



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

- Occupational Safety and Health Administration. Appendix A to §1910.134—Fit Testing Procedures (Mandatory). Available at: <https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134AppA>. Accessed April 10, 2020.
- Lindsley WG, Martin SB Jr, Thewlis RE, et al. Effects of ultraviolet germicidal irradiation (UVGI) on N95 respirator filtration performance and structural integrity. *J Occup Environ Hyg*. 2015;12:509-517.
- Torres A, Lyons AB, Narla S et al. Ultraviolet-C and other methods of decontamination of filtering facepiece N-95 respirators during the COVID-19 pandemic [e-pub ahead of print]. *Photochem Photobiol Sci*. <https://doi.org/10.1039/D0PP00131G>. Accessed April 10, 2020.

<https://doi.org/10.1016/j.jaad.2020.05.008>

Cutaneous manifestations related to coronavirus disease 2019 (COVID-19): A prospective study from China and Italy



To the Editor: We report the results of a binational, multicenter, prospective study to assess cutaneous involvement during the course of coronavirus disease 2019 (COVID-19). Between January 1 and March 15, 2020, we investigated the epidemiologic and clinical features of cutaneous manifestations in adult patients with COVID-19. The data were collected prospectively by experienced dermatologists in Wuhan, Hubei province, China, and Lecco, Lombardia region, Italy. Institutional Review Boards approved the study.

Four participating hospitals (3 in China, 1 in Italy) enrolled patients diagnosed with COVID-19, according to World Health Organization interim guidance.¹ Whenever possible, all new cutaneous findings and pre-existing dermatologic diagnoses were recorded at admission to assess the possible influence of hospital-based treatment and external factors. History and physical examinations were used to categorize all dermatologic conditions as pre-existing vs newly arising.

This observational cross-sectional study enrolled 678 patients with polymerase chain reaction-confirmed COVID-19. Patients were classified by disease severity based on *Chinese Diagnosis and Treatment Scheme for SARS-CoV-2*: 6.0% (41 patients) were considered “critically-ill,” 17.5% (118 patients) “severe,” 18.7% (127 patients) “common,” and 57.8% (392 patients) “mild.” In this cohort, 53 patients (7.8%) had new dermatologic conditions that were detected at admission or during hospitalization. This subgroup was a mean age of 55.9 years (range, 28-69 years), and 60% were men (Table 1). Of the dermatologic conditions, 44% were present on the day of the COVID-19 diagnosis, roughly at the onset of the typical flu-like symptoms. The remaining 56% of

Table 1. Main epidemiologic and clinical characteristics of the study population

Variables	Patients*	Total
Patients with COVID-19 (pharyngeal swab-positive)		678
Italian patients		92
Chinese patients		586
Degree of disease severity [†]		
Critical types	41 (6)	
Severe types	118 (17.5)	
Common types	127 (18.7)	
Mild types	392 (57.8)	
Patients with COVID-19 with skin manifestations		53 (7.8)
Male	32 (60)	
Female	21 (40)	
Age, y	55.9 (28-69)	
Chinese patients	53.2 (28-65)	
Italian patients	58.6 (35-69)	
Inflammatory skin manifestations related to COVID-19		53
Erythematous rash	37 (70)	
Diffuse urticaria	14 (26)	
Varicelliform rash with vesiculation	2 (4)	
Vascular skin manifestations in intensive care patients		13
Diffuse petechiae, purpura, and acroischemia		
Onset of inflammatory skin manifestations related to COVID-19		53
Before hospitalization	23 (44)	
After hospitalization	30 (56)	
Duration of inflammatory skin manifestations, d	3 (2-5)	

COVID-19, Coronavirus disease 2019.

*Patient data are presented as number (%) or mean (range).

[†]Degree of disease severity: For the mild type: slight clinical symptoms with no pneumonia presentation in imaging. For the common type: manifestations such as fever or respiratory presentation with pneumonia by radiography, or both. For the severe type (meeting any of the following conditions): (1) dyspnea, respiration rate 30 times/min; (2) finger oxygen saturation under resting 93%; (3) arterial partial pressure of arterial oxygen/fraction of inspired oxygen 300 mm Hg (1 mm Hg = 0.133 kPa). For the critical type (meeting any of the following conditions): (1) respiratory failure requiring mechanical ventilation; (2) shock; (3) combined with other organ failures requiring an intensive care unit.

dermatoses were observed at a mean of 11.7 days (range, 2-23 days after hospitalization).

Of the 53 patients with new inflammatory skin findings, the most common finding was erythematous rash (70%), seen over a wide spectrum of clinical appearances (macular, papular, maculopapular, and erythema multiforme-like eruptions), followed by diffuse urticaria (26%). Two patients (4%) had scattered vesicular, varicelliform eruptions²; in

both, we ruled out herpes simplex virus and varicella zoster virus clinically and by performing polymerase chain reaction.

Most patients who presented with an erythematous rash had mild itch. There was no correlation between the presence of rash and fever. Involved sites were primarily the trunk and upper limbs, but the head and face were largely spared. In this group, younger patients seem to display more intense and disseminated cutaneous manifestations, including darker red, larger wheal-like and purpuric lesions. All exanthems were short-lived and resolved spontaneously without specific dermatologic treatment after mean of 3 days (range, 2-5 days). The dermatologic manifestations could not be correlated to COVID-19 severity.

Diffuse petechiae, gravity-dependent, and multiple, generalized palpable purpura, and acroischemia (primarily finger/toe cyanosis, but neither skin bulla nor dry gangrene) were seen in more severe cases. These manifestations were associated with clotting disorders, reflected in increased prothrombin time and fibrinogen and D-dimer levels, which are seen in intensive care patients.³⁻⁵

In conclusion, some patients with COVID-19 present with inflammatory cutaneous findings: 7.8% in our cohort of hospitalized adults. These skin findings are generally mild and self-limiting and do not correlate with overall prognosis. They generally resolve promptly without specific therapy.

Vincenzo De Giorgi, MD,^a Sebastiano Recalcati, MD,^b Ziyi Jia, MD,^c Wei Chong, MD,^c Renyu Ding, MD,^d Yunhua Deng, MD,^e Federica Scarfi, MD,^f Federico Venturi, MD,^a Luciana Trane, MD,^a Alessia Gori, MD,^a Flavia Silvestri, MD,^a Xing-Hua Gao, MD,^g and Torello Lotti, MD^b

From the Department of Dermatology, University of Florence, Florence, Italy^a; the Department of Dermatology, Azienda Socio Sanitaria Territoriale Lecco, Alessandro Manzoni Hospital, Lecco, Italy^b; the Department of Emergency^c and the Intensive Care Unit,^d The First Hospital of China Medical University, Shenyang, China; the Department of Dermatology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China^e; the Dermatology Unit, Department of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Bologna, Italy^f; the Department of Dermatology, The First Hospital of China Medical University, Shenyang, China^g; and Dermatology, University of Studies Guglielmo Marconi, Rome, Italy.^b

Funding sources: None.

Conflicts of interest: None disclosed.

IRB approval status: Institutional Review Boards approved this study.

Reprint requests: Vincenzo de Giorgi, MD, Department of Dermatology, University of Florence, Via Michelangelo 41, 50124 Florence, Italy

E-mail: vincenzo.degiorgi@unifi.it

REFERENCES

1. World Health Organization. Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance. 2020. Available at: [https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-\(ncov\)-infection-is-suspected](https://www.who.int/publications-detail/clinical-management-of-severe-acute-respiratory-infection-when-novel-coronavirus-(ncov)-infection-is-suspected). Accessed March 30, 2020.
2. Marzano AV, Genovese G, Fabbrocini G, et al. Varicella-like exanthem as a specific COVID-19-associated skin manifestation: multicenter case series of 22 patients. *J Am Acad Dermatol*. 2020;83(1):280-285.
3. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;6736:1-10.
4. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395(10223):507-513.
5. Fernandez-Nieto D, Jimenez-Cauhe J, Suarez-Valle A, et al. Characterization of acute acro-ischemic lesions in non-hospitalized patients: a case series of 132 patients during the COVID-19 outbreak. *J Am Acad Dermatol*. 2020;83(1):e61-e63.

<https://doi.org/10.1016/j.jaad.2020.05.073>

COVID-19 and personal protective equipment: Treatment and prevention of skin conditions related to the occupational use of personal protective equipment



To the Editor: There have been an increasing number of reports of occupationally induced skin conditions in health care workers related to the use of personal protective equipment (PPE) during the coronavirus disease 2019 (COVID-19) pandemic.^{1,2} The breadth and variety of different types of PPE, such as facemasks, gloves, and respiratory equipment, as well as the extended use beyond previous standards, have led to a spectrum of common dermatologic conditions, including contact/irritant dermatitis, pressure-related skin injury, acneiform eruptions, and moisture-associated skin irritation (Table 1).

Surgical and N95 masks, as well as goggles and face shields, have been reported to cause contact dermatitis, typically behind the ears (from elastic straps), on