

BRIEF REPORT

Allergic contact dermatitis to propyl gallate and pentylene glycol in an emollient cream

Caterina Foti, Domenico Bonamonte, Nicoletta Cassano, Anna Conserva and Gino A. Vena

Department of Internal Medicine, Immunology and Infectious Diseases, Dermatology Clinic, University of Bari, Bari, Italy

ABSTRACT

A 62-year-old man, with a 20-year history of seborrhoeic dermatitis, presented with a worsening of his dermatitis. He had previously been demonstrated to be allergic to various topical corticosteroids, so he had been using an emollient cream (Sebclair®), containing piroctone olamine and various anti-inflammatory substances, for 6 months, with good effect. Patch testing to the cream and its ingredients revealed positive reactions to both propyl gallate and pentylene glycol. A positive reaction to propylene glycol was also detected, whereas patch testing to butylene glycol was negative. Complete remission followed avoidance of the offending substances.

Key words: contact allergy, cosmetic cream, pentylene glycol, propyl gallate, propylene glycol, seborrhoeic dermatitis.

INTRODUCTION

Seborrhoeic dermatitis is a common inflammatory skin disease with a chronic recurrent course, which is usually managed with topical corticosteroids and/or other anti-inflammatory preparations. We describe a patient with a facial seborrhoeic dermatitis and a previous history of contact sensitization to topical corticosteroids, who developed an acute exacerbation during treatment with an emollient cream containing piroctone olamine and various anti-inflammatory substances.

Correspondence: Professor Caterina Foti, Dermatology Clinic, Department of Internal Medicine, Immunology and Infectious Diseases, University of Bari, Policlinico, Piazza Giulio Cesare, 11, 70124 Bari, Italy. Email: c.foti@dermatologia.uniba.it

Caterina Foti, MD. Domenico Bonamonte, MD. Nicoletta Cassano, MD. Anna Conserva, MD. Gino A. Vena, MD.

Submitted 2 July 2009; accepted 14 August 2009.

CASE REPORT

A 62-year-old man, who had hypertension and hypercholesterolemia, presented with a 20-year history of seborrhoeic dermatitis involving the hairline, nasolabial folds and eyebrows. This flared intermittently with spontaneous remissions during summer, and was initially managed with sporadic, short-term courses of topical corticosteroids. He was first referred to our clinic following a progressive worsening of his facial dermatitis after the use of a cream containing hydrocortisone 17-butyrate. Patch tests with the SIDAPA (Italian Society of Allergological, Occupational and Environmental Dermatology) standard series (Euromedical, Calolziocorte, Lecco, Italy) and a corticosteroid series (Firma, Florence, Italy) were carried out at that time. Results were interpreted according to International Contact Dermatitis Research Group criteria. The patient had strong reactions (+++) to corticosteroid mix (hydrocortisone 21-acetate 1%, budesonide 0.01% and hydrocortisone 17-butyrate 1%), budesonide, desoxymethasone, fluocinonide and hydrocortisone 17-butyrate.

The patient was instructed to discontinue the use of topical corticosteroid preparations and to treat his seborrhoeic dermatitis with Sebclair® cream (Sinclair Pharmaceuticals Ltd, Godalming, Surrey, UK), a steroid-free cream containing piroctone olamine and various anti-inflammatory and emollient substances. This product controlled his facial seborrhoeic dermatitis over a 6-month period, but he once again presented with a flare of his facial dermatitis.

Patch testing with the over-the-counter cream revealed a positive reaction (++) to the product at days 2 and 3. Four weeks later, patch tests with the individual ingredients of the cream, provided by Sinclair Pharma (Milan, Italy), were carried out. Table 1 shows the results of patch testing with the cream and its ingredients. Positive reactions were observed to propyl gallate and pentylene glycol. Ten healthy subjects were patch tested as controls with pentylene glycol 5% pet. and 5% aq. and showed no reactions. Patch test with butylene glycol, which was also contained in the cream, 5% pet. and 5% aq. gave a negative reaction. Our patient did not react to patch testing with Acifrufructol complex P63, a mixture present in the cream that contains propylene glycol

Table 1 Results of patch testing with Sebclair® cream and its ingredients

Compound	Concentration and vehicle	Day 2	Day 3
Sebclair® cream	As is	++	++
Acifructol complex P63†	5% pet.	–	–
Allantoin	5% pet.	–	–
Allantoin glycyrrhetinic acid	20% pet.	–	–
Ascorbyl tetraisoalmitate	5% pet.	–	–
Bisabolol	5% pet.	–	–
Butylene glycol	5% pet.	–	–
Butylene glycol	5% aq.	–	–
Cera alba	As is	–	–
Disodium EDTA	1% pet.	–	–
Ethylhexylpalmitate	5% pet.	–	–
Hydrogenated castor oil	20% pet.	–	–
Isohexadecane	10% pet.	–	–
Magnesium stearate	1% pet.	–	–
Magnesium sulphate	1% pet.	–	–
PEG-30 dipolyhydroxystearate	10% pet.	–	–
Pentylene glycol	2% pet.	++	++
Pentylene glycol	5% pet.	++	++
Pentylene glycol	5% aq.	++	++
Piroctone olamine	3% pet.	–	–
Polyglyceryl-6 polyrycnoleate	5% pet.	–	–
Propyl gallate	1% pet.	++	++
Shea butter	20% pet.	–	–
Telmesteine	1% pet.	–	–
Tocopheryl acetate	5% pet.	–	–
<i>Vitis vinifera</i>	1% pet.	–	–

†A mixture consisting of propylene glycol, lactic acid, water, tomato (*Solanum lycopersicum*) extract, lemon (*Citrus medica limonum*) extract, grapefruit (*Citrus grandis*) extract, bilberry (*Vaccinium myrtillus*) extract, citric acid, malic acid.

and many other compounds (Table 1). Patch testing with propylene glycol 5% pet. was subsequently carried out showing a positive response.

The patient's superimposed eczematous reaction remained settled during a 4-month follow-up period after avoidance of the offending substances.

DISCUSSION

Propyl gallate (E310) is used as an anti-oxidant and preservative in topical medicaments, foods and cosmetics, with a particularly widespread use in the manufacture of lipsticks.

A potent sensitizer, it has increasingly been reported to be the cause of contact allergy, possibly due to a reduction in oral tolerance as its use as an anti-oxidant in food has diminished.¹ Pentylene glycol (1,5-pentanediol) is utilized as a preservative, humectant and solvent in cosmetics. It is often used as an alternative for propylene glycol (1,2-propanediol), having similar properties but associated with a lower risk of irritation and sensitization. Allergic reactions to pentylene glycol have been rarely described.^{2–5} Pentylene glycol and propylene glycol share the same chemical structure with the exception of a longer carbon chain on the former molecule and the relative position of the alcohol groups. Therefore, pentylene glycol might be expected to cross-react with propylene glycol.⁴ However, it is not known if the positive reaction to a glycol was the result of a cross-sensitization to the other, or if the contact sensitization to propylene glycol was already present in our patient, who was not previously patch tested with any glycols.

The patient described in this report showed contact sensitization to multiple ingredients of topical preparations used to treat his seborrhoeic dermatitis. On varying occasions, contact allergy to these products manifested as a severe exacerbation of the pre-existing dermatitis, which failed to respond to previously effective treatments. Repeated applications of chemical sensitizers on inflamed skin lesions may be a contributing factor in the development of contact allergy. It should be borne in mind that certain substances, like glycols, are frequently contained in several emollients and topical products recommended for the use on sensitive skin or in patients with chronic inflammatory skin diseases.

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