

Can patch test sensitization with gold sodium thiosulfate be ruled out? – a case report

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doi:10.1111/cod.12864

Key words: booster effect; gold; granuloma; metal allergy; patch test; persistent reaction; primary sensitization.

Patch testing with any hapten has the potential to cause primary sensitization in those who have not been sensitized before. Gold frequently provokes a late reaction at day (D) 7 or even later when it is used for patch testing. We herein report a case of primary (active) sensitization to gold sodium thiosulfate (GSTS) or, alternatively, a booster effect resulting from repeated patch testing with GSTS.

Case Report

A 61-year-old woman was referred to us complaining of erythema on the face, which had been treated with a topical steroid with some effect. No contact dermatitis caused by any metals was reported. Patch testing was performed with her cosmetics and baseline haptens by use of the TRUE Test[®] (SmartPractice, Phoenix, AZ, USA). No reaction to any hapten was observed until D7; however, on D17, the site of GSTS application (75 µg/cm²) showed an indurated erythema, which persisted for as long as 8 months. Histopathology of a lesional biopsy

Table 1. Results of the second patch test with gold sodium thiosulfate (GSTS) from various vendors at 2 months after the initial patch test, read according to ICDRG guidelines

Allergen	Product name	D2	D3	D7
GSTS 0.075 mg/cm ²	TRUE Test [®]	?+	++	++
GSTS 0.5% pet.	Brial	+	+	+
GSTS 0.25% pet.	Trolab	+	+	+

taken on D57 showed mononuclear cell infiltrates in the epidermal–dermal interface and, in a perivascular pattern, in the upper dermis, together with granuloma formation of CD4⁺ T lymphocytes, and histiocyte infiltrates around the sweat glands in the deep dermis. In addition, the infiltrating cells in the dermis showed tumour necrosis factor (TNF)- α expression. It should be noted that no eczematous change was found in the epidermis, suggesting that the persistent indurated erythema might be attributable to the granulomatous reaction.

Two months later, re-patch testing with GSTS from the respective TRUE Test[®] panel as well as two other GSTS patch test preparations gave positive reactions as early as D2, that is, much earlier than in the initial test (Table 1). However, the positive reactions on D2 2 months later are not conclusive evidence of sensitization; see Discussion.

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Conflict of Interest: The authors declare no conflict of interests.

We advised the patient to avoid any exposure to gold. No dermatitis or stomatitis related to gold has developed thus far.

Discussion

Patients with eczema show a prevalence of 8–10% positive reactions to gold (1), which is second after nickel among the metals (2). In the present case, a positive granulomatous reaction to gold appeared on D17 and persisted for as long as 8 months, showing histopathological granuloma formation together with interface dermatitis. A similar case has been reported concerning a woman with granulomatous contact dermatitis caused by gold earrings who showed a persistent patch test reaction 8 weeks later with histological epithelial granulomata (3). Furthermore, long-lasting patch test reactions to GSTS were characterized by intense lymphocytic and granulomatous dermal inflammation without epidermal involvement (4). In our case, dense inflammation around the sweat gland might have resulted from a chronic

reaction to the remaining gold salt, which could have permeated via the eccrine ducts. Therefore, metal allergens such as gold, if they remain in the tissue, might lead to primary sensitization in due course. In addition, TNF- α has been shown to play a role in granuloma formation (5).

Alternatively, the patient might have been sensitized to gold subclinically, as she had a dental alloy containing gold, but no signs or symptoms of contact mucositis. Her response to the initial patch test with GSTS might have taken longer than usual, but the persistent presence of gold may have allowed gold-specific T cell clones to expand before the second patch test, by which time she showed a more rapid response to GSTS on D2. Furthermore, it is well known that repeated testing with a strong allergen, for example dinitrochlorobenzene (DNCB) or diphenylcyclopropenone (DPCP), within a short period may cause a booster effect, and, even though metallic gold is inert, gold salts such as gold chloride and GSTS are potent allergens, which may also cross-link the inflammatory cascade at the T cell receptor level.

References

- 1 Andersen K E, Jensen C D. Long-lasting patch reactions to gold sodium thiosulfate occurs frequently in healthy volunteers. *Contact Dermatitis* 2007; **56**: 214–217.
- 2 Björkner B, Bruze M, Möller H. High frequency of contact allergy to gold sodium thiosulfate. An indication of gold allergy? *Contact Dermatitis* 1994; **30**: 144–151.
- 3 Armstrong D K, Walsh M Y, Dawson J F. Granulomatous contact dermatitis due to gold earrings. *Br J Dermatol* 1997; **136**: 776–778.
- 4 Möller H, Larsson A, Björkner B, Bruze M. The histological and immunohistochemical pattern of positive patch test reactions to gold sodium thiosulfate. *Acta Derm Venereol* 1994; **74**: 417–423.
- 5 Amber K T, Bloom R, Mrowietz U, Hertl M. TNF-alpha: a treatment target or cause of sarcoidosis? *Eur Acad Dermatol Venereol* 2015; **29**: 2104–2111.