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Contact Urticaria From Occupational Exposure to Formaldehyde

To the Editor:

Formaldehyde, known to cause allergic contact dermatitis in sensitized individuals,¹ is rarely reported to cause contact urticaria (CU).^{2,3} We present 2 cases of CU from occupational exposure to formaldehyde.

First is a 26-year-old otherwise healthy woman, employed 3 years as a histology technician in a dermatopathology laboratory, who presented with a 1-month history of sneezing and an itchy rash on her arms, legs, and nose occurring only within 30 minutes of working under a ventilation hood processing formalin-fixed specimens. Symptoms resolved 15 minutes after moving away from the hood. Physical examination was unremarkable. Patch testing was performed using the American Contact Dermatitis Society core series, and readings were done at 48 and 96 hours. Results revealed an irritant-type reaction to propolis but was no reaction to all others, including formaldehyde. Skin prick testing was performed using formaldehyde 1% AQ and the 7 formaldehyde releasers from the American Contact Dermatitis Society core series. Formaldehyde 1% caused an itchy 6-mm wheal with flare extending 15 mm at 15 minutes. All formaldehyde releasers were negative by prick testing. Positive and negative controls were also performed on this patient.

Second is a 45-year-old female dermatologist with a history of asthma flares when exposed to formalin (40% formaldehyde) in the grossing room. Patch testing was not performed. Prick testing was performed as above with 1% formaldehyde. Immediately, she experienced a large 1-cm wheal, generalized pruritus, paleness, and a severe asthma flare. She dramatically improved with intramuscular Benadryl, but her asthma recurred within 10 minutes. The patient became light-headed and hypotensive and was given intramuscular epinephrine. Her asthma subsided and hypotension resolved. She was prescribed an epinephrine pen because her work required periodic exposure to formalin. Seven control patients were negative to prick testing with 1% formaldehyde.

Formaldehyde, a common preservative and the 2015 Contact Allergen of the Year, most typically causes allergic contact dermatitis. Formaldehyde vapors can be an irritant to

mucous membranes,³ especially for atopic persons with an impaired skin barrier. Reports of CU from formaldehyde are rare, with occupational CU cases reported in a leather-handler, surgical nurse, and pathology laboratory worker.^{2,3} Of note, the laboratory worker's CU was believed to be caused by formaldehyde vapors.

Contact urticaria reactions are divided into 3 categories based on etiology: nonimmunologic/irritant, immunologic/allergic, and mixed (idiopathic).^{1,4} Nonimmunologic CU occurs without prior sensitization, with causative agents theoretically able to trigger an urticarial reaction in anyone who comes into contact with them. Examples include stinging nettles, benzoic acid, and cinnamaldehyde.^{4,5} Immunologic CU (ICU) is a rarer type I hypersensitivity reaction resulting from previous sensitization to the offending agent.^{4,5} In addition to the classic wheal-and-flare cutaneous manifestation, ICU can also involve rhinitis, conjunctivitis, asthma, or even shock.⁴

Because of the systemic symptoms in both our patients, we believe that both represent ICU. Contact urticaria should be considered when evaluating patients with a history of respiratory distress when exposed to formaldehyde vapors. The combination of these 2 patient cases may suggest a possible increased risk of ICU in persons working in a dermatopathology laboratory.

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