Occupational contact urticaria caused by polyvinylchloride gloves

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doi:10.1111/j.1600-0536.2011.01985.x

Key words: contact urticaria; gloves; occupational; plastics; polyvinylchloride.

Allergy to natural rubber latex (NRL) gloves in healthcare workers is well recognized, and usually presents as immunological contact urticaria and sometimes anaphylaxis. Latex gloves can also cause allergic contact dermatitis, mostly because of rubber accelerators. As latex sensitivity is well known in healthcare settings, synthetic latex-free gloves are widely used. The most popular latex-free gloves are made of nitrile, polyvinylchloride (PVC), neoprene, or polyethylene. Only a few cases of contact urticaria caused by synthetic rubber or plastic materials have been reported. We describe a case of occupational contact urticaria caused by PVC gloves.

Case Report

A 39-year-old nurse presented with three episodes of itching without lesions on her hands and wrists over the course of a few days. There was subsequent generalization, followed by oedema of the lips and tongue, dyspnoea, and cough. Each episode appeared 5–10 min after she had worn a pair of PVC gloves. The symptoms regressed in 20 min with intravenous diphenhydramine and hydrocortisone. The patient had known latex allergy and had a past personal history of atopic dermatitis and asthma.

Occupational contact urticaria caused by PVC gloves was suspected. Patch testing was performed with two pieces of PVC glove (Premium Vinyl powdered non-sterile medical examination gloves; ADM-Ritmed Inc., Montreal, Canada), applied on the patient’s lower back. Each piece measured 3 × 3 cm, and one was washed to remove all traces of powder. Reading at 15 min showed macular erythema of >15 cm around the area covered by the pieces of gloves; this was accompanied by itching and difficulty in breathing. The pieces of gloves were removed and not reapplied. The second reading was performed at 30 min: the initial itching macular erythema had decreased in diameter, but had migrated under the area formerly covered by the washed piece of gloves. Macular erythema and itching disappeared by the 45-min reading.

Patch testing was also performed with the North American Contact Dermatitis Group Baseline Series (allergEAZE; SmartPractice® Canada, Calgary, Canada), using Finn Chambers® on Scanpor® (SmartPractice, Phoenix, AZ, USA), and with a plasticizer series (dimethyl phthalate, di-N-butyl phthalate, di-2-ethylhexyl phthalate, tricresyl phosphate, and triphenyl phosphate) and with benzisothiazolinone on IQ Ultra™ chambers (allergens and chambers from Chemotechnique Diagnostics, Vellinge, Sweden). No pruritus or erythema was noted.

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Conflicts of interest: The authors have declared no conflicts of interest.
under these patches at the 15-min, 30-min or 45-min readings. The chambers were removed at D2. Readings at D2 and D4 were negative.

In view of these results, and because our patient also had exposure to nitrile gloves at work, we later performed a patch test with nitrile gloves. A piece of nitrile glove (Fingertip Textured Flexal™ nitrile powder-free exam gloves; Cardinal Health, Waukegan, IL, USA) was applied on the patient’s back. Readings at 15, 30, 45 and 60 min were negative, and the patient did not show allergic symptoms.

Discussion

PVC is a synthetic soft plastic that is free of rubber accelerators and NRL. PVC gloves contain additives such as plasticizers (e.g. phthalates), which make up to 60% of the weight of the material, antioxidants [e.g. butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), and bisphenol A], stabilizers (e.g. epoxy resin), biocides (such as benzisothiazolinone), and formaldehyde. Allergic contact dermatitis caused by these additives is well known, but there are only a few reports in the literature of contact urticaria caused by these products in synthetic rubber or plastic materials. Sugiura et al. reported a case of contact urticaria syndrome caused by di(2-ethylhexyl) phthalate in the dotted PVC grip of cotton gloves (1) and in work clothes (2). BHT and oleylamine, used respectively as antioxidant and slipping agent in plastics, have caused contact urticaria (3). Mitchell described a case of contact urticaria caused by a plastic shower curtain, but could not identify the causative agent (4). Epoxy resin is mostly associated with allergic and irritant contact dermatitis, but occasionally with contact urticaria. Immunoglobulin E-mediated allergy to formaldehyde has also been reported (5).

The vulcanization accelerator morpholinyl mercaptobenzothiazole (6) and the antioxidant 2,2’-methylene-bis-(4-methyl-6-tert-buthylphenol) (7) have induced contact urticaria when present in nitrile gloves. Finally, a case of contact urticaria caused by antioxidants and lubricants in polyethylene gloves has been reported (8).

Our patient presented with occupational contact urticaria and showed early patch test reactions to pieces of PVC glove only. Because of the generalization of her pruritus and the appearance of systemic signs and symptoms, we believe that her syndrome is of immunological origin. There was no other early or delayed patch test reaction to any of the additives usually found in PVC gloves. Unfortunately, we were unable to extract, separate and identify the chemicals in PVC gloves for further testing.

References

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