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 (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 wheal appeared at the glycerin test region (Fig 2).

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wheal 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 exantheses 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 \( \text{C}_3\text{H}_8\text{O}_3 \). 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 didn’t show irritant or allergic reactions. Hannuksela\(^4\) 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 report\(^3\)). 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.\(^7\) 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. Our patient had an increased temperature when the urticaia 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. 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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