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## COVID-19 and occupational skin hazards for anaesthetists

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Editor—Anaesthesiologists are expected to adhere strictly to the WHO '5 Moments for Hand Hygiene' during patient care, including tracheal intubation and extubation.<sup>1</sup> These moments include before and after touching a patient or their surroundings, before aseptic procedures, and after patient bodily fluid exposure. Thus, the hazards of frequent hand hygiene are an important consideration for anaesthesiologists.

The presence of a pandemic further highlights these risks; in particular, the coronavirus disease 2019 (COVID-19) pandemic has reinforced awareness regarding hazards exacerbated by hand hygiene practices and use of personal protective equipment (PPE). The Centers for Disease Prevention and Control (CDC) recommends hand decontamination between each step of donning and doffing PPE.<sup>2</sup> These practices increase exposure to a variety of irritants and allergens that can have deleterious effects on the skin and the individual. Anaesthesiologists who have suffered from irritant or allergic contact dermatitis can be subject to incapacitating personal and professional losses as this ailment may prevent them from providing direct patient care.<sup>1</sup>

Survey evidence before COVID-19 suggests that contact dermatitis affects ~4% of healthcare workers and comprises

70–90% of skin diseases among them.<sup>3,4</sup> Risk stratification is based on several factors. Those who have a history of atopy are at higher risk of developing contact dermatitis.<sup>3</sup> Although Black and Hispanic populations may have a higher incidence of severe atopic dermatitis, studies on skin barrier function in different racial or ethnic groups have not shown consistent differences in epidermal structure or the development of contact dermatitis with exposure to irritants.<sup>5,6</sup> Extrinsic risk factors for contact dermatitis include prolonged glove use and hand washing. Thus, the prevalence of dermatitis is expected to increase during a pandemic as a result of excessive precautionary measures.<sup>3,4</sup> Hand hygiene techniques have a broad spectrum of potential adverse effects, ranging from cutaneous xerosis (abnormally dry skin) to severe allergic or irritant reactions. Acutely, contact dermatitis may present with skin erythema, oozing, scaling, crusting, or vesicles (Fig. 1). If chronic, contact dermatitis can lead to lichenification and fissures.<sup>4</sup> About 80% of contact dermatitis is irritant in nature and the remainder true type IV hypersensitivity reactions. Soaps and detergents are a common cause of irritant contact dermatitis.<sup>4</sup>

Hand cleansing, while important in maintaining provider and patient safety, may be excessive during a pandemic and

potentiate adverse dermatologic outcomes. Excessive use of an alcohol-based hand rub every 15 min for 8 h for 5 sequential days increased volunteers' irritant contact dermatitis scores and subjective complaints.<sup>1</sup> In the context of the COVID-19 pandemic, there was an increased rate of irritant contact dermatitis associated with hand washing >10 times per day between January and February 2020 amongst Chinese healthcare workers. Rates of occupational contact dermatitis amongst 280 healthcare workers were higher in February 2020 (74.5%) than during normal working conditions (31.5%) and during the severe acute respiratory syndrome (SARS) outbreak (21.4–35.5%).<sup>8</sup> Increased precaution may encompass excessive hand hygiene practices, which can lead to harmful dermatologic effects for the provider.

Another source of potentially avoidable contact dermatitis may be the excessive use of occlusive gloves. Between January and February 2020, 542 healthcare workers in Hubei, China reported that prolonged glove use was associated with skin damage symptoms such as erythema, maceration, and fissures.<sup>7</sup> Irritant and allergic components of occlusive gloves include natural rubber latex, neoprene, elastyrene, nitrile, and polyvinyl chloride, which may further exacerbate the condition.<sup>9</sup>

Anaesthesiologists should seek treatment early to minimise the risk of worsening dermatitis, even though there is insufficient evidence that healthcare workers with dermatitis are more likely to transmit infection. Frequent application of moisturisers and diligent avoidance of identifiable triggers is

paramount to management. For active therapy of localised lesions, moderate to high potency topical corticosteroids may be used as first-line treatment.<sup>10</sup> Serous crusting may indicate bacterial superinfection, which can be confirmed with cultures and treated with topical or oral antibiotics.<sup>10</sup>

The WHO proposed several strategies to mitigate the development or exacerbation of irritant contact dermatitis in the healthcare setting. These strategies include using less irritating hand hygiene products, avoiding unnecessary hand hygiene techniques that can cause excess irritation, and moisturising the skin.<sup>9</sup> Frequent hand washing with soap and water before or after using alcohol-based hand rubs is unnecessary and may potentiate dermatitis. To minimise skin exposure to irritants while maintaining proper antisepsis, cleaning hands with alcohol-based sanitisers is preferred over antimicrobial soap, which often contains irritating additives such as iodophors, chlorhexidine, chloroxylenol, and triclosan.<sup>9</sup> Chlorhexidine can also be found as an additive in alcohol-based sanitisers and is more likely to cause irritation when its concentration exceeds 4%.<sup>9</sup> To mitigate skin damage from the combined effects of irritants and occlusion, lipid-based moisturisers should be incorporated into hand hygiene practices. Alcohol-based hand rinses containing 1–3% glycerol promote moisture retention. Additionally, hand creams containing humectants, fats, and oils can be used in between patient encounters.<sup>9</sup>

Diligent hand hygiene is crucial to prevent infection transmission. However, during the COVID-19 pandemic, anaesthetists must be mindful to avoid redundant or excessive hand hygiene practices that can result in deleterious dermatologic complications and subsequent personal and professional losses.

### Authors' contributions

Literature review and manuscript writing: NZS, ML

Manuscript editing: all authors

Dermatological input: ARL

Topic development: RO

NZS was afflicted with hand dermatitis and has given permission to reproduce the figure.

### Declarations of interest

The authors declare that they have no conflicts of interest.

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**Fig 1.** Irritant contact dermatitis in an anaesthesiologist after repetitive hand sanitising that developed in April 2020 during the coronavirus disease 2019 (COVID-19) pandemic. The contact dermatitis was complicated by *Staphylococcus aureus* superinfection.

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## Injury-prone: peripheral nerve injuries associated with prone positioning for COVID-19-related acute respiratory distress syndrome

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Editor—Patients with coronavirus disease 2019 (COVID-19) who require invasive mechanical ventilation frequently meet the acute respiratory distress syndrome (ARDS) diagnostic criteria. Both guidelines and expert opinion recommend 12–16 h per day of prone positioning for patients with moderate-to-severe ARDS from COVID-19.<sup>1,2</sup> Many of the most severely affected survivors from COVID-19 are now being discharged to inpatient rehabilitation hospitals.<sup>3</sup> This provides an important opportunity to assess the long-term sequelae of prone positioning in this patient population. Here, we describe 11 patients who were diagnosed with acquired peripheral nerve injury in association with the use of prone positioning for COVID-19-related ARDS.

Study approval was granted by the Northwestern University Institutional Review Board. Patients were identified during their admission to a single rehabilitation hospital (Shirley Ryan AbilityLab, Chicago, IL, USA). Patients admitted to our hospital post-COVID-19 were received from 19 separate hospitals. Use of prone positioning while patients were mechanically ventilated was confirmed either through review of medical records or, when records were not available, interview with family. For the subset from our academic affiliate, Northwestern Memorial Hospital, prone positioning was performed by a team of respiratory therapists and nurses trained in accordance with guidelines set forth by the Intensive Care Society and Society of Critical Care Medicine. Whenever