

Short Communication

Allergic contact dermatitis from para-nitrobenzyl bromide

R. THOMPSON¹, A. M. FINN² AND R. J. G. RYCROFT³

¹Occupational Health Department, Shell International, London, UK

²Occupational Health Department, Glaxo Wellcome Research & Development, Greenford, Middlesex UB6 0NN, UK

³St John's Institute of Dermatology, St Thomas's Hospital, London SE1 7EH, UK

Key words: para-nitrobenzyl bromide; halogenated organic compounds; allergic contact dermatitis; occupational; laboratory workers; prevention; material safety data sheets; lack of cross-sensitivity. © Munksgaard, 1998.

Para-nitrobenzyl bromide (PNBB) is a commercially available alkylating agent, belonging to the family of halogenated organic compounds. These are highly reactive and hence used to produce novel pharmaceutical intermediates and products. PNBB is a potent contact irritant and sensitizer (1–5). Several cases of contact allergy to this chemical have been reported (1, 2). When our patient presented, the supplier's material safety data sheet (MSDS) made no reference to its sensitizing potential.

Case Report

A 26-year-old medicinal chemist was working in a pharmaceutical research laboratory. She had no history of skin problems and was not atopic. In March 1995, she developed a severe, slowly evolving rash on her face, neck, hands and arms up to the elbows. It was itchy, papulovesicular, and discretely macular rather than generalized. She was treated with topical corticosteroids, with resolution in 3 weeks.

A workplace assessment revealed PNBB as the suspect. A literature search confirmed it as a sensitizer. Substance information sheets and Control of Substances Hazardous to Health (COSHH) assessments were duly reviewed and updated. The patient was temporarily removed from exposure. On return to work, the rash reappeared despite no new direct exposure to PNBB, and in spite of the use of appropriate personal protective equipment (PPE) for all other work. She was, however, inadvertently exposed to a daughter compound, which has in part a similar structure.

In view of the recurrence of the rash, there were implications for her career as well as her health, so she was referred for patch testing, which was ++ at both 2 and 4 days to PNBB at 0.001% pet. and +++ to 0.01% pet. and 0.1% pet. She was also tested against *p*-nitrobenzyl alcohol, *p*-tertiary-butyl benzyl bromide and ethyl *p*-nitrophenyl acetate. None of these were positive. As a result of these findings, she was restricted from work

with PNBB only. She has since remained well and symptom-free.

Discussion

This case of confirmed sensitization to PNBB follows 1 report of allergic contact dermatitis due to highly halogenated compounds (6) and 3 other reports of allergic contact dermatitis due to PNBB itself (1–3). In 1980, NIOSH investigated PNBB dermatitis at Sterling Organics (3), confirming that a closed production process prevented exposure to PNBB and hence PNBB dermatitis. In 1983, Goodwin et al. (1983) examined the sensitizing potency of alkylating agents, including PNBB, finding a simple correlation between alkylating reactivity and sensitization potential (5).

The Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (CHIP) (7) require the supplier to classify, label and package chemicals appropriately, and, under certain circumstances, to provide an MSDS. There are recommended sources of information which the supplier should use to classify appropriately, among them reference works and scientific papers. This clearly does not always happen.

As a result of our own findings, changes were made in the control and handling of PNBB and related compounds in our organization. This case might serve as a useful warning to companies using PNBB to ensure that their MSDS are current for this and other chemical compounds, and to consider how they might check or supplement suppliers' MSDS, as has recently been pointed out in connection with (meth)acrylate-containing products (8).

References

1. Pambor M, Weisner M. Allergic contact dermatitis due to *p*-nitrobenzyl bromide. *Contact Dermatitis* 1990; 23: 201–202
2. Giorgini S, Spallanzani P, Fabbri P, Rapi B, Ginanneschi

- M, Sertoili A. A case of multiple sensitization to 3 halogeno-substituted mononitrobenzenes. *Italian General Review of Dermatology* 1978; 15: 107–112.
3. Baker D, Fannick N, Hills B. Health hazard evaluation report no. HETA-80-242-1106. Sterling Organics, Rensselaer. *Hazard Evaluations NIOSH*. US Department of Health and Human Services, Cincinnati, Ohio, Report No. HETA-80-242-1106.
 4. Goodwin B F J, Johnson A W, Roberts D W, Williams D L Relationships between chemical structure and skin sensitization potential. *1st Immunotoxicol Proc Int Symp* 1983: 449–456.
 5. Roberts D W, Goodwin B F J, Williams D L, Jones K, Johnson A W, Alderson J C E. Correlations between skin sensitization potential and chemical reactivity for p-nitrobenzyl compounds. *Food Chem Toxicol* 1983; 21: 811–813.
 6. Pickering F C, Ive F A. Allergic contact dermatitis due to highly reactive halogenated compounds. *Contact Dermatitis* 1983; 9: 500–503.
 7. Health and Safety Executive. *The chemicals (Hazard Information and Packaging for Supply) Regulations*. HMSO, 1994.
 8. Henriks-Eckerman M-L, Kanerva L. Product analysis of acrylic resins compared to information given in material safety data sheets. *Contact Dermatitis* 1997; 36: 164–165.