How Dermatologists Can Learn and Contribute at the Leading Edge of the COVID-19 Global Pandemic

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In this issue of JAMA Dermatology, clinical cases and images of rashes in patients infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are presented.1,2 Although these early observations are not comprehensive of all skin manifestations seen, our intention in publishing them is to help dermatologists recognize emerging patterns of rashes in patients with coronavirus disease 2019 (COVID-19). The reported prevalence of cutaneous signs in association with this pandemic is conflicting; one study reported a rash in only 0.2% of a cohort of Chinese patients,3 whereas the estimated prevalence in a cross-sectional Italian study was 20.4%.4 In the latter study, performed by dermatologists, the cutaneous manifestations were most commonly described as an erythematous rash; however, a range of additional morphologic features were observed, including generalized urticaria and vesicular eruptions. A predilection for the trunk was also noted.4 It may not be possible to determine the exact prevalence of skin findings in infected patients until serologic testing is more widely available, given that some individuals may lack the typical respiratory signs of COVID-19.5

There are many important considerations in the interpretation of these early reports from a dermatologic perspective. Whether these rashes are specific manifestations of SARS-CoV-2 infection involving the skin or represent reaction patterns of rashes in patients with coronavirus disease 2019 (COVID-19) is an important question to keep in mind when evaluating these images. We must be cautious in attributing all rashes seen in patients with COVID-19 to direct effects of SARS-CoV-2; rashes may develop because of co-infection with SARS-CoV-2 and another respiratory infection,6 medical complications that arise in a critically ill patient (such as fever or disseminated intravascular coagulation), or other supportive medications or empirical treatments for infection. The limited availability of SARS-CoV-2 testing, especially early in the global pandemic, further complicates the interpretation of rashes seen in diagnostically unconfirmed cases. Careful and detailed prospective study, including performing specific SARS-CoV-2 testing on skin biopsy specimens, will be needed to clarify the pathogenesis of these rashes.

Clinical Case Highlights

The case reports in this issue show 2 distinct forms of rashes seen in association with COVID-19: a petechial flexural eruption1 and a digitate papulosquamous rash.2 The timing of rash onset is strikingly variable, suggesting that skin findings may present at any stage of the infection. In cases we have seen as medical dermatologists, rashes may precede the onset of fever and other systemic features, and they may also occur late during the infection, including after other typical viral features have subsided.

Key histopathologic features vary depending on the morphologic presentation. Collaborations between dermatologists and dermatopathologists will be essential to characterize these eruptions, both to identify histopathologic features (if any) that are specific to COVID-19 and may guide the treatment of patients—who may have other potential triggers of rash, including use of certain medications—and to perform specific tests to discriminate between direct manifestations of the virus vs generic reaction patterns. In the report by Sanchez et al,2 the papulosquamous eruption has a fundamentally spongiotic pattern, including foci of spongiosis and spongiform vesicles containing lymphocytes and Langerhans cells. Purpura revealed by a morphologic examination may result from extravasated erythrocytes, as in the article by Diaz-Guimaraens,1 in which no thrombotic vasculopathy was noted. In emerging reports posted on social media and in other journals, pernio-like lesions seen on acral sites may represent vasculitis and/or thrombosis in the cutaneous microvasculature, a critical clinico-pathologic correlation and possible pathophysiologic mechanism that may be unique to COVID-19.7

Gaining a Better Understanding of COVID-19–Associated Skin Findings

Early reports about the cutaneous eruptions seen in patients with COVID-19 raise more questions than they provide answers. Some of the rashes we have observed are reminiscent of viral eruptions commonly seen in children, and yet it is well established that viral exanthems are rare in adults. Whether these eruptions suggest pathophysiologic mechanisms underlying rash that may be relevant to the systemic features of COVID-19, and whether these are specific to SARS-CoV-2 or to coronaviruses in general, are vital questions. Furthermore, the significance of a cutaneous eruption associated with COVID-19 remains unclear, especially as it pertains to prognosis. It will require additional study to determine if specific host or pathogen factors contribute to the likelihood of developing a rash, and especially a specific pattern of rash. As dermatologists, we are familiar with rashes that are immediately recognizable as the telltale sign of a particular infection, such as parvovirus B19-associated papular-purpuric “gloves and socks” syndrome or the “slapped cheeks” appearance in children; it remains to be seen whether this will be the case for COVID-19.
Careful study, including comprehensive mucocutaneous examinations, analysis of other systemic clinical features or host characteristics, and histopathologic correlation, will be vital to understanding the pathophysiologic mechanisms of what we are seeing on the skin. Recognizing the dermatologic effect of both supportive drugs and empirical treatments for SARS-CoV-2 infection, including combinations of well-known medications and novel therapeutics such as remdesivir, will provide critical information.

How Dermatologists Can Learn and Contribute During a Pandemic

In the past few weeks, rapid implementation of teledermatology and changes in telemedicine regulation have occurred in response to the COVID-19 pandemic. Teledermatology provides patients ongoing access to dermatologic care and affords a safer way to evaluate patients, including those with confirmed or suspected COVID-19. This strategy also allows for the preservation of resources, including personal protective equipment, that may become increasingly scarce. However, will teledermatology be adequate for all patients, or sufficient for effectively evaluating clinical entities with which we are unfamiliar? Some recently published studies incorporate data (including images) from the indirect evaluation of patients or do not provide images to accompany the clinical descriptions (because of infection control regulations in hospitals). To fully characterize skin manifestations, it may be necessary for dermatologists to evaluate these patients directly; comprehensive evaluation could reveal important morphologic clues, such as the subtle purpuric nature of skin lesions or the characteristic mucosal or ophthalmologic features of COVID-19. Clear descriptions and high-quality images will help all clinicians learn to recognize the cutaneous features of COVID-19, potentially aiding in diagnosis and treatment. It will be critical at this time for dermatologists, like other specialists, to contribute however possible, in ways large and small—including by being a presence in the hospital to provide unique expertise in the evaluation of SARS-CoV-2-infected patients with rashes. This challenging time provides opportunities to contribute and to learn. The creative strategies developed during this pandemic may prove beneficial to future patients and expand the reach of our specialty. Social media posts and online forum discussions of many unidentified clinical images of rashes in infected patients has already enabled the rapid recognition of skin signs by dermatologists; it is now time for rigorous science. We hope that dermatologists will be among those leading the global response to the COVID-19 pandemic: characterizing COVID-19-related rashes, understanding their implications, and determining best evidence for their treatment.

ARTICLE INFORMATION

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REFERENCES


