

Contact urticaria syndrome and protein contact dermatitis caused by glycerin enema

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INTRODUCTION

Glycerin is a rare sensitizer and is widely used for cosmetics, medicine, and food for its stable, nontoxic properties. We report on a patient with generalized urticarial eruptions who had contact urticaria syndrome caused by glycerin enema. Our case suggests that glycerin can be a cause of contact urticaria syndrome and even anaphylaxis, although allergic reactions to glycerin are very rare.

CASE REPORT

An 81-year-old woman, who was admitted to the department of internal medicine for arteriosclerotic Parkinsonism, was referred to the department of dermatology for exanthemas. Her nurse recognized that her symptoms started about 2 weeks before. The generalized exanthemas appeared only in the morning, but not every day, and disappeared within a few hours without pigmentation. The eruptions always occurred on the same day that a glycerin enema was administered. Nurses routinely give enemas to their patients who need them after breakfast. It was eventually determined that the generalized urticarial eruptions appeared 30 minutes after the enema (Fig 1) and disappeared within an hour. The eruptions were accompanied by a temperature of up to 100°F, but her vital signs were stable. The content of the enema was 50% glycerin only. Dimethylpolysiloxane was coated on the insertion region of the polyethylene container as a lubricant. Prick testing and scratch-patch testing were performed for the content (50% glycerin), the lubricant (dimethylpolysiloxane), and the container

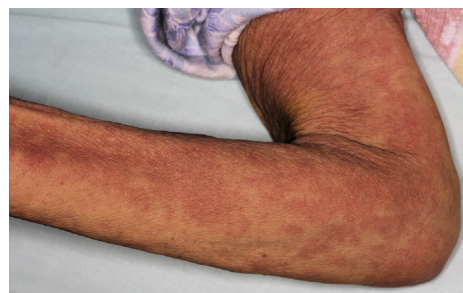


Fig 1. Generalized urticaria appeared after administration of a glycerin enema.

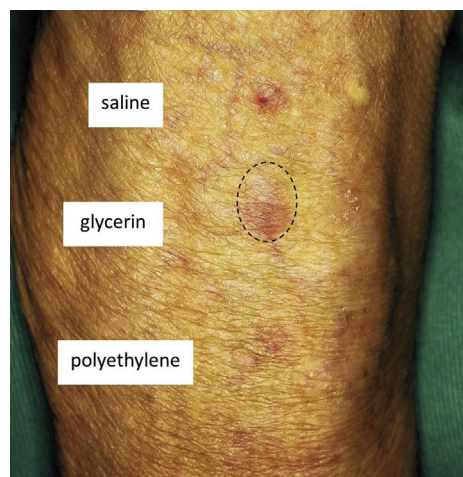


Fig 2. Scratch-patch testing: a wheal appeared at the glycerin test region.

(polyethylene) of the enema to determine which ingredient(s) was the cause. The prick testing results were all negative. In the scratch-patch testing, a

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Table 1. Comparison of our case with previous reports of allergic reactions to glycerin

Year	Case	Age	Sex	Symptoms	Cause	Method	Positive reactions
1976	Hannuksela and Förström ³	N/A	Female	Eczema on the hand	Mixture of glycerin and 70% ethanol	Patch testing	50%, 10%, 5%, 1% glycerin and glycerin-ethanol mix as is
1979	Hannuksela ⁴	N/A	Female	Widespread dermatitis	Cream containing 10% glycerin	Patch testing	50% glycerin
2003	Tamagawa-Mineoka et al ²	30 y	Female	Pruritic and erythematopapular eruptions for 6 months (face)	Cosmetics (cosmetic lotion and cleansing foam)	Patch testing	Cosmetic lotion as is, cleansing foam 1% aq, 1,3-butylene glycol 1% aq, glycerin 1% aq
2007	Preston and Finch ⁵	29 y	Female	Patchy eczema for 7 mo (eyelids, face, neck, scalp, and axillae)	Hand cream	Patch testing	Dimethylaminopropylamine 1% aq, hand cream as is, glycerin 1% aq
	Current case	81 y	Female	Generalized urticaria	Glycerin enema	Scratch-patch testing	50% glycerin

Whereas all previous cases showed eczema and contact dermatitis, this case showed generalized urticarial and contact urticaria syndrome to glycerin. aq, Aqueous; N/A, not available.

wheel appeared at the glycerin region 30 minutes after the start of the test (Fig 2). A slight skin flush was observed at all her other regions after the scratch test. This slight skin flush with flat exanthemas without swelling was entirely different from the exanthemas that manifested as an urticarial wheal, at the glycerin area of the scratch-patch test. Contact urticarial syndrome to glycerin was diagnosed. After ceasing the glycerin enemas, the symptoms did not return.

DISCUSSION

Glycerin is a trihydric alcohol with a molecular formula of $C_3H_8O_3$. Glycerin is stable, nontoxic, nonirritating and hypoallergenic with antibacterial effects.^{1,2} Because of those properties, glycerin is widely used in various cosmetics, medicine, and food. Allergic reactions to glycerin are considered rare. Glycerin is used as a negative control in allergy scratch tests. To date, only 4 case reports regarding allergic reactions to glycerin are published, according to searches of the PubMed database using the keywords *glycerin* or *glycerol* and *allergy*, *hypersensitivity*, *contact dermatitis*, *anaphylaxis*, *drug eruption*, or *erythema multiforme* (Table 1). An allergic reaction to glycerin was first reported by Hannuksela and Förström in 1976.³ In their examinations of irritant and allergic properties of some humectants, they found 1 patient who showed an allergic reaction to 50% glycerin by the chamber method, whereas 420 other consecutive patients with eczema didn't show irritant or allergic reactions. Hannuksela⁴ also tested several thousand patients with 50% glycerin using the Finn Chamber method. Those results were negative in all but 2 cases (one of them was the same patient in the previous report³). In both of those cases, widespread dermatitis was caused by a cream containing 10% glycerin. The patients in the other 2 cases also had eczema that was caused by cosmetics such as hand moisturizing creams, cosmetic lotions, and cleansing foams.^{2,5} In both cases, results of patch tests for glycerin were positive. The reports of the 4 previous cases didn't mention urticaria or immediate skin reactions but discussed only eczema or dermatitis. These investigators also performed patch testing but not prick or scratch testing, so the cases are considered contact allergic dermatitis, rather than contact urticaria syndrome.

Contact urticaria syndrome is a condition that is characterized by the immediate development of contact skin reactions, mainly consisting of wheals or eczema.⁶ The severity of the syndrome can be classified into 4 stages, from localized contact urticarial (stage 1) to anaphylactoid reactions (stage 4). Ours is classified as stage 2, which includes

generalized urticaria. Contact urticaria syndrome is divided into 2 groups: the nonimmunologic type and the immunologic type. Our case is considered the immunologic type, as glycerin is a rare sensitizer, and the patient began to show symptoms during the repetitive use of the enema. For the diagnosis of contact urticaria syndrome, an intradermal test is required when the open test result is negative. A suspicion that a patient has immunologic type contact urticaria syndrome increases the risk of an anaphylactoid response.⁷ Our patient had an increased temperature when the urticaria appeared, suggesting that she had a risk of anaphylaxis (stage 4) from the generalized urticaria (stage 2). Scratch tests and chamber scratch tests are less standardized than the prick tests but are useful when a nonstandard allergen must be studied.⁶ In our case, the patient showed a positive reaction to glycerin only in the scratch-patch test.

To our knowledge, this case is the first report of contact urticaria syndrome caused by glycerin. Glycerin enemas are frequently used to control

constipation for hospitalized patients. Although glycerin is a rare sensitizer, our case shows that glycerin can be a cause of contact urticarial syndrome and even anaphylaxis.

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