

COMMENTARY

Protecting medical staff from skin injury/disease caused by personal protective equipment during epidemic period of COVID-19: experience from China

An ongoing outbreak of Coronavirus Disease 2019 (COVID-19), a pneumonia caused by SARS-CoV-2, was first reported in Wuhan, China, in December, 2019.^{1,2} As a strongly contagious disease, the accumulated cases in Wuhan have risen to 49 986 by March 12, 2020, including 34 094 recovered patients and 2430 deaths.³ To help local medical staff rescue lives, over 42 000 health workers from all over China have gathered in Wuhan and its surrounding cities to care for the large number of patients there. For many of the medical staff working in this epidemic area of COVID-19, repeated contact with skin disinfectants and overtime use of personal protective equipment have caused injury and even diseases of the skin, impacting their performance and quality of life.⁴

To help overcome these problems, experts from The Chinese Society of Dermatology have discussed on skin conditions caused by hand hygiene and personal protective equipment and have recommended measures to prevent and treat them. This has helped the Chinese medical staff who are caring for COVID-19 patients but lack a dermatology background to correctly prevent and tackle these skin problems. Here, we describe the clinical features of these frequently seen skin conditions and share our experience on the appropriate preventive and therapeutic strategies to help medical staff worldwide who are fighting against COVID-19.

Skin injury/diseases caused by disinfectants

Commonly used skin disinfectants in clinical practice of caring for COVID-19 patients are 75% ethanol and iodophor. Commonly seen adverse reactions after using these disinfectants include allergic and irritant contact dermatitis.

Allergic contact dermatitis

Allergic contact dermatitis often occurs at the contact site that is exposed to certain disinfectants. Rashes may present as an eczematous erythema with clear demarcation limited to the disinfectant-exposed area, accompanied with swelling, pruritus and

stabbing pain. The rashes may also be widespread on exposure sites, when the allergenic disinfectant has been sprayed in the air. In severe cases, the lesions may develop into papules, blisters or even erosion, potentially followed by secondary infections.

Recommended treatment: (i) Stop using the suspected disinfectant and replace it with other non-allergenic products. Mild rashes may improve spontaneously after 3–5 days without additional treatment. (ii) For rashes with significant pruritus, second-generation H1 antihistamines are recommended. (iii) For severe rashes, mid-strength to potent topical corticosteroids such as mometasone furoate or halometasone cream is recommended. Rashes with bullae, secondary erosion and exudates can be treated with short-term systemic corticosteroids (0.5–1.0 mg/kg/day). (iv) For rashes with a secondary infection, topical or systemic antibiotics may be benefit.

Skin barrier damage and irritant contact dermatitis

Repeated cleansing and use of disinfectants to the skin may damage the lipid layer on skin surface and undermine the skin barrier, which can lead to irritant contact dermatitis. Skin manifestations may include erythema, papules, blisters and chapped skin, often with itch.

Recommended treatment: skin care with emollients is the crucial procedure and should be applied as frequently as possible.⁵ Other measures are the same as the recommendations for allergic contact dermatitis.

Skin injury/diseases caused by personal protective equipment

Gloves, masks, goggles, protective clothing and coveralls, rubber boots and shoe covers are frequently used to protect medical staff from infection by the virus. However, their prolonged contact, mechanical pressure and repeated frictions may cause skin injury and diseases. In addition, protective products often contain rubber, plastic and other organic components, which may cause allergic dermatitis in susceptible individuals.

Skin maceration

Prolonged use of gloves and rubber boots often causes skin maceration of hands and feet, which presents as softening, whitening and wrinkling of the skin, and sometimes, skin peeling.

Recommended treatment: (i) Choose proper size of gloves and rubber boots to ensure an appropriate tightness. (ii) Apply stoma powders or baby powders topically to hands and feet after the disinfectant on skin dries completely and before donning gloves and rubber boots. This helps protect the skin from friction and

excessive hydration. (iii) Replace gloves and rubber boots frequently, and apply powders before donning them again. (iv) After removing personal protective equipment, wash the skin and use skin care emollient soon. (v) For existing skin maceration, apply astringents such as zinc oxide cream or paste topically.

Secondary superficial fungal infection

Prolonged use of protective equipment can create a sweaty, moist and warm environment in the skin folds, which may cause superficial fungal infection such as tinea corporis, tinea cruris, tinea manuum and tinea pedis. Tinea corporis/tinea cruris usually presents as annular or semi-circular erythema on the trunk, groins and buttocks, respectively. Tinea manuum/tinea pedis may present as either skin maceration followed by erosion at the webs of fingers or toes (interdigital type), or vesicles followed by skin peelings (vesicular type), or diffuse erythema and scaling affecting the lateral aspects and soles of hands or feet (moccasin type).

Recommended treatment: (i) Similar measures are recommended as mentioned in section Skin maceration to keep the skin dry. (ii) To treat the fungal infection, apply topical antifungals such as bifonazole cream and ketoconazole ointment. (iii) If skin lesions are widespread or resistant to topical treatment, systemic antifungal drugs such as itraconazole or terbinafine can be used as appropriate.

Pompholyx

Prolonged occlusion by gloves and rubber boots may cause pompholyx, or vesicular eczema, which presents as plenty of small blisters symmetrically occurring on hands and/or feet, and may be accompanied by itching, tingling or burning.

Recommended treatment: (i) Before donning gloves and rubber boots, apply skin care emollients topically. (ii) Reduce the contact time. (iii) To treat the skin rash, topical application of mid-strength to potent glucocorticoids such as halometasone or mometasone furoate cream can be used.

Mechanical injury of the skin

Skin injury can occur as a result of the continual pressure and frictions caused by goggles and masks.⁶ Commonly affected parts include the cheeks, nose and ears. These injuries include indentations, frictions and scratches.

Recommended treatment: (i) Skin care emollients should be applied topically, and silicone foam dressings or hydrocolloid dressings can be used for local decompression before donning mask and goggles, as long as there is no air leakage that would compromise the protective effect of the equipment. (ii) Adjust the protective clothing to a suitable tightness, and avoid prolonged, persistent contact. (iii) Indentation of the skin generally does not require special treatment. (iv) For repeated or long-lasting indentation, with or without ecchymoma, topical application of polysulphonate mucopolysaccharide cream or heparin cream may improve local blood circulation and help with recovery. (v)

For wounded skin, antibiotic ointment or paste can be applied topically, and the wound can be covered by vaseline gauze.

Allergic reactions

Clinical manifestations and recommended treatments are basically similar to the allergic contact dermatitis caused by disinfectants, as mentioned in section Allergic contact dermatitis.

Acne


For medical personnel caring for patients with COVID-19, their mental stress, overwhelmingly heavy workload and sleep deprivation may cause acnes or deteriorate their existing acnes. Prolonged occlusion and local pressure on the skin caused by masks may lead to occlusion of the pilosebaceous ducts, which may also contribute to the development of acnes.

Recommended treatment: The general principles for controlling acnes are recommended, including: (i) wash the face twice daily with warm water. (ii) Choose appropriate facial cleansers, and do not use soap with strong alkalinity. (iii) Select light cosmetics or avoid cosmetics altogether. (iv) For mild lesions, topical use of antibiotics and/or retinoid ointment is recommended. (v) For severe conditions, systemic treatment with minocycline or isotretinoin can be added as appropriate.

Please also refer to the perspectives and recommendations presented in the COVID-19-related articles by colleagues from China and Europe included in this issue of J EADV.^{7–11}

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Conflict of interest

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