BRIEF REPORT

What You Need to Know About Hand Hygiene and Dermatitis During the Coronavirus Pandemic

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Increased attention towards infection control measures during the COVID-19 pandemic have brought to light the dermatological consequences of intensified hand hygiene measures. Healthcare workers are inherently at an increased risk of developing both allergic and irritant contact dermatitis. Individuals with a history of atopy are especially vulnerable given their impaired native skin barriers and increased sensitivities at baseline. Examination gloves not only induce contact allergies from manufacturing chemicals, but also serve as an occlusive catalyst for facilitating contact sensitization and irritant dermatitis. Similarly, handwashing practices with soap and alcohol-based hand rubs (ABHRs) undermine the natural skin barriers with increasing frequency of use. We highlight clinical pearls for the frontline healthcare worker experiencing COVID-19 surges and offer practical measures to minimize the development of hand-based dermatitis. (J Am Board Fam Med 2021;34:888–890.)

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As the importance of diligent infection control grew during the Coronavirus disease 2019 (COVID-19) pandemic, an increase in the intensity of handwashing was recommended. Here, we briefly review and provide clinical pearls for frontline healthcare workers experiencing COVID-19 surges. Furthermore, we highlight dermatologic consequences of hand hygiene measures.

The Centers for Disease Control and Prevention (CDC) has recommended gloving during the pandemic for patient care "in accordance with standard and transmission-based precautions." However, double gloving is discouraged, and institutional guidelines may vary.[1] The major benefit of gloves is barrier protection for both the patient and provider against infection when there is direct contact with possibly contaminated skin or bodily fluids. However, gloves do not prevent the need for proper hand hygiene before donning and after removing gloves and should not be reused.[2]

Wearing gloves can induce contact allergies to common rubber chemicals and polymerization catalysts used in production, such as thiurams, carbamates, and mercaptobenzothiazoles.[3] Latex can induce immediate-type allergic reactions leading to contact urticaria and asthma attacks, but latex usually does not induce delayed-type eczematous reactions. Moreover, occlusion from examination gloves accelerates transepidermal absorption of potential allergens and irritants, and the constant humidity damages the skin barrier.[3] This results in increased contact sensitization and irritant dermatitis, particularly in atopic individuals with genetically impaired skin barriers and hyperirritability at baseline.

Another cornerstone of hand hygiene is handwashing. The CDC has recommended soap and water for 20 seconds or an alcohol-based hand rub (ABHR) with >60% ethanol or >70% isopropanol.[4] Scenarios where the CDC encourages handwashing

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include: immediately before/after touching patients, contact with blood/bodily fluids, visibly soiled hands, and after glove/PPE removal.[2] Because traditional handwashing can be time-consuming for healthcare workers, ABHRs can be used more rapidly in busy clinical settings. However, clinicians should note that increased frequency of handwashing can result in contact dermatitis of the hands.

When noticing skin change, it is important to distinguish dermatitis subtypes to guide diagnosis, identify potential allergens, and direct appropriate treatment (Table 1). Irritant contact dermatitis (ICD) develops after repeated exposure to substances, including soaps and water (Figure 1). In contrast, allergic contact dermatitis (ACD) is an immune-mediated response to allergens, such as rubber chemicals and other additives in gloves or disinfectants (Figure 2).[5] Clinical manifestations of both include xerosis, erythema, scale, pruritus, and fissuring, while ACD can have the addition of vesicles and bullae. In the acute and subacute phase of eczema, the ICD is localized to sites of exposure and concentrated in areas of broken skin. In contrast, ACD usually spreads beyond the sites of exposure. Chronic ACD is also associated with impaired use of hands and disability if the allergen is not determined.[6]

Healthcare workers are uniquely predisposed for developing dermatitis given increased soap, water, and ABHR exposure. Specifically, handwashing with soap and water is more likely to cause ICD than ABHRs due to greater irritation.[7,8] Notably, health care workers are 55% more likely to develop hand dermatitis with handwashing ≥10 times daily.[8] In the early rise of the pandemic in China, two-thirds of healthcare workers met this threshold.[3] While definitive treatment for ICD and ACD is avoidance of the inciting agents, moisturizers provide symptomatic relief, prevent skin breakdown, and reduce irritation.[3,7–9] As such, ABHRs should

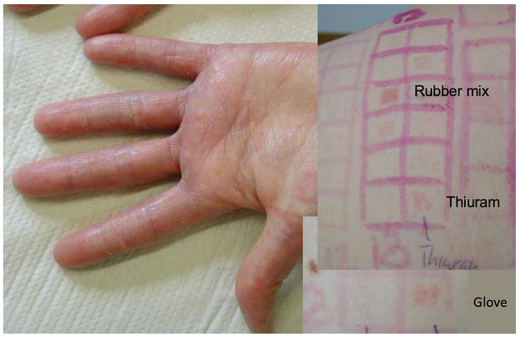
Table 1. Comparison Between Irritant Contact Dermatitis (ICD) and Allergic Contact Dermatitis (ACD)

	Irritant Contact Dermatitis (ICD)	Allergic Contact Dermatitis (ACD)
Clinical Manifestation	• Xerosis • Erythema • Pruritus • Burning • Fissuring • Scaling • Lichenification • Mostly limited to site of exposure (Figure 1)	• Erythema • Pruritus • Edema • Induration • Vesicles, bullae, crusting • Fissuring • Lichenification • Spreading over site of exposure (Figure 2)
Pathophysiology	• Non-immune response to repeated exposure to agents • Disrupted skin integrity • Loss of moisture and protective lipids	• Immune-mediated response to allergens • Sensitization results in cell-mediated inflammatory cascade
Causative Agents	• Detergents • Disinfectants • ABHRs • Water • Fragrances • Often related to atopic predisposition	• PPE (eg, gloves) • Latex • Rubber compounds • ABHRs • Fragrances • Propylene glycol • Any possible contact allergen
Treatments	• Avoidance of known irritants • Emollients • Keratolytics • Topical steroids	• Avoidance of allergens • Emollients • Topical steroids • Modifications to occupation
Diagnostic	• Patch tests to rule out ACD (diagnosis by exclusion) with decrescendo reactions in patch tests* • Fungal culture (exclude Tinea) • Biopsy if suspicion for Psoriasis • Evaluation of atopy (history, spec IgE, prick tests)	• Patch tests to find causative agents and allow allergen avoidance with crescendo reactions in patch tests*

PPE, personal protective equipment; ABHR, alcohol-based hand rub.
*Decrescendo reactions mean that after 2 days (removal of patch tests), there is a slight reaction that disappears the next 2 days. Crescendo reactions mean that there is no or slight reaction at day 2 (removal of patches) followed by an increased reaction the next 2 days. This difference is why we need 2 readings to distinguish irritants from allergic reactions, which is particularly important in atopic individuals with a high risk for irritant reactions. Most patients with irritant hand dermatitis have an atopic predisposition.

Figure 1. Representative photograph of irritant contact dermatitis (ICD) in a patient resulting from frequent handwashing.

Figure 2. Representative photograph of allergic contact dermatitis (ACD) in a patient undergoing patch testing to allergens found in rubber chemicals and polymerization catalysts used in the production process.



be used whenever possible, followed by the application of an emollient to minimize hand irritation.

The risk for hand-based dermatitis is likely increasing with growing hand hygiene awareness and glove use. Understanding glove use, hand hygiene, and emollient use post-handwashing are paramount for the frontline healthcare worker during the COVID-19 pandemic.

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