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Allergic contact dermatitis from acrylic resin repair of windscreens

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Key words: windscreen; UV-curable acrylic resin; 2-hydroxyethyl methacrylate; occupational; allergic contact dermatitis. © Munksgaard, 1998.

Case Report

During the last 2 months, a 26-year-old non-skilled workman had been employed in a small company. His main task was to repair minor damage in car windscreens. He repaired cracks in the windscreens by means of an acrylic glue of unknown composition. Defects in the windscreens were filled with the glue, the air in the cracks first being removed by means of a syringe and the glue afterwards being injected into the crack from the same syringe. Subsequently, the glue hardened within a short while of being exposed to sunlight. After 6 weeks of this work, the patient developed minor skin changes and itching. When he was seen by us 2 weeks later, dry skin on the fingertips was noted together with small vesicles down the sides of some of the fingers.

The patient brought a small bottle of the resin from his workplace and said that its composition was secret. According to the label, the name of the glue is TEAM GLAS, prep 20, and it contains acrylic acid and methacrylic ester. The label further states that direct exposure to sunlight should be avoided. Patch testing was performed with the European standard series, and with

methyl methacrylate (MMA) and 2-hydroxyethyl methacrylate (HEMA) from a dental screening series (Chemotechnique). The standard series was negative, but the tests to the 2 acrylic derivatives were clearly positive.

Discussion

It is known from other investigations (1, 2) that HEMA is a component of UV-cured resins and contact allergy to it is regarded as relevant to such patients' dermatitis. The positive test to MMA may be a cross-reaction. Subsequently, I have seen advertisements in the newspapers for small companies offering repair of windscreens. The repairs are performed where people gather for other reasons, e.g., in the parking lots of supermarkets.

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Occupational allergic contact dermatitis in a patient with a positive patch test to tin

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Key words: allergic contact dermatitis; tin chloride; CAS 7772-99-8; positive patch test reaction; lymphocyte transformation assay; occupational; metalworking. © Munksgaard, 1998.

In 1987, Menné et al. (1) reported 6 patients with positive allergic reactions to metallic tin in a patch test study of 73 nickel-sensitive patients. However, the clinical signifi-

cance of the reactions to tin was not established. Olivarius et al. (2) tested a larger series of patients (n=2206) with tin chloride (SnCl₂ 1%) and only 5 positive reactions were

found (2). Because of the low frequency of doubtful reactions to SnCl_2 1%, these positive reactions were probably allergic.

Table 1. Composition of the alloy used to produce metal patterns

Sn	42.9%
Bi	57.9%
Pb	0.02%
Cd	25 ppm
Cu	59 ppm

Case Report

A 44-year-old man presented with a 6-month history of work-related dermatitis around the eyes and on the forehead and later symmetrically on the wrists. He had no previous history of dermatitis or atopy. He produced metal patterns for body parts for trucks. His face was exposed to airborne dust. The alloy used contained tin (Table 1).

Patch testing was done with the European standard series supplemented with cosmetic ingredients and topical medicaments (Hermal; Reinbek, Germany). Further, patch testing was performed with SnCl_2 ($\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$) (purity >99.9%) (Merck, München, Germany) in pet. in doubling concentrations from 0.125% to 1.0%, and with CuSO_4 2% (purity >99.9%) (Merck, München, Germany) in aq., with Finn Chambers on Scanpor tape (Nor-

gesplaster; Oslo, Norway). Patch tests were read at days (D) 2, 3 and 7, patch tests with SnCl_2 on D3 and D7, according to ICDRG recommendations (3). At D3, there was a positive (++) to SnCl_2 1%, a follicular reaction to SnCl_2 0.5% and doubtful (?) reactions to SnCl_2 0.25% and 0.125% (Fig. 1). No other positive reactions were seen.

To further elucidate the mechanism of the skin reaction to tin, peripheral mononuclear cells (MNC) were obtained by Ficoll-Hypaque (Pharmacia, Uppsala, Sweden) from the patient and 3 volunteers with no history of skin disease. The MNC were suspended in RPMI 1640 with antibiotics, glutamine and 10% heat-inactivated autologous serum. 50,000 MNC were incubated with increasing concentrations of SnCl_2 (purity >99.9%) (Merck, München, Germany) from 10^{-7} to 10^{-4} M in a final volume of 200 μl in 96-well round-bottom microtitre plates. At each SnCl_2 concentration, 2 sets of triplicates were performed. For 48 h of culture phytohemagglutinin, 1 $\mu\text{g}/\text{ml}$ (PHA) (Murex Diagnostics Limited, Dartford, England) was added to 1 set of the triplicates to control for the toxic effects of SnCl_2 . After 5 days, T-cell proliferation was measured by [^3H]TdR (Amersham, UK) incorporation for the last 18 h of culture.

We were not able to confirm the specificity of the tin-induced skin reaction by the lymphocyte transformation test. Using SnCl_2 , at concentrations from 10^{-7} to 10^{-4} M, we did not find any stimulation of MNC either from the patient or from the 3 volunteers. This was not due to a toxic effect of SnCl_2 on the MNC, since at all concentrations below 10^{-5} M SnCl_2 , we found a strong proliferation of MNC in the cultures where PHA was added.

Discussion

To our knowledge, this paper is the 1st report of dermatitis due to tin. In an earlier study, SnCl_2 1% pet. has been shown to be non-irritant (2). No reported studies of lymphocyte transformation tests with tin were available, and a relatively low sensitivity and specificity of the lymphocyte transformation test for gold, palladium and nickel was recently reported by Cederbrant et al. (4).

Tin is widely used for soldering, plating and in metal alloys. Our patient had neither concomitant sensitization, nor a history of dermatitis or atopy. Because the dermatitis was dramatically improved during vacations and after he changed his working environment, we report this case as occupational allergic contact dermatitis due to tin.

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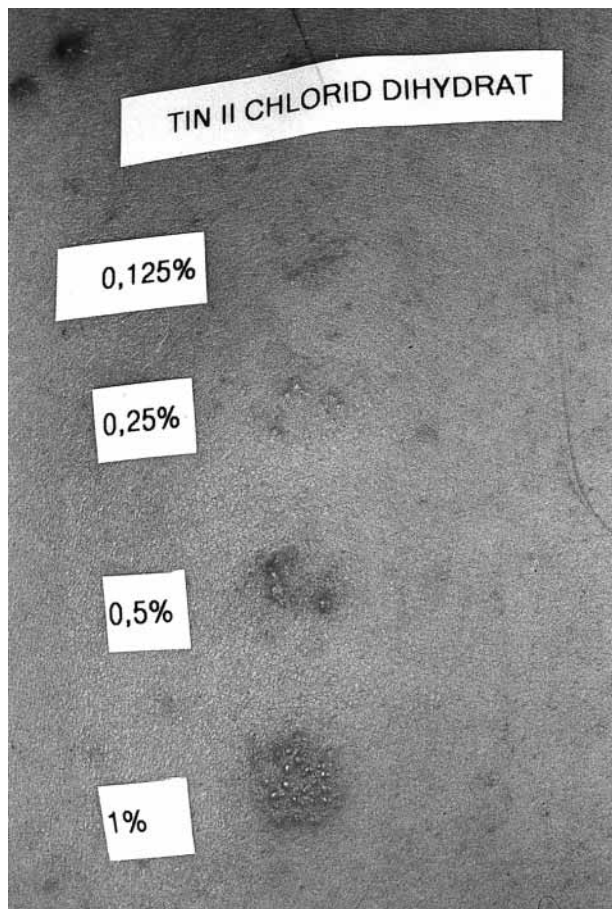


Fig. 1. Patch test reactions to serial dilution of tin (D3).