

Systemic Nickel Allergy Presenting as Papuloerythroderma-like Eruptions

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Papuloerythroderma is characterized by erythroderma with widespread coalescent solid or lichenoid papules, and eruptions often spare skin folds. Below is reported an old woman experiencing pruritic papules for a long period.

CASE REPORT

An 82-year-old woman had had pruritic papules on her entire body for 4 years. Her medical history included hypertension controlled with cilnidipine. On examination, there were numerous red-brown lichenoid papules on her trunk and extremities. The papules tended to aggregate or coalesce to form diffuse erythematous plaques with sparing flexors, mimicking papuloerythroderma (Fig. 1). Laboratory data revealed elevated levels of blood eosinophils (1204/ μ l) and lactate dehydrogenase (354 U/l), but no other abnormal findings. Histologically, lichenoid papules showed irregular acanthosis with hyperkeratosis. There was a cellular infiltrate comprising lymphocytes and eosinophils in the upper dermis (Fig. 2). Extensive examinations, including serum tumour markers, computed tomography and fiberoptic examination of the gastrointestinal tract, did not reveal any evidence of internal malignancy. The condition had been resistant to topical corticosteroids prior to admission, but the skin lesions improved after external application of petrolatum and without cessation of cilnidipine. Lymphocyte stimulation test and patch-testing for cilnidipine (10% and 20% in petrolatum) were negative. She did not have a history of allergic reactions to metals. However, patch-testing for metals revealed positive reactions for NiSO_4 (5% aq) and $\text{K}_2\text{Cr}_2\text{O}_7$ (0.5% aq) at 48 h, 72 h and 7 days. Oral challenge test with 12 mg $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$ (2 mg Ni) (1, 2) induced diffuse erythema with pruritus on her trunk and extremities, but similar effects were not seen with 7.5 mg K_2CrO_4 (2.5 mg Cr) or placebo control (NaCl 10 mg) (Fig. 3); the reaction peaked at 2 days after challenge. Examination revealed that her dental materials contained nickel, as determined by X-ray fluorescence spectroscopy. In addition, the patient had been consuming boiled Japanese barnyard millet as part of her diet. She was advised to



Fig. 1. Clinical features of skin lesions. (A) Numerous lichenoid papules were distributed on the trunk. (B) Eruptions spared popliteal fossa.

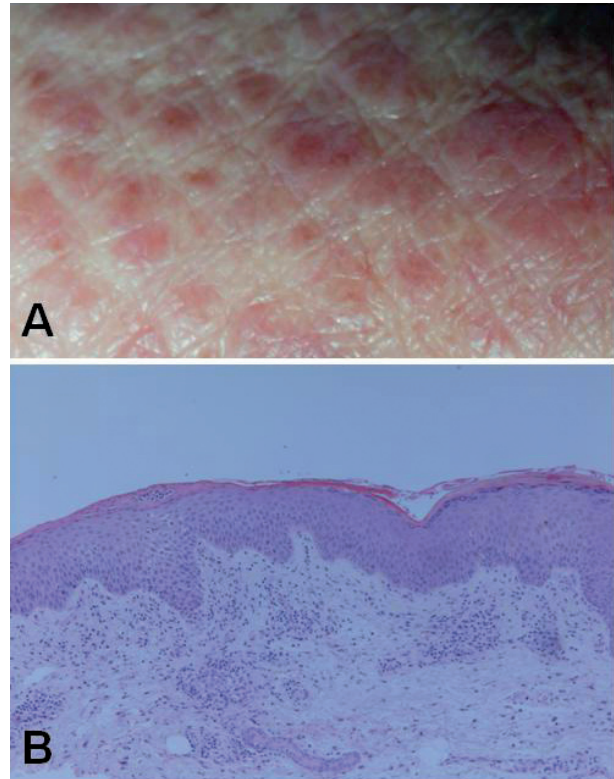


Fig. 2. Clinical and histological manifestations of lichenoid papules. (A) Polygonal, red, solid papules on the arms. (B) Papules showed parakeratotic hyperkeratosis and acanthosis with dermal cellular infiltrates. (Haematoxylin and eosin staining, original magnification $\times 100$).

avoid this food and to commence a low-nickel diet (3) together with sodium chromoglycate.

DISCUSSION

Papuloerythroderma was first described by Ofuji et al. (4). Papuloerythroderma has been reported to be associated with internal malignancy (5, 6), and recent reports have shown that it may occur due to ingestion of aspirin or furosemide (7, 8). The present case exhibited papuloerythroderma-like eruptions characterized by aggregated lichenoid papules on the entire body, but it was intriguing that the present patient had a nickel allergy, as demonstrated by the positive skin patch-test and oral challenge test with NiSO_4 . Nickel is known to be a common cause of contact allergies, and it is present in various metal compounds, such as coins, ornaments, utensils and dental braces. Systemic intake of nickel can induce pompholyx and/or systemic contact dermatitis (9, 10). However, we are not aware of any

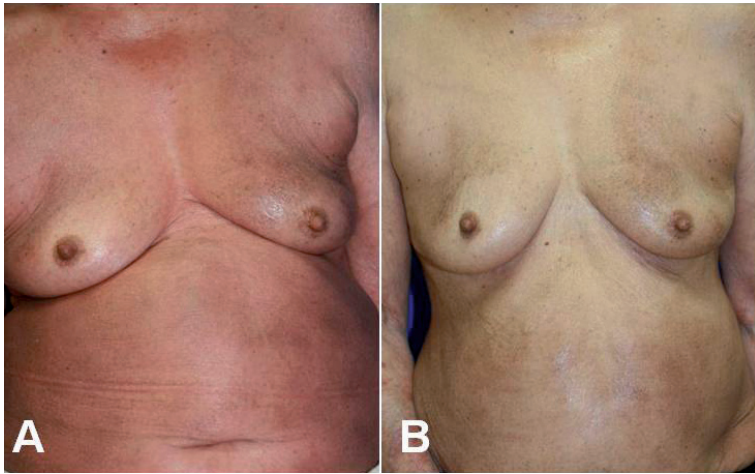


Fig. 3. Oral challenge test. (A) Twenty-four hours after challenge with NiSO_4 . Diffuse erythema on the trunk. (B) Challenge with placebo control (NaCl). No erythema.

prior reports of papuloerythroderma-like eruption as a systemic symptom.

Notably, the patient had been consuming boiled Japanese barnyard millet as a health supplement, which contains large amounts of nickel ($535 \mu\text{g}/100 \text{g}$) (3). It was estimated that her nickel intake was $160 \mu\text{g}/\text{day}$. Thus, in our patient, this health supplement could have been a major source of nickel that may have caused skin symptoms, although nickel derived from dental braces might also have contributed to some extent. This notion was supported by the finding that skin symptoms improved after hospitalization with the cessation of Japanese barnyard millet, and the removal of dental braces was not necessary.

Oral challenge with $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$ induced acute diffuse erythema, but not lichenoid papules. Continuous administration of nickel may be required for the gradual development of papular lesions characteristic of papuloerythroderma.

The present case suggests that eruptions presenting as papuloerythroderma may be a manifestation of a systemic allergy to metals, in addition to indicating an underlying malignancy, or a reaction to drugs.

The authors declare no conflict of interest.

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