efficiency compared to disinfection for both enveloped and non-enveloped viruses.

Ultraviolet germicidal irradiation (UVGI) is a disinfection method that uses UV-C radiation to inactivate microorganisms by causing deoxyribonucleic acid damage (DNA) and preventing replication. Inactivation of Middle East respiratory syndrome coronavirus (MERS-CoV) in plasma with riboflavin and UV-A light has been reported. In addition, the efficacy of whole room UV-C disinfection has been reported. Whole room UV-C disinfection system during coronavirus outbreaks, including severe acute respiratory syndrome coronavirus (SARS-CoV) and MERS-CoV, has been demonstrated in previous studies. This may prevent the nosocomial spread of the virus and protect staff in the process. Hamzavi et al. proposed repurposing of phototherapy devices, including these UVB units, to serve as a platform for ultraviolet-C (UV-C) germicidal disinfection.

It has been also noted that 0.5% sodium hypochlorite with colour additive achieved full viral inactivation of human CoV 229E. Newly implemented strategies include application of long-lasting compounds based on quaternary ammonium chloride on buttons and check-in kiosk and other surfaces in public spaces.

Front-line medical workers are facing tremendous pressure, containing major risk of infection and insufficient contamination protection. Hand hygiene, while an important preventive measure, is insufficient and should not stand alone for control of SARS-CoV-2 spread. Currently, there are no data to describe the frequency of hands contamination with coronavirus, or the viral load on hands after patient contact or touching contaminated surfaces. WHO recommends applying alcohol-based hand rubs for the decontamination of hands, e.g. after removing gloves. Hospitals should have infection control strategies in place for managing the spread of infection, including personal protective equipment, such as N95 respirators, double gloves, gowns, and goggles, alcohol-based hand sanitizer and soap.

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Acro-ischaemia in hospitalized COVID-19 patients

Dermatological manifestations of the coronavirus disease 2019 (COVID-19) may include unspecific macular erythematous rash, urticarial lesions and chickenpox-like vesicles. Acro-ischaemic lesions have been described in two different types of COVID-19 patients: firstly critically ill patients with severe limb ischaemia and secondly paucisymptomatic young patients with chilblain-like lesions. The aetiopathogenesis and clinical implications of these lesions remain unclear.

This letter reports three cases admitted to our hospital with bilateral pneumonia during the COVID-19 pandemic in Madrid (Spain), who developed acral ischaemic lesions during their hospitalization period. All three patients presented with atypical bilateral pneumonia and positive nasopharyngeal swab for severe
acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Physical examination revealed rounded reddish-purple plaques, measuring between 0.5 and 1 cm, sharply defined, with no retiform borders (Fig. 1a,b). Toes were affected in all three cases, and soles were affected in one of them. Palms and mucous membranes were not altered. Time from the onset of respiratory symptoms to skin acro-ischaemia was 17, 24 and 28 days. D-dimer was elevated in the three of them and fibrinogen in two, but no other coagulation abnormalities were detected. There were no signs of multiorgan dysfunction and no vasoactive drugs were used. None of the patients had a fatal outcome. Skin lesions fully recovered in a two-week period. Histological examination showed ischaemic necrosis affecting the epidermis and dermis with signs of re-epithelialization. Vasculitis or microthrombi were not found after reviewing extensive deep sections (Fig. 2).

Coagulation parameters in SARS-CoV-2-infected patients are often altered. D-dimer is the most common laboratory abnormality and appears to be related to mortality. Zhang et al. reported a case series of seven patients with critical COVID-19 pneumonia and acro-ischaemia, accompanied by significant elevation of D-dimer, fibrinogen and abnormal coagulation function (mainly prolonged prothrombin time). This could be explained by the cytokine storm triggered by the virus, which would lead to an undesirable activation of the coagulation cascade and the development of microthrombi. However, histological examination in our patients did not show vasculopathic features.

We would like to underscore that acro-ischaemia was not the reason for dermatologic consultation. These asymptomatic types of lesions, similar to the ones seen in the paediatric population, are probably underreported. Physicians should be aware of acro-ischaemic lesions, as they could be associated with systemic involvement and benefit from anticoagulation therapy in the hospitalized patient.

In conclusion, we would like to highlight that self-healing acro-ischaemic lesions can also appear in hospitalized COVID-19 patients. It would seem that there is a continuum spectrum related to acro-ischaemic lesions, ranging from mild chilblain-like lesions to dry gangrene. Whether these lesions are associated with prognostic factors or have therapeutic implications needs to be elucidated.

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Figure 1 (a) Two red macules and one purple macule, subcentimetrics, on the plantar side of the left feet. This patient was the only one who referred occasional mild discomfort. (b) Reddish-purple oval plaque on the first toe.
Acute generalized exanthematous pustulosis with erythema multiforme-like lesions induced by Hydroxychloroquine in a woman with coronavirus disease 2019 (COVID-19)

Dear Editor,

The antimalarials, chloroquine and hydroxychloroquine (HCQ), and the antivirals lopinavir/ritonavir have been recently recorded as having anti-severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) effects. In particular, regarding Italy, one of the countries most affected by the pandemic, the Italian Society of Infectious and Tropical disease (Lombardy section) has recommended the use of HCQ for treatment of coronavirus disease 2019 (COVID-19). HCQ is widely used to treat dermatologic and rheumatologic diseases, and it has been described as one of the main drugs triggering acute generalized exanthematous pustulosis (AGEP). Only one single case of AGEP induced by HIV post-exposure prophylaxis with lopinavir/ritonavir has been reported.

Figure 1 (a) Widespread acute rash on an erythematous-oedematous base, with scattered pinhead-sized pustules involving the face, trunk and upper limbs; the patient is wearing a surgical mask and gloves in accordance with the hospital’s anti-coronavirus disease 2019 recommendations. (b) Extensive desquamation with scattered pustules on the abdomen and targetoid lesions on the thigh. (c) Erythematous-oedematous targetoid lesions covered by discrete small pustules and scales.

Figure 2 Acral skin that shows an intra-epidermal vesicle. It has ischaemic necrosis on its roof, containing preserved cell outlines without nuclei, and reticular changes. The vesicle is associated with an acute inflammatory infiltrate. The dermis shows dilated vessels (H&E stain; x4).

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