

## Skin Manifestations and Covid 19

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### Abstract

After the first confirmed case of Covid-19 infection was reported in December 2019, the SARS-COV-2 virus has spawned one of the most diagnostically and therapeutically complex pandemics in recent decades. The clinical manifestations of covid-19 remain polymorphic, predominated by respiratory involvement. However, skin lesions have been of significant interest because of their frequency and diagnostic orientation, despite the initial difficulty in establishing a direct causal link between these skin manifestations and the diagnosis of certainty by Covid-19 infection. The various studies conducted have led to a common classification, including five main skin manifestations seen in SARS-COV-2 disease: Urticarial rash, acral lesions, vesicular and chickenpox-like lesions, maculopapular rash and necrotic lesions.

Through this study, we try to look into the different skin manifestations observed during Covid-19 infection and their pathophysiological mechanism.

**Keywords:** Covid-19, cutaneous manifestations, SARS-COV-2 infection, skin

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### I. Introduction

In December 2019, the first case of SARS-COV-2 infection was reported in Wuhan, China, subsequently leading to one of the largest pandemics in recent decades, the third of its kind [1]. Pulmonary involvement remains by far the most predominant and frequent. However, other lesions have been observed, in particular various cutaneous manifestations, responsible for a polymorphous clinical picture, making the diagnosis of certainty difficult. [2-5]

Given the lack of understanding of the pathophysiological mechanism of SARS-COV-2, the measures undertaken during this health emergency, as well as the difficulty of access to health care, the causal link between this virus and the cutaneous manifestations was difficult to establish: are they clinical signs specific to the Covid-19 infection or are they isolated cutaneous lesions or other etiology? [6-7]

The aim of this work is to identify and try to understand the physiopathology of the skin manifestations observed during covid-19 infection.

### II. Material And Methods

We conducted a literature search on the PubMed, ScienceDirect, and ClinicalKey databases for validated articles published from January 2020 through June 2021, using the terms "skin manifestations," "Sars-CoV-2 infection," and "Covid-19." A total of 385 articles written mainly in English were retrieved, with 322 articles at the PubMed level, 42 publications at the ScienceDirect level and 21 articles at the ClinicalKey level.

### III. Results

Focusing mainly on articles dealing only with skin manifestations in the context of Covid-19 infection, we selected nine articles: six articles dealt with skin manifestations during SARS-COV-2 infection, one article detailed all extra-pulmonary manifestations, and two articles included the various publications concerning skin manifestations during the pandemic.

All the articles dealing with skin manifestations during covid-19 proposed a quasi-common classification [1, 6, 7]:

- Urticarial rash (Fig. 1): Quite frequent lesions during covid-19 infection, located mainly on the trunk, as they may be scattered throughout the body.
- Acral lesions (Fig. 2): Second most frequent type of lesion, preferentially located on the hands and feet.

- Vesicular and Chickenpox-like lesions (Fig. 3): They are located mainly on the trunk, sometimes on the limbs. These rashes constitute, with the two previous ones, the main cutaneous signs observed during SARS-COV-2.

- Maculopapular rash (Fig. 4-5): The most frequent. These lesions are located on the trunk and extremities of the limbs, without affecting the mucous membranes.

- Livedoid or Necrotic lesions (Fig. 6): Located in the distal extremities of the limbs, especially the legs.

The total number of patients with cutaneous signs during covid-19 was variable due to the initial lack of interest in these manifestations. However, all the articles found a sex ratio equal to 1 with a slight male predominance. The age ranged from 8 to 85 years, with a predominance of cutaneous manifestations in adolescents and adults [7-9].

The onset of cutaneous signs coincided with the first signs of SARS-COV-2 as well as being late, with a mean latency of 2 to 21 days [7].

Concerning the therapeutic management, some authors noted a spontaneous evolution of the cutaneous lesions without recourse to treatments "Wait and See", whereas others administered various essentially symptomatic therapies [1,7,8].



**Figure 1: Forearm urticarial rash during Covid 19**



**Figure 2: Acral Lesions during covid 19 [10]**



**Figure 3: Vesicular lesions of the trunk during Covid 19**



**Figure 4: Maculopapular Rash of the trunk during Covid 19**



**Figure 5: Acral erythematous papules (erythema multiforme like) during Covid 19**



**Figure 6: Livedoid lesions during Covid 19**

**IV. Discussion**

The studies initially conducted in China did not establish a causal link between cutaneous manifestations and covid-19 infection not only due to a lack of understanding of the pathogenicity of the infection, but also due to the lack of exploitation of the cases as well as the poverty of these cutaneous manifestations and their association with respiratory signs that are often much more pronounced and worrying [8-10].

During the peak of the pandemic observed in Italy, analyses of cases of cutaneous manifestations during covid-19 began to take place, despite the difficulty of access to health care and therefore to means of diagnosis of certainty [9-11].

The pathogenesis of the cutaneous manifestations is a mystery as it remains difficult to establish given the wealth of differential diagnoses and the diagnostic delay. Also, the link between cutaneous and respiratory signs remains unclear: are the cutaneous signs a consequence of the pulmonary infection or is it a primary infection of the skin tissue?

However, the first hypotheses consist of an inflammatory response with activation of the coagulation pathways leading essentially to thrombotic complications. Lung and skin biopsies have also been performed, suggesting microvascular occlusions by complement activation of both the alternative and lectin-associated pathways [1,8,9].

Common forms described were [1, 6, 7,10-13] (Table 1):

- Urticarial rash: Founded in about 20% of cases, with symmetrical involvement of the trunk and extremities. Clinically, there is pruritus of variable intensity, with erythematous plaques and papules. They were associated with cases of covid-19 of intermediate severity accompanying mainly the first phase of the infection.
- Acral lesions: In about 20% of cases, they are described as typical lesions of SARS-Cov-2 infections and are located preferentially on the feet in an asymmetrical manner. Clinically, they may be asymptomatic or pruritic or even painful. They present as a plaque, macule, papule or nodule. They have been reported in young patients with a low-grade or asymptomatic infection but seem to appear only in the late stages of infection coinciding with the negativation of the viral load, which makes their correlation with the disease rather difficult.
- Vesicular and Chickenpox-like lesions: Founded in almost 10% of cases. They are mainly localized on the trunk, sometimes on the limbs, while sparing the mucous membranes and the face. A burning sensation or pain is reported, associated with a vesicular rash. They appear in middle-aged patients and seem to precede the other clinical signs of the infection. They are correlated with a medium severity course.
- Maculopapular rash: The most frequent, found in more than 45% of cases. These lesions occurred on the trunk and extremities of the limbs, without affecting the mucous membranes, and were manifested by a low to medium intensity pruritus with a rash of erythematous macules and papules that were often confluent. These lesions were mainly seen in middle-aged patients with an infection of intermediate severity and their evolution was short.
- Livedoid or Necrotic lesions: Affecting 5% of patients, these lesions are located in the distal extremities of the limbs, especially the lower limbs. Clinically, these lesions can be ischemic or necrotic, well limited or sometimes diffuse. They are the prerogative of patients of advanced age with a high severity infection often requiring hospitalization.

**Table 1 :Skin manifestations and Covid 19 [1, 7, 13-22]**

	Urticarial Rash	Acral Lesions	Vesicular and Chickenpox-like Lesions	Maculopapular Rash	Livedoid or Necrotic Lesions
<b>Frequency</b>	20%	20%	10%	45%	5%
<b>Age</b>	Adolescents - Young Adults	Adults	Adults	Adults	Elderly adults
<b>Sex-ratio</b>	1	1	1	1	1
<b>Location</b>	Trunk +++ Extremities of the limbs	Feet +++	Trunk +++ Limbs +/- Facial and mucosal involvement ---	Trunk and Extremities of the limbs +++ Mucosal involvement ---	Distal extremities of the limbs, legs +++
<b>Characteristics</b>	Erythematous plaques and papules Pruritus	Plaque, macule, papule or nodule Asymptomatic, pain or pruritus	Vesicular rash Burning sensation or pain	Erythematous macules and papules Pruritus	Ischemic or necrotic lesions
<b>Treatment</b>	Antihistamine	Dermocorticoid +/-Local antibiotic	None	Dermocorticoid Antihistamine Oral corticoid	Anticoagulation

The severity of associated disease followed a gradient from the least severe infection in acral lesions to the most severe in patients with livedoid lesions, as evidenced by the increasing percentages of pneumonia, hospitalizations, and intensive care requirements across the different studies analyzed.

Acral lesions, maculopapular rash, and urticarial lesions appear to be fairly sensitive indicators of Covid infection 19 despite the lack of elucidated understanding of the risk of one manifestation or another in a given patient due to the specificities of the virus and its variants and the individual susceptibility of the host.

## V. Conclusion

At this time, despite the large number of reported cases, the pathophysiology of covid-19 infection remains a real enigma, with many unclear points regarding the causal link with skin manifestations; this could be due to its speed of spread, the ubiquity of the disease and the priority placed on the search for treatments [9, 12]. Further studies would be desirable to better clarify the specific characteristics of the Covid 19-skin link; however, knowledge of skin signs by health care personnel is of great interest for the positive, retrospective diagnosis and severity of the disease.

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