

Pulpitis of the fingers from a shoe glue containing 1,2-benzisothiazolin-3-one (BIT)

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Case Report

A 38-year-old woman, working in a Tunisian shoe factory, presented with a 4-month history of fissured, well-demarcated pulpitis of all the fingers of both hands. She was not atopic and had never had any previous skin trouble. She had worked at the same job for 6 years: she glued shoe linings. She applied the glue to the leather upper with a short brush, then placed a synthetic fabric, with pressure and friction, upon it with the fingertips. The surface of this fabric was a little rough. Sometimes the glue came into contact with the fingers. The handle of the brush was also contaminated with the glue. Gloves were not practical for such work. The lesions disappeared, with or without treatment, during vacations and recurred repeatedly 3–4 days after return to work. The worker had to achieve glueing of up to 1500 pieces a day. The dermatitis cleared with a change of job within the shoe factory.

On enquiry from the manufacturer, it was learnt that the glue was an aqueous natural rubber adhesive containing 1,2-benzisothiazolin-3-one (BIT; Proxel®). Patch tests with the glue as is and 10% alc. were positive +/+ and with BIT 0.1% pet. +/+ at D2 and D4. They were negative to the European standard series (including MCI/MI), leather, cloth and the other ingredients of the glue.

Discussion

The clinical appearance of the lesions, with fissures and sharp demarcation, could have been caused partially by repeated frictional microtrauma, humidity and alkalinity. The glue also contained 1.5% ammonia and 5% petroleum solvent. Nevertheless, the patient had developed her dermatitis very late, i.e., after more than 5 years of working at the same job. The other workers (about 50 women) had not developed any lesions. The positive patch tests to the adhesive, and to BIT 0.1% pet., seemed to indicate that this was a combination of irritant and allergic contact dermatitis.

Cronin (1) observed skin irritation in 1 of 30 controls with 0.1% BIT in MEK. Andersen & Hamann (2) found 7 irritant reactions in 466 patients patch tested with 0.1% BIT in aqueous solution of propylene glycol. De Boer et al. (3), Ledieu-Willems (4, 5) and Camarasa et al. (6) used 0.05% in alcohol. Greig (7) patch tested 1 patient with Proxel press paste (BIT in water: not further defined) 0.1% and 0.01% pet.; 10 control subjects were negative to 0.01% pet. To define the optimal patch test concentration, Damstra et al. (8) patch tested 25 healthy, non-dermatolo-

gical volunteers with a range (0.16%, 0.08% and 0.04% aq.) of BIT. As some irritant reactions were observed at the 2 higher concentrations, 0.04% was chosen as optimal. Recently, Chew & Maibach (9) also showed that 0.1% BIT in pet. is irritant in some subjects and therefore not suitable for patch testing. Andersen & Rycroft (10), on behalf of the EEC DRG, nevertheless recommended 0.1% pet. Goossens (personal communication) has "few or no problems as to its irritant potency (162 patients patch tested with 0.2% pet.)". According to Chew & Maibach (9), in our patient, it would have been necessary to retest with 0.1% to confirm the specificity of the reaction. Unfortunately, this was not possible. For some years, Chemotechnique Diagnostics has reduced the concentration of BIT from 0.1% to 0.05% pet. (8).

Some previous reports concern reactions to BIT in glues: gum arabic (11), neoprene adhesive (12) and wall-paper paste (8, 13, 14). Fousereau et al. (15) have reported a case of occupational allergy to a product containing 2-n-octyl-4-isothiazolin-3-one, used by shoe factory workers. Podmore (16) reported the use of BIT in adhesives for heel and toe counters. To our knowledge, ours is the 1st reported case of dermatitis from this use. BIT should be included in shoe and glues series. Tunisian legislation mentions BIT in Table 59 of occupational diseases.

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Occupational allergic contact dermatitis from potassium persulfate

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Key words: laboratory assistant; occupational; allergic contact dermatitis; potassium persulfate; ammonium persulfate; analytical reagent; water analysis; cross-sensitivity. © Munksgaard, 1999.

Case report

A 45-year-old non-atopic female laboratory assistant had been working in the same water laboratory for 16 years when eczema developed on the fingerwebs of both hands. This became vesicular and spread to the palms, fingertips and backs of the hands, though it cleared on vacations. Her job in the water laboratory was to check the quality of various river, lake, and seawater samples. She was exposed to numerous alkalis, acids and other laboratory chemicals in her work. During the next 4 years, her eczema remained mild, but needed occasional sick leaves of 1 week. Her eczema then worsened and she consulted a dermatologist. Patch testing revealed allergic patch test reactions to nickel, cobalt and fragrance mix. The dermatologist considered her dermatitis to be occupational irritant contact dermatitis because she was exposed to several irritants and had to wash her hands more than 10× a day. She used protective gloves, but not in all aspects of the work because they hindered dexterity.

The insurance company then referred the patient to the Finnish Institute of Occupational Health for further investigation. Patch testing was negative to a series of antimicrobials and cosmetics, whereas oak moss 2% pet. (Chemotechnique Diagnostics, Malmö, Sweden) provoked a ++ reaction. In a series of photographic chemicals, ammonium persulfate (Chemotechnique, 2.5% pet.) provoked a ++ reaction. On patch testing chemicals from her workplace, potassium persulfate (analytical grade, 2.5% pet.) provoked a ++ reaction at D2, 3 and 6. Prick tests with standard environmental allergens were negative. 20 controls were negative on patch testing with potassium persulfate 2.5% pet.

The patient was daily exposed to potassium persulfate ($K_2S_2O_8$, CAS No. 7727–21–1; syn. potassium peroxydisulfate, potassium peroxydisulfate, peroxydisulfuric acid/dipotassium salt, Anthion), as it was used as an analytical agent in chemical analysis of the phosphate content of water samples. For this purpose, potassium persulfate powder was weighed and dissolved in water or sulfuric acid. The liquid was pipetted into sample bottles and the bottles placed in an autoclave. The samples were poured into tubes and the color reaction that developed was measured.

Discussion

The industrial uses of potassium persulfate include bleaching, oxidizing agent, antiseptic, soap manufacture, analytical reagent, polymerization promoter, pharmaceuticals, modification of starch, flour-maturing, desizing of textiles, and in photography under the name of Anthion. In consumer use, potassium persulfate is used in hair bleaches.

The related ammonium persulfate is a well-known cause of irritant contact dermatitis (1), as well as immediate and delayed allergy (2). Few reports have dealt with allergic contact dermatitis from potassium persulfate, but it has caused this in hairdressers (3) and bakers (4), as well as urticaria (5) and asthma (5–7). For patch testing, Forck (4) used 5–7% potassium persulfate (aq.) and Van Joost et al. (3) potassium persulfate 2% aq., whereas we used potassium persulfate 2.5% pet.. Chemotechnique supplies ammonium persulfate in pet., and as patch test substances in pet. are easier to handle than