

Short Communication

Occupational allergic contact dermatitis and blepharoconjunctivitis caused by gold

TUULA ESTLANDER¹, OSMO KARI², RIITTA JOLANKI¹ AND LASSE KANERVA¹

¹Section of Dermatology, Finnish Institute of Occupational Health, Topeliuksenkatu 41 aA, FIN-00250 Helsinki, Finland

²Skin and Allergy Hospital, University of Helsinki, Helsinki, Finland

Key words: allergic contact dermatitis; blepharoconjunctivitis; electrolytic process; gold plating; hydrazine; gold potassium cyanide; gold sodium thiosulfate; patch testing; prick testing; occupational; airborne. © Munksgaard, 1998.

The best-known adverse reaction to gold is as a side-effect of parenteral Myocrisin® (gold sodium thiomalate) (Rhône-Poulenc Rorer A/S). Gold and its salts can also cause allergic contact dermatitis (1, 2) and granulomatous contact dermatitis (3). Contact allergy to dental gold can lead to gingivitis and glossitis (4–6). Oral lichen planus has also been associated (5, 6). Black dermographism and chrysiasis can additionally occur (1).

Case Report

A 26-year-old non-atopic man, who had previously had neither dermatitis nor blepharoconjunctivitis, had been working in the electroplating department of a metal factory for 7 months when he developed eczema on his fingers and eyelids, with redness and itching of the eyes. For the past 3 months, he had been exposed to both gold-plating solutions and metallic gold. His symptoms were alleviated during weekends and disappeared in a week away from work. He had no symptoms on exposure to nickel, silver or tin-plating solutions. Exposure to gold came from the gold-plating of small metal objects for 4 h a day in 3 tanks, only 1 of which was computerized. The gold-plating solution contained: make-up (2% hydrazine), stabilizer (10% hydrazine), gold potassium cyanide (68% gold), thallium and water. The patient wore thick industrial PVC gloves, and thin cotton gloves when polishing finished products, as well as a half-mask for respiratory protection.

Investigations included patch and prick tests (8, 9), total IgE and gold-specific IgE antibodies in serum (sodium gold thiosulfate (GST)-RAST) (10), and ophthalmological examination. Patch tests included a modified European standard series, other relevant series, hydrazine sulfate 1%, palladium chloride 10%, silver sulfate 2%, 5 mercury test substances (metallic mercury, phenyl mercuric acetate, merthiolate, mercury chloride, phenyl mercuric nitrate), tin 50%, and copper sulfate 2%, all in petrolatum (pet.) except phenyl mercuric acetate and silver sulfate in aqua (aq.), and GST 0.5% pet. and aq., supplied mainly by Chemotechnique Diagnostics AB (Sweden). Prick tests were performed with a standard series (Allergologisk Laboratorium A/S, Denmark),

GST 0.5% aq. and a GST-HSA (human serum albumin) conjugate (11). On patch testing, only GST (pet., aq.) gave a positive (++) reaction. All prick tests and the GST-RAST were negative. Total IgE was normal. After a working day, scaly dermatitis of the eyelids, chemosis of the bulbar conjunctiva, hyperemia of the tarsal conjunctiva, follicular hypertrophy on the lower lid conjunctiva, and eosinophilia in conjunctival scrapings were noted, consistent with an allergic reaction.

The patient made 2 attempts to continue working in the same factory building but on different tasks. His symptoms slowly relapsed and worsened despite the use of Lomudal® (sodium cromoglycate) eye medication and hand protection, and he had to get a new job with no exposure to gold salts. On follow-up 6 months later, he was symptomless.

Discussion

Gold dermatitis from occupational exposure is very rare (15). Gold salts are usually the cause, rarely gold objects (16). This has been reported from photography and laboratory work, as well as from gold plating (7, 15, 17, 18). Our patient was mainly exposed to gold potassium cyanide, with some additional exposure to metallic gold. Gold plating can also cause sensitization to hydrazine (19). Gold salts are irritants as well as sensitizers (2, 20). The patient had neither gold jewelry nor dental gold. GST has previously been found to be a reliable patch test substance (6, 12–14). Mercury (21) was negative.

Conjunctivitis or blepharoconjunctivitis associated with type IV allergy to occupational chemicals has seldom been reported (22, 23), though acute conjunctivitis associated with allergic contact eczema from gold plating has been mentioned (7). Our patient's findings correspond to the conjunctivitis seen in contact (type IV) allergy to eye medication (24). Similar conjunctival findings can also be seen in chronic conjunctivitis associated with late-phase type-I allergic reactions (23), but type-I allergy to gold or common environmental allergens could not be detected. An irritant eye reaction may also have occurred.

References

1. Webster C G, Burnett J W. Gold dermatitis. *Cutis* 1994; 54: 25–28.
2. Marks J G, Jr, Helm K F, Krueger G G, Griffiths C E M, Guzzo C A, Leyden J J. Contact dermatitis from topical auranofin. *J Am Acad Dermatol* 1995; 32: 813–814.
3. Aoshima T, Oguchi M. Intracytoplasmic crystalline inclusions in dermal infiltrating cells of granulomatous contact dermatitis to gold ear rings. *Acta Dermato-venereologica* 1988; 68: 261–264.
4. Aro T, Kanerva L, Häyrynen-Immonen R, Silvennoinen-Kassinen S, Kontinen Y T, Jolanki R, Estlander T. Long-lasting allergic patch test reaction caused by gold. *Contact Dermatitis* 1993; 28: 276–281.
5. Laeijendecker R, Van Joost Th. Oral manifestations of gold allergy. *J Am Acad Dermatol* 1994; 30: 205–259.
6. Räsänen L, Kalimo K, Laine J, Vainio O, Kotiranta J, Pesola I. Contact allergy to gold in dental patients. *Brit J Derm* 1996; 134: 673–677.
7. Cronin E. *Contact dermatitis*, London: Churchill, Livingstone, 1980.
8. Estlander T. Occupational skin disease in Finland. Observations made during 1974–1988 at the Institute of Occupational Health, Helsinki. *Acta Dermato-venereologica* 1990; (suppl) 155: 1–85.
9. Jolanki R. Occupational skin diseases from epoxy compounds. Epoxy compounds, epoxy resin compounds, epoxy acrylates and 2,3-epoxypropyl trimethyl ammonium chloride. *Acta Dermato-venereologica* 1991; (suppl) 159: 1–80.
10. Estlander T, Kanerva L, Tupasela O, Keskinen H, Jolanki R. Immediate and delayed allergy to nickel with contact urticaria, rhinitis, asthma and contact dermatitis. *Clin Exp Allergy* 1992; 23: 306–310.
11. Hytönen M, Martimo K P, Estlander T, Tupasela O. Occupational IgE-mediated allergic rhinitis caused by ninhydrin. Case report. *Allergy* 1996; 51: 114–116.
12. Bruze M, Edman B, Björkner B, Möller H. Clinical relevance of contact allergy to gold sodium thiosulfate. *J Am Acad Dermatol* 1994; 31: 579–583.
13. McKenna K E, Dolan O, Walsh M Y, Burrows D. Contact allergy to gold sodium thiosulfate. *Contact Dermatitis* 1995; 32: 143–146.
14. Sabroe R A, Sharp L A, Peachey R D G. Contact allergy to gold sodium thiosulfate. *Contact Dermatitis* 1996; 34: 345–348.
15. Schwartz L, Tulipan L, Birmingham D J. *Occupational diseases of the skin*. London: Henry Kimpton, 1957.
16. Camarasa J G, Serra-Baldrich E. Allergic dermatitis caused by gold. Description of a new case. *Med Cutan Ibero Lat Am* 1989; 17: 187–188.
17. Adams R M. *Occupational skin disease*. New York: Grune & Stratton, 1983.
18. Goh C L. Occupational dermatitis from gold plating. *Contact Dermatitis* 1988; 18: 122–123.
19. Wrangsjö K, Mårtensson A. Hydrazine contact dermatitis from gold plating. *Contact Dermatitis* 1986; 15: 244–245.
20. Kligman A M. The identification of contact allergens by human assay (III). The maximization test: a procedure for screening and rating contact sensitizers. *J Invest Dermatol* 1966; 47: 393–409.
21. Osawa J, Kitamura K, Ikezawa Z, Hariya T, Nakajima H. Gold dermatitis due to ear piercing: correlations between gold and mercury hypersensitivities. *Contact Dermatitis* 1994; 31: 89–91.
22. Orlandini A, Viotti G, Martinoli C, Magno L. Allergic contact conjunctivitis from synthetic detergents in a nurse. *Contact Dermatitis* 1990; 23: 269–272.
23. Estlander T, Kanerva L, Kari O, Jolanki R, Mölsä K. Occupational conjunctivitis associated with type IV allergy to methacrylates. *Allergy* 1996; 51: 56–59.
24. Tosti A, Tosti G. Allergic contact conjunctivitis due to ophthalmic solutions. In: Frosch P J, Dooms-Goossens A, Lachapelle J-M, Rycroft R J G, Scheper R J (eds): *Current topics in contact dermatitis*. Berlin: Springer-verlag, 1989.
25. Bonini Se, Bonini St, Bucci M G, Balsano F. Allergic mechanisms of the eye. *Allergologie* 1989; 12: 158–162.