

BRIEF REPORT

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An Adolescent Boy with Urticaria to Water: Review of Current Treatments for Aquagenic Urticaria

Abstract: We report the case of an adolescent boy with aquagenic urticaria unresponsive to oral antihistamine therapy. We successfully treated his condition by topical application of a petrolatum-containing cream as a protective coating. To our knowledge, this is the first report showing the use of topical therapy alone to treat aquagenic urticaria in a child. Based on the effectiveness, safety profile, and ease of use, clinicians may wish to consider this regimen as a first-line therapy.

Physical urticaria is defined as urticaria induced by physical stimuli, such as trauma, pressure, heat or cold, exercise, and water. Aquagenic urticaria (AU) is a rare form of physical urticaria, first described by Shelley and Rawnsley in 1964 (1). Upon contact with water, patients develop distinctive folliculopapular urticaria 1 to 2 mm in size, distributed mainly on the trunk and upper arms (1). Symptoms included mild to severe prickling, pruritus, and burning (1). The authors proposed that a toxic substance, formed by water reacting with sebum or sebaceous glands, stimulates the degranulation of local mast cells (1). The released histamine then produces urticarial lesions (1). In 1981, Sibbald and colleagues reported that acetylcholine may also induce histamine release (2). In 1986, Czarnetzki and colleagues suggested that a water-soluble antigen in the epidermis causes mast cell degranulation upon diffusion into the dermis (3). These reports imply a histamine-dependent mechanism of AU, but Luong and Nguyen recently described that, in certain patients, water challenge did not induce the expected increase in histamine level (4). Hence, the pathogenesis of this condition is poorly understood, making it difficult to develop evidence-based treatment strategies. Here, we present a case of an adolescent boy with AU successfully treated with topical application of a petrolatum-containing cream. We also review the current treatments.

CASE REPORT

A 13-year-old boy without personal or family history of atopy presented with a 1-year history of AU. Within 5 to 10 minutes of contact with water, small follicular wheals with diffuse erythematous flares developed, along with severe pruritus (Fig. 1). The urticarial lesions were distributed on the chest and back, sparing the palms and soles. These symptoms occurred regardless of water temperature. The urticaria typically persisted for 10 to 20 minutes after exposure to water. Emotional stress, physical exercise, and spicy food, known triggers for cholinergic urticaria, did not induce these symptoms. Sweating induced minimal urticaria occasionally but not to the extent induced by water. The patient never experienced any systemic symptoms such as wheezing, dysphagia, or respiratory distress when drinking water. Prophylactic antihistamine therapy (cetirizine and diphenhydramine) failed to provide any relief, forcing the patient to limit exposure to water. He resorted to taking a brief shower once per week with a great deal of pain and reluctance, and he refused to take baths.

Physical examination yielded no abnormal findings. Laboratory studies including complete blood count and metabolic panel were all within normal limits. Treatment was initiated by coating the skin with a protective layer of a bland topical cream (Cetaphil, Galderma Laboratories, Switzerland) prior to showering, but the treatment did not improve the symptoms, because it completely washed off. Next, the patient was instructed to apply a petrolatum-containing cream (Aveeno Intense Relief Repair Cream, Johnson & Johnson, New Brunswick, New Jersey) before showering. This product also contains dimethicone, a type of silicone oil with hydro-



Figure 1. Five to 10 minutes after water exposure, anterior chest.

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TABLE 1. *Current Treatment Options for Aquagenic Urticaria*

Therapies	Mechanisms
H ₁ -receptor antagonists (3,4)	Blocks histamine effects (e.g., terfenadine)
H ₁ -receptor inverse agonists (3,4)	Blocks histamine effects (e.g., hydroxyzine)
H ₂ -receptor antagonists (3,4)	Blocks histamine effects (e.g., cimetidine)
Acetylcholine antagonists (2)	Prevents histamine release (e.g., scopolamine)
UV therapies (5,7,8)	Thickens epidermis, preventing water penetration (e.g., psoralen plus UVA and UVB)
Topical barrier creams (2,6)	Prevents water contact with skin via hydrophobicity (e.g., petrolatum)

UV, ultraviolet.

phobic properties, thus serving as an added layer of skin protection. With this therapy, the patient displayed immediate improvement, with cessation of urticaria. He is now able to bathe normally, with excellent therapeutic outcome after 6 months of follow-up.

DISCUSSION

AU is a rare form of physical urticaria induced by contact with water. Because of its unclear pathogenesis, treatment options are limited and produce varied responses at best. Current therapies for AU exploit several different mechanisms (Table 1). Antihistamines are generally considered to be safe, so they are the first-line therapy for AU (3), but their efficacy is inconsistent (4). Anticholinergics have also had limited success, albeit with potential risk of developing systemic side effects (2). As an alternative, ultraviolet (UV) therapy induces epidermal thickening, which serves as protection against contact with water (5), but it has the risk of cutaneous cancer development (5). As a barrier therapy to prevent water penetration into the dermis, different emollients and water-resistant topical creams have been investigated without much success. In 1981, Sibbald and colleagues reported the first successful experiment of a topical barrier therapy using petrolatum-containing ointment (2), but petrolatum therapy was not used successfully in

an adult patient until 2003, and complete remission was not achieved in this case (6).

Here, we report a case of complete remission of AU with topical petrolatum. This regimen is an attractive option for the treatment of children, in whom the risk of adverse effects secondary to oral and UV treatments is especially troubling. Because of its safety, it can also be an excellent long-term therapy. Therefore, it deserves serious consideration as a simple, practical, safe option for the treatment of AU.

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