

Glove Choice Crucial in Job-Related Dermatitis

BY JEFF EVANS
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HERSHEY, PA. — The right pair of gloves can make all the difference to patients who develop contact dermatitis from the chemicals they are exposed to on the job, Matthew J. Zirwas, M.D., said at a meeting on contact dermatitis sponsored by Pennsylvania State University.

“There’s a big importance to whenever you are investigating occupational cases and going to be doing glove recommendation that you really take a thorough glove history, and you really look at what that patient is doing, and what a glove will need to do,” advised Dr. Zirwas, director of the contact and occupational dermatitis center at the University of Pittsburgh.

Dr. Zirwas described a case of a printing press operator who presented with a 6-month history of psoriasiform, fissuring, patchy dermatitis on the dorsal part of his hands and forearms. He had performed the same job of working with and cleaning metal plates and a printing press with a mixture of very strong solvents for 5 years. His dermatitis would improve when he was absent from work for 1 week but would return shortly after he returned.

The patient said that about 7 of 50-60 other employees in the shop had the same condition. Patch tests to a modified North American Contact Dermatitis Group panel, a panel of different rubbers, selected chemicals from the patient’s workplace, and samples of printed materials all yielded negative results. The man used his nitrile work gloves for about 2 weeks at a time and noted that his hands often felt wet under the gloves after several days of use even though no liquid was visible when the gloves were removed. “I always try to have patients bring their gloves in so that I can examine them,” Dr. Zirwas said.

The nitrile work gloves offered pretty good chemical resistance, he said, but are



Solvent dermatitis can be the result of chemical exposure that occurs even through protective gloves.

subject to degradation and permeation by certain chemicals, such as methanol, methyl isobutyl ketone, acetone, toluene, propyl acetate, and xylene.

“You need to think about [permeation and] degradation as starting from the minute that that chemical comes in contact with the glove,” he recommended. One week or even 2 or 3 days after the printing press operator began using his gloves, they were “severely degraded and really providing no barrier at all.”

Despite the limitations of the nitrile gloves, Dr. Zirwas decided that the nitrile gloves would be safe for the patient to use if he used them for shorter periods because of the intermittent nature of the patient’s chemical exposure. Plus, “he didn’t think that his shop would be very interested in switching gloves,” Dr. Zirwas said.

By changing the gloves at the end of every 4-hour shift, the man had dramatic improvement in dermatitis during the next month. “Even though these gloves were not the ideal glove to protect him against the chemicals he was exposed to, by having him use the gloves appropriately, we were able to continue using the

gloves and still get him better,” he said.

Another man working as a countertop assembler presented to Dr. Zirwas with a 1-year history of itchy, burning dermatitis on his fingertips that was associated with tingling and paresthesias that improved when he was away from work. The patient had tried using several kinds of gloves with no improvement in his condition.

Patch testing was done with a variety of different panels including a modified North American Contact Dermatitis Group standard series and plastic, glue, and rubber panels; all of these came out negative until he tested positive to multiple acrylates, including methyl methacrylate. Methacrylates are known to penetrate almost all types of rubber and can cause paresthesias similar to those reported by the countertop assembler, Dr. Zirwas noted.

The patient held the nozzle of the glue gun that dispensed methyl methacrylate throughout the day with the most severely affected fingers. The patient did not think that polyvinyl alcohol gloves would provide enough protection for him since he also encountered alcohols and water-based products at work, both of which can penetrate



This case of hand dermatitis is the result of methyl methacrylate exposures through poorly protective gloves.

polyvinyl alcohol materials. The gloves also did not provide good dexterity.

Two kinds of multilayer laminate gloves—Silvershield (also known as 4H) and Barrier gloves—incorporate a hydrophilic/polar layer between two hydrophobic/nonpolar layers. Both gloves are nonelastic, thin-film materials that provide poor dexterity, fit, and resistance to cuts, abrasions, and tears. “The best way you could describe them to a patient is to say ‘essentially put a garbage bag on each hand and try to do your job,’” he said.

Silvershield gloves have slightly better chemical protection than Barrier, Dr. Zirwas said, but Barriers are made to be right- and left-hand specific with a liner that disperses moistures and decreases slippage. Both gloves offer protection against methyl methacrylate. The patient switched to Barriers he changed weekly unless obvious damage occurred. He wore disposable elastic gloves over the Barriers for better dexterity.

The patient reported about 90%-95% improvement in his dermatitis and near resolution of his neuropathic symptoms after 6 weeks. ■

Contact Dermatitis in Auto Mechanic? Think Isothiazolinones

BY JEFF EVANS
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HERSHEY, PA. — A new onset of dermatitis in an auto mechanic should raise clinical suspicion for contact allergy to isothiazolinone preservatives found in many car repair and maintenance products, Bruce A. Brod, M.D., said at a meeting on contact dermatitis sponsored by Pennsylvania State University.

In an illustrative case of allergic contact dermatitis to isothiazolinones, Dr. Brod described a nonatopic male auto mechanic who owned a diesel fuel station and auto repair shop. The man presented with a 5-month history of a “horrific, nearly erythrodermic” dermatitis involving his hands, arms, legs, and trunk. While he responded very well to systemic steroids, the dermatitis would completely clear when he was away from work for weeklong vacations.

Besides patch testing with the North American Contact Dermatitis Group standard series, Dr. Brod also used an oil and

cooling fluid series, a plastic and glue series, a rubber additive series, and a corticosteroid series. The most relevant positive results on patch testing included the isothiazolinones 5-chloro-2-methyl-4-isothiazolin-3-one (MCI), 2-methyl-4-isothiazolin-3-one (MI), and 2-n-octyl-4-isothiazolin-3-one (OIT), said Dr. Brod of the department of dermatology at the University of Pennsylvania, Philadelphia.

He began a search for isothiazolinones in the patient’s environment. “It’s quite an undertaking in somebody who works around a lot of [industrial] products in an auto shop.” After searching for isothiazolinones in the patient’s personal care products, such as his moisturizers, cleansers, and topical medications, Dr. Brod read through material data safety sheets for the industrial chemicals and products in the auto shop and called companies to learn about the chemicals in motor oils and other automotive fluids.

“As a last resort and just an afterthought, we asked him if he worked with any sort

of adhesives because there have been some reports of octyl-isothiazolinone present in some adhesives,” Dr. Brod said.

The man reported working with a silicone gasket sealant. Material data safety sheets did not identify OIT in the sealant, but the toxicologist working for the sealant’s manufacturer confirmed its presence.

Although the mechanic’s widespread dermatitis improved when he avoided the sealant, he still had the condition on his hands and forearms at a 2-month follow-up visit. The man admitted to pumping diesel fuel for customers at the fuel station since his duties at work had become limited because of his avoidance of numerous auto parts and products. A toxicologist working for the oil company confirmed that some of the businesses that refine oil for the company (which does not have its own oil refinery) added OIT and MCI to their storage tanks.

The patient’s dermatitis cleared almost completely when he began avoiding the diesel fuel. Isothiazolinones are added to

diesel fuel because diesel’s high water content makes it vulnerable to microbial overgrowth. A bus mechanic in the Netherlands also has been reported to react to MCI/MI in diesel fuel (Contact Derm. 1996;34:64-5).

Besides silicone sealants, the fungicide OIT (also known under the trade names Kathon 893 and Skane M-8) is found in products such as wallpaper adhesives, water-based paints, cutting oils, and leather preservatives. Allergic contact dermatitis to OIT has been reported in painters, paint factory workers, and laboratory workers. No nonoccupational cases have been published, because OIT is “not really used in the personal care industry,” Dr. Brod said.

The North American Contact Dermatitis Group’s 2001-2002 study of patch testing of 65 allergens on 4,913 patients showed that 2.3% of patients had positive reactions to MCI and MI. Of the patients with positive reactions, 88% had a current or past episode of dermatitis from exposure to MCI and MI. ■