Gold Allergy to a Permanent Gold Acupuncture Needle

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A 68-year-old female had slightly elevated, dusky erythematous nodules on the right infraorbital and the right temple area. Topical, intralobal corticosteroids and oral antihistamines provided temporary but incomplete improvement. Follow-up biopsy, four months after the first visit revealed a tiny gold acupuncture needle lodged at the center of the nodule. Subsequent skull series revealed seven more linear radiopaque densities on the corresponding sites to the skin nodules.

A patch test and an intradermal test with gold chloride showed strongly positive reactions. Removal of the embedded needles led to disappearance of the cutaneous nodules and itching sensation in seven days. (Ann Dermatol 1:91–94, 1989)

Key Words: Gold allergy, Lodged acupuncture needle

In their ability to produce allergic contact dermatitis, the gold salts are different from the metallic gold. Soluble gold salts in occupational and therapeutic exposure are frequent allergens. However, individuals exposed to gold jewelry rarely developed gold sensitivity presumably because of the insolubility of gold in bodily secretions.1

Allergic gold dermatitis may be expressed as an ordinary eczematous contact dermatitis,2 a persistent dermal infiltrate,3 or a chronic papular eruption.4

We report a case of gold allergy with the histopathological findings of persistent dermal lymphoid cell infiltrate. The patient was thus sensitized by a permanent gold acupuncture needle embedded in her facial skin for three years.

REPORT OF A CASE

A 68-year-old female was seen in the Department of Dermatology, Kangnam St. Mary's Hospital, Catholic University Medical College for evaluation of facial nodules of 6 months duration. She was well until three years earlier, when she noticed bilateral diffuse and erythematous swelling and itching of the periorbital areas and conjunctival injection ten days after use of a commercial hair dye. She had used the hair dye without any untoward problem for four years. The focal lesions were treated with acupuncture (Fig. 1) without symptomatic improvement. Six months before her visit to our clinic, she exposed her lesions to metallic mercury fumes for one month. Subsequently bilaterally symmetrical, erythematous and pruritic cutaneous nodules developed gradually on her face and persisted indefinitely. No known history of photosensitivity was elicited and the nodular eruption was not influenced by exposure to natural sunlight.

Physical examination disclosed a monomorphous nodular eruption involving both sides of the temple,

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Fig. 1. Acupuncture needles and stylet used in this patient.

Fig. 2. A slightly elevated, dusky erythematous nodule with surrounding red flare on the right infraorbital and the right temple area.

Fig. 3. Biopsy specimen from the right forehead nodule. Fairly well circumscribed multiple cellular patches were scattered throughout the entire dermis. These cellular patches consisted largely of lymphoid cells admixed with eosinophiles and macrophages (H & E stain; × 40).

Fig. 4. Tiny, red to yellow, thread-like gold acupuncture needle measuring about 0.01mm × 7mm with the excised nodule where the needle had been lodged.

Fig. 5. Central eosinophilic necrosis where the needle had been lodged and surrounding moderately dense fibrosis and mononuclear cell infiltrate (H & E stain; ×100). Tissue of Fig. 4.

Fig. 6. Patch test results after 48 hours. Erythematous induration with 1% gold chloride.

Fig. 7. Intradermal test results after 36 hours. Intense erythematous dermal induration with 0.1% gold chloride.

Fig. 8. Moderate perivascular mixed inflammatory cell infiltrate in the upper dermis (H & E stain; × 40). Tissue specimen obtained from the intradermal test site with 0.1% gold chloride after 72 hours.

The patient was treated with oral antihistamines, topical fluorinated corticosteroids and an intralesional injection of triamcinolone acetonide. Although the size of the nodule became smaller and the itching sensation decreased moderately, symptomatic improvement was only temporary. Two months later, follow-up biopsy was done on the right infraorbital nodule and the histopathological findings essentially the same as previous one, were noted. Lesions persisted despite intermittent treatment.

During the second follow-up biopsy, four months after the first visit, a tiny, red to yellow, thread-like metallic structure measuring about 0.01mm × 7mm was removed from the center of the nodular skin lesion (Fig. 4). The histopathological findings of the excised tissue specimen showed a central eosinophilic necrosis where the metallic structure had been lodged and surrounding this, a moderately dense fibrosis and mononuclear cell infiltrate (Fig. 5). Additional medical history was taken; a history of insertion of a permanent gold acupuncture needle through the corresponding sites of the nodular skin lesion was elicited. Neither gold accessories nor gold dental prosthesis were found. Posterior-anterior X-rays of the skull and both lateral views showed seven more radiopaque curved or straight linear densities on the sites corresponding to the nodular skin lesions, i.e., both sides of the forehead, infraorbital area, and nasal bridge and right temporal area. The gold needle, by a quantitative, atomic absorption assay, contained 91.0% yellow gold and 0.1% copper. Nickel and other metallic substance were not detected. Patch testing with aqueous solution of 1% gold chloride, 1% nickel sulfate, and 5% nickel sulfate and intradermal testing with 0.01ml aqueous solution of 0.1% gold chloride, 0.1% nickel sulfate, and 0.5% nickel sulfate were performed. The patch test was read at 48 hours, erythematous induration was noted with 1% gold chloride (Fig. 6). On subsequent intradermal testing, an intense erythematous dermal induration was noted 36 hours after injection of 0.1% gold chloride (Fig. 7). A biopsy specimen from the indurated intradermal test site with 0.1% gold chloride showed a moderate perivascular mixed inflammatory cell infiltrate in the upper dermis, but no evidence of intraepidermal exocytosis and resultant epidermal damage was observed in the specimen taken at 72 hours (Fig. 8). A lymphocyte transformation test was done in our patient, two nickel sensitive patient, and two normal
volunteers. The patient's lymphocytes were stimulated an average 1.6 times greater than those of the control lymphocytes at the concentration of 100 micrograms of gold chloride per 0.02 ml of cultured media; this is not statistically significant.

Complete removal of the remaining seven lodged needles, attempted on three occasions, failed and the needle remnants still remained at two lesional sites (as proved by followup skull series). Subsequent complete removal was followed by disappearance of the cutaneous nodules and the itching sensation in seven days.

DISCUSSION

Soluble gold salts in occupational and therapeutic exposure have been frequent allergic sensitizers. However gold in jewelry could provoke contact sensitization. Gold dermatitis may not be based on the ordinary allergic mechanisms but on the enzymatic interference in a biochemically deviant individual because metallic gold is corroded only by substances such as halogens or alkaline cyanides not normally present in the body. Contact gold sensitivity developed after a gold ball prosthesis was implanted after enucleation of an eye. Our case is unique in that the patient had undergone sensitization and produced a contact gold sensitivity due to permanently inserted gold acupuncture needles.

Most Korean acupuncture needles are composed of stainless steel (iron with 13.3% chromium and 6.7% nickel). Thin, fiber-shaped gold needles inserted into the body until broken into thin segments and retained permanently are also frequently used. The type of needle used in our patient was this kind and is reportedly negative to the dimethylglyoxime spot test. Our patient showed a negative patch test result to nickel sulfate and copper sulfate.

Our patient developed an allergic cutaneous reaction to gold after exposure to inorganic mercury fumes. Although there is no implication regarding the role of inorganic mercury in gold sensitivity and although patient showed a negative patch test reaction to mercury bichloride, further clarification is needed concerning immunological interaction between such metallic substances.

Allergic eczematous patch test reactions to gold may develop into a persistent dermal infiltrate and allergic gold dermatitis due to occupational exposure to gold salts may be manifested as a chronic papular eruption. In our case, the histopathological findings of the persistent cutaneous nodule were fairly well circumscribed multiple cellular patches scattered throughout the dermis. These cellular patches consisted almost entirely of lymphoid cells with rare histiocytes and macrophages.

On a clinical basis, our initial differential diagnosis was angiolymphoid hyperplasia with eosinophilia, cutaneous sporotrichosis, plaque-type polymorphous light eruption, discoid lupus erythematosus, pseudolymphoma of Spiegler-Fendt, Lymphocytic lymphoma, and lymphocytic infiltration of the skin. Questions regarding a history of treatment with acupuncture should be included at initial evaluation when dealing a patient with longstanding itching erythematous cutaneous nodules on the face. If there is such a history, then skull series would be a rewarding next step in the evaluation.

REFERENCES