

CONTACT POINTS

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Acrylate-induced hand dermatitis in the manufacture of contact lenses

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Acrylic monomers are well-known sensitizers of importance because of their widespread industrial and consumer use. We report a case of allergic contact dermatitis from exposure to acrylic monomers in the manufacture of contact lenses.

Case Report

After 9 months of work in a factory manufacturing disposable contact lenses, a 36-year-old Chinese man presented with a 4-month history of a work-related, recurrent, bilateral dermatitis affecting the tips of his fingers and thumbs. Clinical examination showed scaly, eczematous plaques limited to the left thumb, index, and middle fingertips as well as the right index and middle finger tips. Personal protective equipment included safety boots, latex gloves, and goggles.

The patient was patch tested with National Skin Centre baseline and acrylate series (Chemotechnique® Diagnostics, Sweden) with Finn® chambers on Scanpor® tape as well as to the constituent monomers of the contact lenses (in 1% and 2% pet.) and his own gloves. After 2D application, readings were taken on D3 and D7 using International Contact Dermatitis Research Group criteria (1). Details of the patch test results are shown in Table 1.

Table 1. Acrylate and glove patch test results

Allergen (dilution, vehicle)	Day 3	Day 7
2-Hydroxyethyl methacrylate (2-HEMA) (2% pet.)	+	+
2-Hydroxypropyl acrylate (HPA) (0.1% pet.)	–	+/-
Ethyleneglycol dimethacrylate (EGDMA) (2% pet.)	+	+
Methyl methacrylate (MMA) (2% pet.)	+	+
Triethyleneglycol diacrylate (TREGDA) (0.1% pet.)	–	–
Own acrylate monomers (1% pet.)	+	+
Own acrylate monomers (2% pet.)	+	+
Own black glove (as is)	–	–
Own rubber glove (as is)	–	–

Discussion

The manufacturing process of these contact lenses involves the moulding of polypropylene casts and the injection, spinning, and UV-curing of liquid acrylic monomers. These processes are automated and enclosed. Hence, workers do not have direct contact with the chemicals. Our patient, however, a technician involved in the servicing and maintenance of the manufacturing machines, would be exposed to the liquid monomers in the machines. The constituent monomers used in the contact lens manufacture were 2-hydroxyethyl methacrylate (2-HEMA), glycerol monomethacrylate (GMA), and ethyleneglycol dimethacrylate (EGDMA). Other substances handled included machine oil, acetone, and isopropyl alcohol.

Although acrylates are common sources of occupational hand dermatitis, acrylate sensitization from contact lens manufacturing is rarely seen. It has only been previously reported by Peters et al. (2) who described two cases of occupational hand dermatitis occurring in technicians working in a contact lens factory. Both patients had positive patch tests to 2-hydroxyethyl acrylate (HEA) and one of them had a weak reaction to 2-hydroxyethyl methacrylate (2-HEMA).

Commonly used latex gloves protect poorly against acrylates, as acrylates penetrate over relatively short periods. 4-H® gloves (Safety 4 Inc), followed by nitrile gloves, have been found to

afford the best protection (3). Although 4-H® gloves, which consist of a five-layer laminate, can inhibit the penetration of acrylics, they do not give a good anatomical fit for tasks needing dexterity and tactility. As such, nitrile gloves were recommended for use during servicing of the machines. Our patient was moved to another section of the factory, where the acrylates had been cured and were not in monomer form; there was no further recurrence of his hand dermatitis.

This report highlights the sensitizing potential of acrylate monomers such as 2-HEMA and EGDMA in the manufacture of contact lenses, and the need for worker education and training to increase awareness and improve compliance with occupational hygiene precautions. It also highlights the importance of understanding the work processes so that appropriate recommendations can be made to the management to reduce the risk of dermatitis.

References

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