Occupational allergic contact dermatitis from N,N-methylene-bis-5-methyl-oxazolidine in a nylon spin finish

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Key words: allergic contact dermatitis; occupational; N,N-methylene-bis-5-methyl-oxazolidine; biocide; formaldehyde-releaser; spin finish; nylon industry. © Munksgaard, 1999.

Case Report

A 40-year-old man presented with a 3-month history of vesicular eczema on the forearms, with periorbital swelling and erythema. He worked in a large nylon manufacturing plant and, 4 weeks prior to the onset of the eruption, had moved to the spinning area. During nylon spinning, the polymer is melted and extruded to transform it into fine threads. Spin finish is applied to the thread line by metered pumps. After this, the threads go to spinning reels and the bobbins of yarn are packaged and distributed. A factory visit revealed that the application of spin finish was automated. In the spinning area, however, operatives did come into contact with the spin finish during cleaning of equipment, re-stringing after yarn breakages and packaging of bobbins of yarn, as well as from airborne mist. Protective gloves were available but, due to the humidity of the spinning environment, short-sleeved shirts were worn with no forearm protection.

Patch tests to standard, and preservative and cutting oil series were all negative at D2 and D4. The patient was also patch tested to 4 spin finishes at their use concentrations. 2 of these produced positive (+) reactions at D4. Both these contained the biocide N,N-methylene-bis-5-methyl-oxazolidine at 0.2%. Patch testing with this biocide in water at 1% elicited positive reactions at D2 (++) and D4 (++). Patch testing with it at 1% in 20 control patients was negative at D2 and D4. Avoiding contact with the spin finish by leaving the spinning area resulted in resolution of the allergic contact dermatitis.

Discussion

The application of spin finish in nylon and other synthetic fibre spinning reduces friction between the fibres and the metal guides that they move along, thus reducing electrostatic charge and preventing the filaments from fraying. Chloroacetamide in a spin finish was suggested to have caused allergic contact dermatitis in 7 nylon workers by Savage (1). Dimethoxane has been reported as a sensitizer in a polyester spin finish (2). Burrows & Campbell (3) thought that 10 workers with dermatitis after polyester spin finish exposure had irritant rather than allergic contact dermatitis (3). 6 cases of allergic contact dermatitis from methylchloroisothiazolinone, methylisothiazolinone were reported from a nylon spin finish (3).

N,N - methylene - bis - 5 - methyl - oxazolidine (Grotan OX) is a formaldehyde-releasing biocide. Our patient did not react to formaldehyde in the standard series or to any other formaldehyde-releasers in the preservative and cutting oil series. To our knowledge, this formaldehyde-releasing preservative has not previously been reported as a human sensitizer. Its sensitizing potential has, however, been assessed by guinea pig maximization testing, when it was found to be a strong sensitizer (4).

References

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