

Short Communication

Simultaneous active sensitization to multiple chemicals

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Key words: active sensitization; Kathon® CG; isothiazolinones; phenylglycidyl ether; diaminodiphenylmethane; epoxy resin; glues; occupational. © Munksgaard, 1998.

Case Report

A 39-year-old non-atopic caretaker in a school of design developed hand and face dermatitis in 1988, 3 weeks after having used an epoxy resin glue. Patch testing revealed allergy to diglycidylether bisphenol A type epoxy resin (DGEBA-ER; +++). Other substances in the European standard series, a fragrance series, and a plastic and glues series were negative. Thereafter, she avoided epoxy resin exposure and remained symptomless. In 1996, she had 2 episodes of severe dermatitis on her face and eyelids, neck and upper chest, and upper arms. Patch testing was performed according to the recommendations of the ICDRG with 2 days occlusion with a modified European standard series (without DGEBA-ER), an epoxy resin series, a fragrance series and a turpentine series. Brominated epoxy resin, which contains DGEBA-ER (1), was the only substance that elicited an allergic patch test reaction. However, after 10–20 days, the patient developed 3 further patch test reactions. On retesting 2 months later, the patient had a +++ reaction to Kathon® CG (200 ppm), a +++ reaction to phenylglycidyl ether (0.25%) and a ++ reaction to diaminodiphenylmethane (0.5%) (all allergens from Chemotechnique Diagnostics AB, Malmö, Sweden; readings on D 2, 3 and 4; Fig. 1). Later, a work site visit was performed; it became evident that epoxy resin glues had caused the patient's episodes of dermatitis.

Discussion

Active sensitization is iatrogenic sensitization to a chemical induced by application of a patch test (2, 3), and is detected by the patch test site becoming positive 10–21 days after application (2–5). The allergy can be verified by retesting; the patch test site becomes positive in 1–4 days using the routine patch test procedure (2–5), as in our case.

Active sensitization is usually caused by a single chemical (4, 5), or a group of closely-related chemicals (6). In rare cases, "double active sensitization" has occurred: the patient has become sensitized to further chemicals during the retest (7, 8). Both double active sensitization and simultaneous active sensitization to

multiple unrelated chemicals reflect a heightened individual tendency to develop delayed-type hypersensitivity.

Phenylglycidyl ether is a potent allergen; it is used as a reactive diluent in epoxy resins (9, 10). Diaminodiphenylmethane is used, e.g., as an epoxy resin hardener

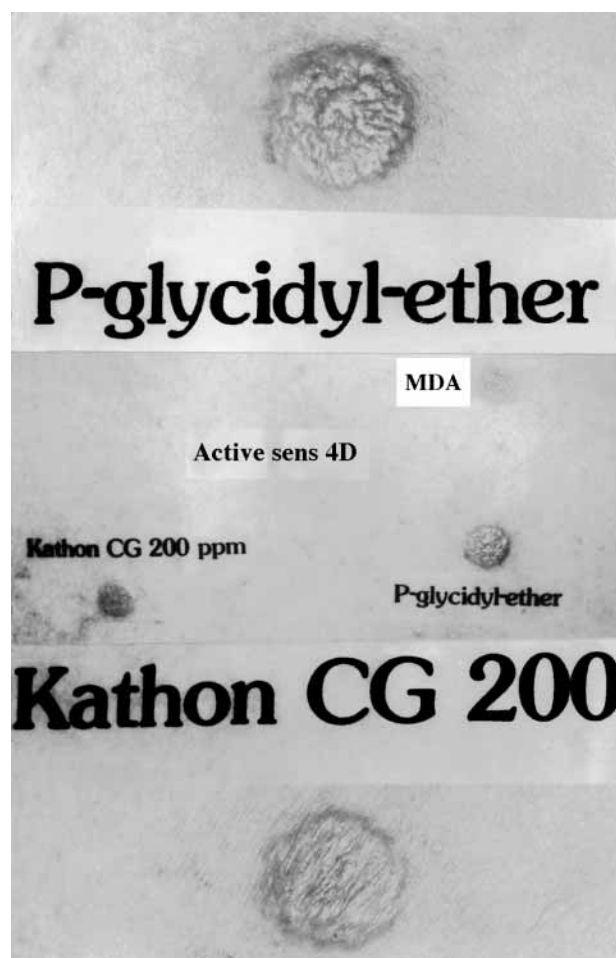


Fig. 1. Patch test reactions on retesting at D 4, confirming active sensitization to Kathon® CG, diaminodiphenylmethane (MDA) and phenylglycidyl ether (P-glycidyl-ether).

(11), and may also cause allergy from its use in polyurethanes (12). Kathon® CG often actively sensitizes if patch tested at 300 ppm, whereas 100 ppm may give false-negative patch test reactions (13, 14). In our case, 200 ppm Kathon® CG caused active sensitization.

We request all our patients to report late reactions in order to obtain more knowledge about active sensitization. We also consider it important to report active sensitization, and to lower the patch test concentration if active sensitization occurs in several patients (3–5). Patch testing is usually safe (4, 15) and, as stated by Cronin (16), active sensitization is a potential hazard of patch testing but not a major risk, and should not be accepted as a reason for not doing this investigation. Kathon® CG, phenylglycidyl ether and diaminodiphenylmethane have not previously caused active sensitization in our patients.

References

1. Kanerva L, Jolanki R, Estlander T. Allergic contact dermatitis from non-diglycidyl-ether-of-bisphenol-A-epoxy resins. *Contact Dermatitis* 1991; 24: 293–300.
2. Calnan C D. Studies in contact dermatitis XX. Active sensitization. *Trans St John's Hosp Dermatol Soc* 1967; 53: 128–134.
3. Kanerva L, Estlander T, Jolanki R. Sensitization to patch test acrylates. *Contact Dermatitis* 1988; 18: 10–15.
4. Kanerva L, Estlander T, Tarvainen K, Jolanki R. Active sensitization caused by elecampane (*Inula helenium*). *Am J Contact Dermatitis* 1994; 5: 30–33.
5. Estlander T, Kostiaainen M, Jolanki R, Kanerva L. Active sensitization and occupational allergic contact dermatitis caused by paratertiary butyl catechol. *Contact Dermatitis* 1998; 38: 96–100.
6. Kanerva L, Estlander T, Jolanki R. Active sensitization caused by 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, ethyleneglycol dimethacrylate and N,N-dimethylaminoethyl methacrylate. *J Eur Acad Derm Venereol* 1992; 1: 165–169.
7. Kanerva L, Estlander T, Jolanki R. Double active sensitization caused by acrylics. *Am J Contact Dermatitis* 1992; 3: 23–26.
8. Malanin K. Active sensitization to camphoroquinone and double active sensitization to acrylics with long-lasting patch test reactions. *Contact Dermatitis* 1993; 29: 284–285.
9. Jolanki R, Kanerva L, Estlander T, Tarvainen K. Epoxy dermatitis. In: Nethercott J (ed): *Occupational medicine: state of the art reviews* Philadelphia, PA: Hanley & Belfus, Inc, 1994: 97–112.
10. Angelini G, Rigano L, Foti C, Grandolfo M, Veña G A, Bonamonte D, Soleo L, Scorpiniti A A. Occupational sensitization to epoxy resin and reactive diluents in marble workers. *Contact Dermatitis* 1996; 35: 11–16.
11. Kanerva L, Estlander T, Jolanki R. Occupational allergic contact dermatitis caused by 2,4,6-tris-(dimethylaminomethyl)phenol, and a review of sensitizing epoxy resin hardeners. *Int J Dermatol* 1996; 35: 852–856.
12. Estlander T, Keskinen H, Jolanki R, Kanerva L. Occupational dermatitis from exposure to polyurethane chemicals. *Contact Dermatitis* 1992; 27: 161–165.
13. Färm G, Wahlberg J E. Isothiazolinones (MCI/MI): 200 ppm versus 100 ppm in the standard series. *Contact Dermatitis* 1991; 25: 104–107.
14. Bruze M, Gruvberger B, Björkner. Kathon® CG – an unusual contact sensitizer. In: Menné T, Maibach H I (eds): *Exogenous dermatoses; environmental dermatitis*. Boca Raton, FL, USA: CRC Press Inc, 1991: 283–298.
15. Meneghini C L, Angelini G. Behaviour of contact allergy and new sensitivities on subsequent patch tests. *Contact Dermatitis* 1977; 3: 138–142.
16. Cronin E. Clinical prediction of patch tests. *Trans St John's Hosp Dermatol Soc* 1972; 58: 153–161.