

Systemic allergic dermatitis resulting from oral administration of chromium with a food supplement

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Contact dermatitis is produced by external exposure of the skin to an allergen. Sometimes, a systemically administered allergen may reach the skin through the circulatory system, and thereby produce systemic allergic dermatitis, which may result in a variety of skin eruptions (1). The allergens responsible for this clinical manifestation include nickel, cobalt, and zinc (2–4), but systemic reactions to chromium have been rarely reported (5–7).

We describe here a case of systemic allergic dermatitis resulting from oral administration of chromium with a food supplement in a chromium-sensitized patient.

Case Report

A 41-year-old man presented with a 7-day history of a widespread, pruritic, exanthematous eruption. Examination showed a maculopapular rash covering the trunk, arms, forearms, and thighs (Fig. 1a). No other abnormality was found, including lymphadenopathy, oral symptoms, involvement of internal organs, haematological abnormalities, or fever. The skin lesions were refractory to oral antihistamines (cetirizine 20 mg daily for 5 days)

and topical corticosteroids. The patient reported that he had taken no other conventional drug, but a detailed history revealed daily intake of a food supplement for the previous 4–5 weeks. The preparation contained 10 µg of chromium chloride per 10 ml of syrup, giving an estimated daily intake of 50 µg of the metal. The food supplement was analysed at the laboratory of our department, and the dose/concentration was in accordance with that stated on the package. The preparation did not contain nickel, vitamin B12 (cyanocobalamin), or iron.

We did not use any conventional treatment with antihistamines or corticosteroids, but we stopped the use of the food supplement, and the maculopapular rash resolved completely within 2 weeks. Systemic contact dermatitis was suspected, and patch testing was performed with the European baseline series extended with additional metals, including chromium(III) chloride (Lofarma, Milan, Italy), in Finn Chambers® on Scanpor® tape (SmartPractice, Phoenix, AZ, USA). Patch tests were applied with 2 days of occlusion, and readings were performed at D2, D3, D5, and D7. According to the International Contact Dermatitis Research Group criteria, positive reactions (++++) to chromium(III) chloride (1% pet.) and potassium dichromate (0.5% pet.) developed on D2 and persisted up to D7. A mild flare-up reaction was observed during patch testing (Fig. 1b). Two months later, after giving informed consent, the patient was subjected to systemic challenge. A daily dose of 50 ml

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Fig. 1. (a) Maculopapular rash covering the trunk, arms, and anterior flexural crease of the elbows. (b) Flare-up reaction during patch testing.

of the food supplement (50 µg of chromium) was given orally for five consecutive days, and resulted in recurrence of the maculopapular rash. Use of the preparation was stopped again, and lesions resolved within 1 week. The patient was advised not to use food supplements containing chromium, and no recurrence of the maculopapular rash occurred during a 12-month follow-up period.

Discussion

Chromium-induced allergic contact dermatitis is mainly exacerbated following skin contact with hexavalent

chromium but trivalent chromium compounds may also be responsible (8). Systemic allergic dermatitis can be elicited in these patients by oral ingestion of the allergen in the hexavalent form (5) or in the form of trivalent chromium, that is, chromium picolinate (6) or chromium chloride (7).

In our patient with widespread maculopapular rash, the results of the elimination and provocation test with the food supplement containing chromium chloride and the sensitization to chromium chloride and potassium dichromate suggest the diagnosis of systemic allergic dermatitis resulting from oral administration of chromium.

Recently Ozkaya et al. (7) described the first case of systemic allergic dermatitis caused by chromium chloride contained in multivitamin/multimineral tablets in a potassium dichromate-sensitized patient. Our case report adds some novel features. In patch testing, we found a positive reaction to chromium(III) chloride, the trivalent form of chromium that was contained in the food supplement. Ozkaya et al. (7) found a positive reaction to potassium dichromate, but did not perform additional patch testing with chromium chloride. The second point was the amount of chromium that caused systemic contact dermatitis in the sensitized patients. Ozkaya et al. (7) reported the exacerbation of chromate-induced eczema with a daily intake of chromium chloride (150–300 µg daily for the previous 2–3 months) that was much lower than the exposure to milligrams of oral potassium dichromate reported in the previous study by Veien et al. (5). Interestingly, in our patient, the estimated intake of chromium with the food supplement preparation was much lower (50 µg daily for the previous 4–5 weeks), although slightly higher than the adequate daily intake (35 µg) for adult men (9). The increasing prevalence of chromium allergy among dermatitis patients (10) and the growing popularity of food supplements containing metals suggest that we should suspect systemic contact dermatitis and take a detailed medical history when patients present with a widespread, pruritic, maculopapular rash that is refractory to conventional therapy.

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