because no sign of dermatitis was present. She was unnecessarily treated with intravenous antibiotherapy. Allergic contact dermatitis mimicking angioedema caused by black henna, castor oil and paraphenylenediamine has been previously reported in the literature.⁹⁻¹¹ To the best of our knowledge, this is the first case of angioedema-like allergic contact dermatitis related to nickel.

Conclusion

We report an unusual case of allergic contact dermatitis caused by nickel. Practitioners should be aware of the presentation which is similar to angioedema. Finding the source of the nickel exposure requires an elaborate medical history investigating the patient's daily routine and environment. Patch testing is necessary to demonstrate the allergen(s). A detailed medical history combined with the patch test would guide clinicians to the correct diagnosis.

Consent for Publication

The father of the patient has given her written consent to publish this article.

Author Disclosure Statement

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Figure 1. Angioedema after chickpea water application

Figure 2. The demonstration of the dimethylglyoxime nickel spot test used to detect nickel on the metal pot



