

Allergic contact dermatitis to polyethylene glycol-7 hydrogenated castor oil

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Case Report

A 73-year-old nonatopic man presented with eczematous rash on the face and neck after application of a sunscreen lotion. Patch testing with an extended British Contact Dermatitis Society standard series, medication series, facial series, photoallergic series and patient's own sunscreen was performed. Photopatch testing with the photoallergic series and patient's own sunscreen was also performed. The only positive reaction was to the sunscreen lotion on nonirradiated and irradiated skin, indicating

a non-photosensitive allergic contact dermatitis. Further patch testing with individual ingredients of the sunscreen lotion, obtained courtesy of the manufacturers, showed a positive reaction to polyethylene glycol (PEG)-7 hydrogenated castor oil 10% in petrolatum (day 2 +/day 4 +). There were negative reactions to all the other ingredients including PEG-8.

Discussion

Castor oil is a nonvolatile oil obtained from the seeds of *Ricinus communis*, a member of the Euphorbiaceae family. It is used topically for its emollient effect and orally as a purgative. Castor oil derivatives (hydrogenated, polyoxyethylated and sulfated castor oil, sodium ricinoleate, PEG-2-ricinoleate, and glyceryl ricinoleate) are used in the pharmaceutical and cosmetic products for their high viscosity, emollience, resistance to rancidness, and ready solubility in alcohol. Ricinoleic acid accounts for about 90% of the glyceride fatty acids of castor oil. Ricinoleic acid is also used in textile finishes, in dry cleaning soaps, and as a spermicide in contraceptive jellies. Ricinoleates (zinc ricinoleate, magnesium ricinoleate, and glyceryl ricinoleate) are metal soaps of ricinoleic acid. They are used in adhesives, corrosion inhibitors, cosmetics, greases, varnishes, print pigments, and for deodorizing various products.

Allergic contact dermatitis has been previously reported to castor oil, sulfonated castor oil, ricinoleic acid, to the stems, leaves or beans from the *R. communis* plant, and to ricinene (1-methyl-3-cyano-4-methoxy-2-pyridone), a chemical encountered in the production of castor oil. Allergic contact dermatitis to zinc ricinoleate in deodorants (1, 2) and glyceryl ricinoleate in lipsticks (2) and camouflage creams (3) has been reported.

Polyethylene glycols (PEGs), also known as macrogols, are dihydric alcohols. PEGs are designated by a number indicating the average molecular weight. They are hydrophilic and easily bind many products. They also impart a pleasant feel or texture to a formulation. Because of these properties, PEGs are used extensively in the cosmetic and pharmaceutical industry as a vehicle to facilitate skin penetration. Relatively few contact allergies to PEGs are reported. It has been suggested that the lower molecular weight PEGs are more

likely to cause allergic contact dermatitis than higher molecular weight PEGs (4). Our patient was patch-test negative to PEG-8. PEG-7 and ricinoleic acid were not available to test separately.

We have described a case of allergic contact dermatitis to PEG-7-hydrogenated castor oil in a sunscreen. To our knowledge, this is the first report of allergy to a castor oil polyethylene glycol compound.

References

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