

Concomitant allergic contact dermatitis and aquagenic urticaria caused by personal protective equipment in a healthcare worker during the COVID-19 pandemic

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Aquagenic urticaria (AU) is a chronic, rare type of physical urticaria that is elicited by skin contact with water, including sweat and tears.¹ Due to its rarity and the existence of other skin diseases caused by water exposure, exclusion of differential diagnoses is essential.² We, here, describe a patient with concomitant AU and allergic contact dermatitis (ACD) that impaired her work ability during the coronavirus disease 2019 (COVID-19) pandemic.

CASE REPORT

A 22-year-old woman presented with a 7-year history of generalized pruritus and erythematous wheals dispersed over her trunk and limbs 10 minutes after contact with sea water or warm bath water, with spontaneous resolution. Symptoms with exercise were limited to sweating areas only. During the past year, she had started working as a nurse on a COVID-19–dedicated ward, and experienced the same symptoms on the anterior trunk and dorsal hands minutes after sweating inside her personal protective equipment (PPE), which contains both a disposable full cover gown or a cover all with hood, plastic apron (changeable between patients), head cap, and shoe covers. No episodes occurred during hand-washing, emotional stress, eating spicy foods, or temperature changes. She also reported pruriginous vesicular erythema located on her hands and wrists, hours after wearing latex gloves, that persisted for more than 24 hours and was alleviated with topical corticosteroids. No symptoms were reported with use of accelerator-free nitrile gloves. She mentioned similar late-onset dermatitis after using rubber domestic gloves. She denied other symptoms or use of relief medication.

A water provocation test was performed (wet compress at 30°C applied on forearm for 30 minutes), with strongly positive results (Figure 1), rendering a diagnosis of cholinergic urticaria less likely. To

exclude other chronic urticarias, we tested for cold urticaria, performed a methacholine skin challenge (intradermal, at concentrations of 0.001 mg/mL, 0.01 mg/mL, and 0.1 mg/mL) and an autologous serum test, all of which were negative. Laboratory work-up excluded autoimmune or infectious causes. A diagnosis of AU was established, but we did further work-up for the vesicular erythema. Skin prick test and patch test with latex were negative. Patch tests were performed with European Baseline Series³ on IQ-Chambers (Chemotechnique Diagnostics, Vellinge Sweden) applied on the back with occlusion for 48 hours. On day (D)4, positive reactions were observed to 2-mercaptobenzothiazole (MBT) (++++) and 1% cobalt chloride (+) (Figure 2). We prescribed topical emollients and corticosteroids, eviction of rubber objects (ie, use of accelerator-free nitrile gloves), and Ebastine 20 mg twice daily for urticaria, with



FIGURE 1 Positive water provocation test (histamine – 5 mm; diluent – 0 mm)

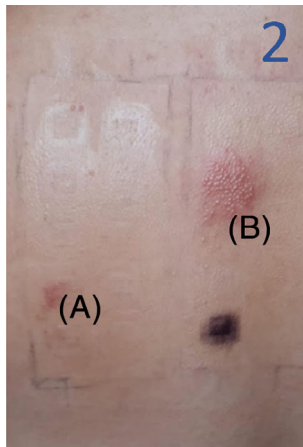


FIGURE 2 Positive patch test to cobalt (A) and MBT (B)

subsequent symptom relief and facilitating use of PPE for the required work periods.

DISCUSSION

During the COVID-19 pandemic, a high prevalence of occupational dermatoses among health care workers (HCWs) has been noted. In China, 74% of HCWs reported adverse skin reactions due to PPE use and hand hygiene practices.⁴ Irritant and allergic contact dermatitis are frequent, but other conditions may occur.⁵

This patient was diagnosed with a rare AU that flared while she worked wearing PPE due to intense sweating. In addition, we diagnosed ACD in response to MBT, as symptoms were elicited only upon contact with rubber products, both during occupational use of latex gloves as part of the PPE and domestic exposure to protective gloves.

This case highlights not only how broad occupational dermatosis in a single patient can be, but also raises awareness for the impact that skin conditions (even as rare as AU) may have on the new occupational requirements, such as the extensive use of PPE during the COVID-19 pandemic.

CONFLICTS OF INTEREST

The authors of this article declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Pedro Botelho Alves: Conceptualization; investigation; methodology; writing-original draft; writing-review & editing. **Marta Pires Alves:** Investigation; writing-review & editing. **Ana Todo-Bom:** Supervision; writing-review & editing. **Frederico S. Regateiro:** Conceptualization; investigation; methodology; writing-review & editing.

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