

Short Communication

Allergic contact dermatitis due to methyl ethyl ketone peroxide, cobalt naphthenate and acrylates in the manufacture of fibreglass-reinforced plastics

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Case Report

A 64-year-old man who had been a part-time worker in a fibreglass-reinforced plastics (FRP) factory producing gutter covers etc. developed severe acute hand dermatitis 6 years into his employment. He was involved in the assembly process and had had no previous skin problems. Before the onset, he had not worn protective gloves either when using resin, hardener and accelerator to mend flaws in moulded FRP products, or when using acrylate glue to assemble the FRP. The chemical composition of the resin was unsaturated polyester resin (UP) and the main ingredients of the hardener and accelerator were methyl ethyl ketone peroxide (MEK peroxide) and cobalt naphthenate, respectively. The glue was the product of a mixture of acrylates.

Two months' treatment and sick leave cured the dermatitis. He returned to work in the same FRP manufacturing process as before, but started wearing natural rubber latex (NRL) gloves with inner thin cotton gloves. Nine months later, with careful use of gloves, he showed only minor recurrence (scaling on the fingertips).

Patch tests showed positive results to MEK peroxide in the hardener, cobalt naphthenate in the accelerator and 2-hydroxyethyl methacrylate and methyl methacrylate in the acrylate glue (Table 1).

Discussion

Few cases of allergy due to MEK peroxide and cobalt naphthenate, used as a catalyst and an accelerator, respectively, for UP systems, have been reported in FRP workers (1–4). On the other hand, acrylate is a common allergen (5). This patient had been involved in postlamination processing, mainly assembling parts of molded

plastics. His sensitization occurred because for 6 years he neglected to use skin protection, even though NRL gloves and inner cotton gloves were provided in the factory. Education about the importance of protective glove usage is thus required as well as ensuring access to gloves.

References

1. Rietschel R L, Fowler J F. Plastic and resin dermatitis. In: *Fisher's Contact dermatitis*, 4th edition. Baltimore: Williams & Wilkins, 1995: 637–675.
2. Tarvainen K, Jolanki R, Forsman-Grönholm L, et al. Exposure, skin protection and occupational skin diseases in the glass-fibre-reinforced plastics industry. *Contact Dermatitis* 1993; 29: 119–127.
3. Bhushan M, Craven N M, Beck MH. Contact allergy to methyl ethyl ketone peroxide and cobalt in the manufacture of fibreglass-reinforced plastics. *Contact Dermatitis* 1997; 39: 203.
4. Stewart L, Beck MH. Contact sensitivity to methyl ethyl ketone peroxide in a paint sprayer. *Contact Dermatitis* 1992; 26: 52–53.
5. Estlander T. Occupational skin disease in Finland: observations made during 1974–88 at the Institute of Occupational Health, Helsinki. *Acta Dermato-Venereologica Supplement* 1990; 155: 1–85.

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Table 1. Patch test results

	Concentration	D3
Chemicals used in factory		
Unsaturated polyester resin	5% pet.	–
Hardener (methyl ethyl ketone peroxide complex)	0.5%, 1% pet.	+
Accelerator (containing 6% of cobalt naphthenate)	5% pet.	+
Acrylate glue	1%, 5% pet.	+
Components of acrylate glue provided by manufacturer		
Nitrile butadiene rubber	as is	–
Butadiene-styrene methyl methacrylate polymer	50% pet.	–
Paraffin wax	as is	–
Methyl methacrylate	2% pet.	–
2-Hydroxyethyl methacrylate	1% pet.	+
Dicyclopentenloxyethyl methacrylate	1% pet.	–
Cumen hydroperoxide	0.5% pet.	–
Vanadyl acetylacetonate	1% pet.	–
Stabilizer	1% pet.	–
Plastics series		
(2-Hydroxyethyl) methacrylate	1% pet.	+
Methyl methacrylate	2% pet.	? +
Ethyleneglycol dimethacrylate	2% pet.	+
Triethyleneglycol dimethacrylate	2% pet.	–
BIS-GMA ^a	2% pet.	+
Diurethane dimethacrylate	2% pet.	–
Di- <i>n</i> -butylphthalate	5% pet.	–
Tricresyl phosphate	5% pet.	–
Triphenyl phosphate	5% pet.	–
Dimethylphthalate	5% pet.	–
di-2-ethylhexyl-phthalate	5% pet.	–
Benzotriazole	1% pet.	–
Hydroquinone	5% pet.	–
para-tertiary-Butylcatechol	1% pet.	–
Benzoyl peroxide	1% pet.	? +
Potential allergens prepared in laboratory		
Styrene	1% o.o.	–
Methyl ethyl ketone peroxide (in dibutyl phthalate)	0.5% pet.	+
Cobalt naphthenate ^b	2% pet.	+
Dimethylaniline	10% alc.	–
Benzophenone	5% pet.	–
Japanese standard series		
Cobalt chloride	1% pet.	+
Nickel sulphate	2.5% pet.	+
All other allergens		–

^aBIS-GMA: 2,2-bis[4-(2-hydroxy-3-methacryloxy-propyloxy)phenyl]propane.

^bCobalt naphthenate preparation contains cobalt at 0.16%.

Pet./in petrolatum, o.o./in olive oil, alc./in 70% ethanol.