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Case report

Contact allergy to gold after systemic administration of gold for rheumatoid arthritis

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SUMMARY A patient with seropositive, nodular rheumatoid arthritis (RA) developed contact allergy to gold jewellery following a severe skin rash which occurred after 13 weeks of treatment with sodium aurothiomalate. Patch testing confirmed that the contact allergy was due to gold. This is the first proved case of contact allergy to gold or any other compound initiated by systemic administration of the allergen.

Case report

A 52 year old woman had a 15 year history of seropositive, erosive RA. She also had a history of psoriasis and hay fever, was allergic to neomycin and cosmetics, and there was a family history of atopy. Extra-articular features of her RA included peripheral and pulmonary rheumatoid nodules proved by biopsy and keratoconjunctivitis sicca. In 1978 she was treated with intramuscular sodium aurothiomalate 50 mg weekly for 13 weeks. A disease remission ensued, but treatment with gold was stopped after a severe, generalised, pruritic skin rash. The patient subsequently noted a contact rash if she wore gold jewellery, whereas before the administration of sodium aurothiomalate this had never occurred. She also noted that higher grades of gold jewellery produced a more severe skin rash. Contact allergy persisted and eventually she was unable to tolerate wearing any gold jewellery. Eight years after her initial gold reaction she was patch tested, in the absence of any clinical dermatitis, to the following antigens (supplied by Trolab laboratories): potassium dichromate 0·5%, cobalt chloride 1%, nickel sulphate 5%, potassium dicyanoaurate 0·002% (in water), sodium thiosulphatoaurate 0·5%, copper sulphate 1% (in water). She had strongly positive reactions to potassium dicyanoaurate and sodium thiosulphatoaurate, developing erythema with vesiculation and pruritus. Two weeks later these areas were still obvious. There were no reactions to cobalt chloride or nickel sulphate and there were faint irritant reactions only to potassium dichromate and copper sulphate.

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Discussion

Contact allergy to jewellery is a well known phenomenon and is usually due to metals such as copper and nickel.[1] Contact allergy to gold is rare but has been reported with rings, ear-rings, other jewellery, dental crowns, and an orbital implant.[2] Contact allergy to gold initiated by the systemic administration of therapeutic gold compounds and confirmed by patch testing has not been previously described. To our knowledge there is no documented case of the systemic administration of any substance initiating a contact allergy to that substance.

Two previous reports have linked gold injections with contact dermatitis. An allergic bullous eruption localised to the jewellery areas occurring 12 hours after the first injection of sodium aurothiomalate has been reported in a patient with RA and a history of contact allergy to jewellery.[3] Patch testing showed this reaction to be due to nickel, however, and nickel was subsequently found in the sodium aurothiomalate solution after contact with a metallic

needle. An exacerbation of a pre-existing contact dermatitis to jewellery has been described after one injection of sodium aurothiomalate, but this report contained no description of patch tests.[4] Both the above cases had pre-existing contact dermatitis to jewellery before the therapeutic administration of gold and had reactions limited to the jewellery areas after one injection of sodium aurothiomalate. In contrast, our patient had no history of previous contact dermatitis and developed her gold allergy, confirmed by patch testing, after a three month course of sodium aurothiomalate.

The immunological function of the skin and the mechanisms underlying contact allergy have been recently reviewed.[5,6] Epidermal Langerhan's cells bind low molecular weight allergens which have penetrated the stratum corneum and combined with autologous proteins. Langerhan's cells present antigens to T lymphocytes bearing appropriate HLA and antigen receptors. This specific interaction is then amplified through the release of interleukins and interferon, resulting in a clone of sensitised T cells. Topical applications of gold are soluble in a range of amino acid solutions and enter the skin of experimental animals. Skin samples from beneath gold rings on the fingers of normal controls showed a similar gold content to that of the skin of patients with RA who were receiving treatment with gold. These observations suggest that gold in contact with the skin may form compounds which dissolve in sweat, are absorbed through the skin, and may sensitise a local area.[7] In susceptible subjects sensitisation usually occurs following first exposure to an antigen and usually involves the entire integument.[6,8] Systemic exposure, as used in hyposensitisation regimens, favours the development of immunological tolerance, perhaps because the epidermal Langerhan's cells are bypassed.[5,6]

In contrast, our patient appears to have been sensitised via the systemic route, with no evidence of contact allergy to gold before or during a course of treatment with sodium aurothiomalate. The contact allergy may then have been precipitated by a local concentration of gold in the skin beneath jewellery areas sufficient to cause a delayed hypersensitivity response. We believe ours is the first recorded case of contact allergy to any compound initiated by systemic administration.

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