

Allergic contact dermatitis to benzalkonium chloride with erythema multiforme-like reaction in a child

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CASE REPORT

A 2-year-old female infant was referred with a 3-month history of eczema on the buttocks and upper part of the thighs; the patient was otherwise healthy. Physical examination additionally revealed sharply

demarcated erythema multiforme-like lesions with annular borders, which had recently started to involve the back, knees, and elbows (Figure 1). The lesions were mildly itchy and painful. History revealed that the parents used to wash the child's potty with a specific disinfectant without rinsing it. Patch-testing with the AL test (Euromedical,



FIGURE 1 (A) Erythema multiforme-like reaction involving knees.
(B) Eczematous lesions at the site of contact

Thanks to its biocidal and disinfectant properties, benzalkonium chloride is used as a preservative in several pharmaceutical products and for the sanitization of surfaces, although, rarely, it can cause allergic contact dermatitis.



FIGURE 2 (A) The patient sitting on the potty. (B) Patch test result

Calolziocorte, Italy) on Scanpor tape (Norgesplaster, Vennesla, Norway) fixed on the upper back with Hypafix (BSN Medical, Hamburg, Germany) and occluded for 48 hours was performed. The patient was tested with the Italian SIDAPA (Italian Society of Allergological, Occupational and Environmental Dermatology) baseline series, and benzalkonium chloride 0.1% aq. The disinfectant product (benzalkonium chloride 1.5%, cationic surfactants <5%, non-ionic surfactants <5%, perfume, color, and water) was not tested directly but only the possible principal allergen contained in it, namely benzalkonium chloride 0.1% aq., due to the strong irritating effect of the disinfectant itself. Readings revealed a ++ reaction on days 2 and 4 to benzalkonium chloride 0.1% aq., potassium dichromate 0.5% pet. and nickel sulfate 5% pet. (Figure 2). Despite some uncertainty regarding categorization as allergic or irritant reaction, we have interpreted the result with benzalkonium chloride 0.1% aq. as contact allergic in view of the morphology of the lesions and the appearance of distant lesions.

Benzalkonium chloride-free disinfectants were recommended. Over 2 weeks, the lesions gradually cleared after avoidance of this particular disinfectant, a change of potty, and application of topical fluticasone cream.

DISCUSSION

Benzalkonium chloride, a quaternary ammonium cationic surfactant, is a strong skin irritant and an uncommon cause of allergic contact dermatitis.^{1,2} Because benzalkonium chloride can be present in skin disinfectants, ophthalmic preparations, and various other medical products, it can cause contact dermatitis in physicians, nurses,

dentists, and veterinarians as a result of occupational exposure, or in patients using ophthalmological products.³ In our case, the clinical history and the presentation of the lesions over the buttocks and the upper posterior thighs were suggestive of contact dermatitis from some allergen with which the patient had come into contact at that anatomical site, namely the disinfectant.⁴ Indeed, although people of all ages can develop contact dermatitis from benzalkonium chloride, it rarely occurs in the pediatric population. However, some authors report benzalkonium chloride to be an emerging hapten in the pediatric population, especially in children with atopic dermatitis who experience a higher exposure to allergens because of the breakdown of the skin barrier.⁵

Finally, this case highlights the importance of patch testing, especially when the differential diagnosis between contact and irritative dermatitis is not clear, as in the case of highly irritating chemical products.⁶ Some authors suggest that sensitization to benzalkonium chloride is more likely when using products in which it is used as an active agent (disinfectant) and therefore with a concentration greater than 1%, as in our patient, compared to products in which it is used at a lower concentration as a preservative (typical concentration $\leq 0.01\%$ as preservative).⁴ In our case the presence of eczematous lesions at the site of contact with the potty, in addition to the erythema multiforme-like reaction in distant areas, strongly suggested the diagnosis of allergic contact dermatitis.

CONFLICT OF INTERESTS

None to declare.

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