

Dermatological Manifestations in COVID-19 and Post COVID-19 Patients: An Observational Study

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Abstract

Background: In December 2019, a new infection termed severe acute respiratory syndrome coronavirus 2 was recognised in Wuhan China. In literature only few studies exist on cutaneous manifestations in COVID-19 and post-COVID-19 phase. Hence the present study is conducted to know the most common cutaneous manifestations.

Material & Method: The present study included total of 60 patients presented with skin manifestations during COVID-19 and post COVID-19 phase of both in-patients and out-patients from October 2020 to June 2021. The patients aged more than 18yrs, tested positive for SARS CoV2 with dermatological manifestation during the infection and 3wks after testing negative for SARS CoV2 up to 3 months were included. The dermatological manifestations were recorded during the active COVID-19 infection and during post-COVID-19 period.

Result: Among the 60 patients the common pattern was maculopapular rash in 24 patients (40%), urticaria seen in 8 patients (13.3%), chilblain seen in 4 patients (6.66%) and livedo reticularis seen in 2 patient (3.33%), during post COVID-19 were acneiform eruption seen in 16 patients (26.4%), vesicular lesions seen in 4 patients (6.66%) and lichen plan us observed in 2 patients (3.33%).

Conclusion: There is significant association of presence of the dermatological manifestations among the patients with COVID-19 and post COVID-19 period. Study of these dermatological manifestations and their pathogenesis and their significance in human health is useful in avoiding misdiagnosis and proper treatment.

Keywords: COVID-19, Maculopapular, Urticaria, Acneiform, Lichen Planus.

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Introduction

Corona virus disease (COVID-19) is an infectious disease caused by severe acute

respiratory syndrome corona virus 2 or SARS CoV 2. Various cutaneous conditions have

been manifested and observed during COVID-19 infection and also during post COVID-19 phase.[1,2] A variety of possible dermatologic manifestations of coronavirus disease 2019 have been discovered in case series from throughout the world.[3–9] It is important to identify the most common dermatological symptoms, its timing and its frequency of COVID-19's cutaneous symptoms.[10–12] The association between specific skin symptoms and the severity of the disease is also unclear. [13] Furthermore, it cannot be ruled out that some patients' reported skin changes may reflect cutaneous responses to the various COVID-19 therapies.[13,14]

Globally, there were variations in the prevalence of COVID-19-related cutaneous symptoms, ranging from 0.2% in China[12] to 7.25% in India[15] and in Italy 20.4%.[10] Geographic differences were also present in the morphology of the dermatological manifestations in COVID-19. The most common COVID-19 dermatological presentations in Europe and the US were pseudo-chilblains, although there was just one instance documented from Asia. The majority of healthcare professionals who gave direct care of patients with corona-virus illness reported skin damage, mechanical/friction dermatitis, and irritating contact dermatitis as a result of personal protective equipment (PPE) and hand hygiene practises in 2019 (COVID-19).[15,16] The present study, the dermatological manifestations in COVID-19 and post COVID-19 patients.

Material & Method

The present study included total of 60 patients presented with skin manifestations during COVID-19 and post COVID-19 phase of both in-patients and out-patients from

October 2020 to June 2021. The patients aged more than 18yrs, tested positive for SARS CoV2 with cutaneous manifestation during the infection and 3wks after testing negative for SARS CoV2 up to 3 months were included. Patients less than 18yrs of age and patients not willing to be part of study were excluded.

The patients were included in present study after obtaining the informed consent and took approval from the institutional ethics committee prior to enrolling the participants. The patients were selected, and the clinical history, physical examination and laboratory investigations were reviewed. The cutaneous manifestations were documented during the active COVID-19 infection and among the patients with post-COVID-19 period.

Statistical Analysis

All the data were entered in excel sheet and the data were represented using tables, figures. The data were summarised as mean, standard deviation, frequency, and percentage. The data was analysed using SPSS v26 operating on windows 10.

Result

The present study included total of 60 cases COVID-19 and post COVID-19 patients with cutaneous manifestations, most common age affected were in between 30-40 years with no remarkable sex predominance.

Most common dermatological manifestations during COVID-19 were maculopapular rash seen in 24 patients (40%), urticaria seen in 8 patients (13.3%), chilblain seen in 4 patients (6.66%) and livedo reticularis seen in 2 patients (3.33%), during post COVID-19 were acneiform eruption seen in 16 patients (26.4%), vesicular seen in 4 patients (6.66%) and lichen planus seen in 2 patients (3.33%).

Table 1: Showing the type of lesion during COVID-19 infection

Type of lesion	Maculopapular rash	Urticaria	Chilblain	Livedo reticularis
Percentage involved	40%	13.3%	6.66%	3.33%
Most common site of involvement	Trunk and limbs	Trunk and limbs	Hands and feet	Trunk, arms, forearms, dorsal aspect of hands
Most common age	30-40 years	40-50 years	20-30 years	50-60 years
Most common gender	Either gender	Either gender	Either gender	Female
Onset and duration of lesion	Associated with COVID-19 symptoms lasting for 1 week	Associated with COVID-19 symptoms lasting for 5-6 days	Associated with COVID-19 systemic symptoms lasting for 2 weeks	Associated with COVID-19 systemic symptoms lasting for 10 days

Table 2: Showing the type of lesion during post-COVID-19 period

Type of lesion	Acneiform eruptions	Herpes zoster	Lichen planus
Percentage involved	26.4%	6.6%	3.3%
Most common site involved	Trunk	Trunk	Flexor aspect of upper extremities and lower extremities
Most common age	25-35 years	50-60 years	40-45years
Most common gender	Either gender	Male	Female
Onset and duration of lesion	20 days after recovering from COVID-19 which lasted for 2-3 weeks	7 days after recovering from COVID-19 which lasted for 1-2 weeks	3 weeks after recovering from COVID-19

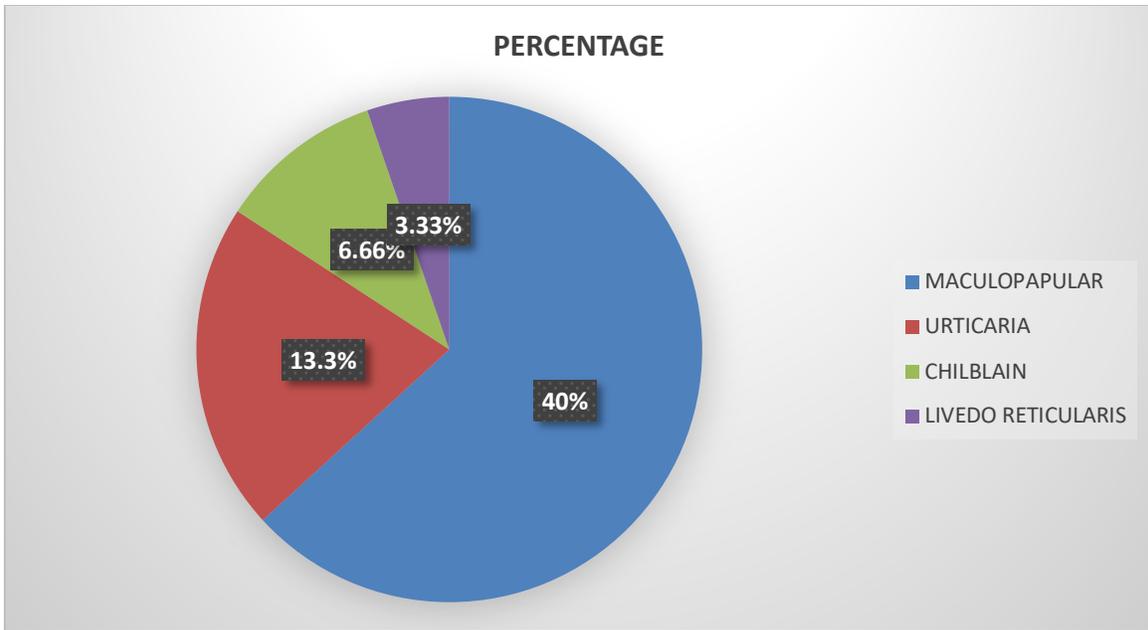


Chart 1: Showing the type of lesion during COVID-19 infection.

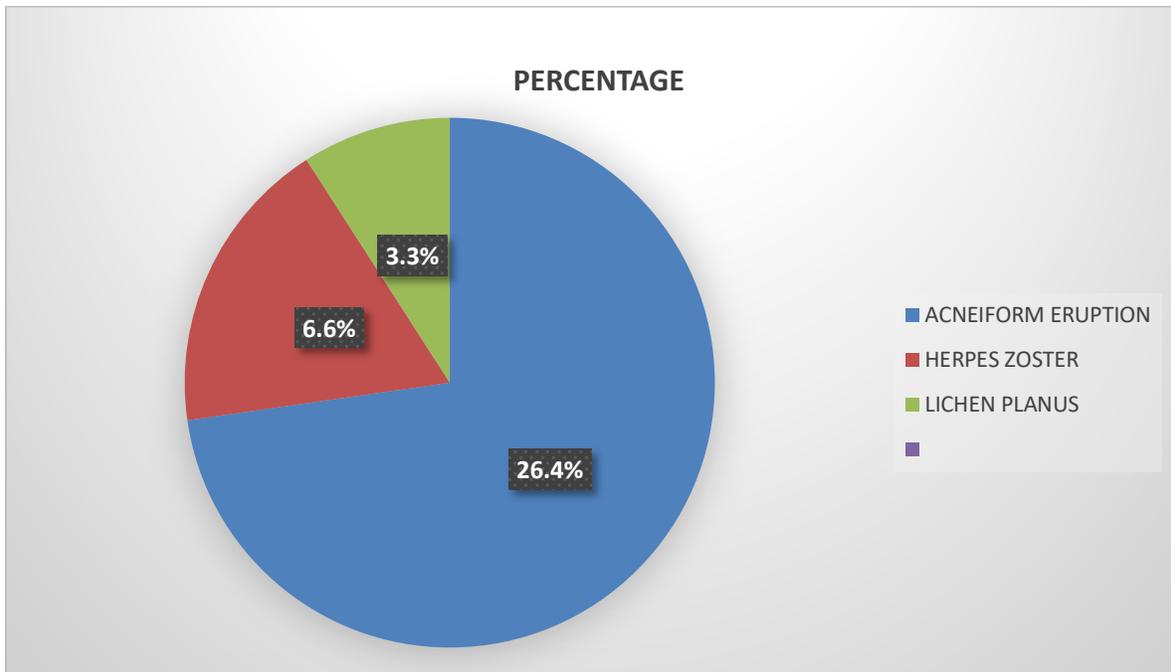


Chart 2: Showing the type of lesion during post COVID-19 infection.

Most Common Dermatological Manifestations in COVID-19 Phase

Clinical pictures:



Figure 1: Maculopapular rash



Figure 2: Urticaria



Figure 3: Chilblain



Figure 4: Livedo reticularis

Most Common Dermatological Manifestations in Post COVID-19 Phase

Clinical pictures:



Figure 5: Acneiform eruptions



Figure 6: Herpes zoster



Figure 7: Lichen planus

Discussion

The COVID-19 pandemic, caused by the recent development of SARS-CoV-2 in humans, is spreading swiftly, culminating in a global health disaster. Despite the continuous publication of new data, much about COVID-19's clinical features, especially its dermatological symptoms, is still unclear.[17] Despite the fact that COVID-19 is most commonly present as

fever, cold, cough and shortness of breath but sometimes it may present as dermatological symptoms.[18] Even while reports of the COVID-19-associated dermatological symptoms are on the rise, it is still unclear how common they are, what causes them, and if SARS-CoV-2 plays a direct or indirect role in their pathogenesis. Moreover, emerging studies indicates that COVID-19-related skin

symptoms are extremely polymorphic.[19] Knowledge of the alterations in skin morphology associated with COVID-19 may aid clinicians in diagnosing and treating future COVID-19 patients.

In concordance to present study by American Academy of Dermatology COVID-19 registry, documented that among 171 laboratory-confirmed COVID-19 patients with dermatological manifestations from the registry, the most reported were morbilliform rash (22 percent), pernio-like acral lesions (18 percent), urticaria (16 percent), macular erythema (13 percent), vesicular eruption (11 percent), papulosquamous eruption (9.9 percent), and retiform purpura (6.4 percent). Fever and cough were reported in approximately 60 percent of cases.[20,21] The present study documented maculopapular rash in 24 patients (40%), urticaria seen in 8 patients (13.3%), chilblain seen in 4 patients (6.66%) and livedo reticularis seen in 2 patients (3.33%), during post COVID-19 were acneiform eruption seen in 16 patients (26.4%), vesicular seen in 4 patients (6.66%) and lichen planus seen in 2 patients (3.33%).

The pathophysiologic processes behind COVID-19's dermatological manifestations are unknown; but several hypotheses have been proposed. The cause of maculopapular and urticarial rashes is thought to be an unfavourable reaction to pharmacological COVID-19 medications or an overproduction of cytokines caused by hyperinflammation.[14,22] Possible molecular causes of chilblain-like lesions are varied, including "immune dysregulation, vasculitis, vascular thrombosis, or neoangiogenesis. [23]" Pauci-inflammatory thrombogenic vasculopathy with significant deposition of complement components C5b-9 and C4d inside the cutaneous microvasculature is observed in the pathogenesis of petechial/purpuric lesions. The alternative cause of these dermatological

lesions might be unpleasant side effects of COVID-19 medicines. The molecular pathways of livedoid are believed to be affected by the severity of the COVID-19 infection. Livedoid eruptions are hypothesised to be caused by DIC and macro thromboses in more severe infections. These vascular lesions may be the result of microthrombi development caused by inflammatory cytokines or ACE2 entrance into cells in less severe COVID-19 infections. Vesicular lesions are hypothesised to be the outcome of a "cytokine storm" caused by immune system activation. The proposed aetiology of MIS-C is uncertain. Finally, it should be mentioned that the cutaneous signs observed during this pandemic may have been caused directly by the SARS-CoV-2 virus.[17] Maculopapular rash and urticaria could be due to overproduction of cytokines(IL-6) triggered by hyper inflammation. Vascular lesions occur due to prothrombotic state, due to inflammation, platelet activation and endothelial dysfunction leading to formation of micro thrombi in dermal vessels.

In another review study by Singh H *et al.*, the dermatological manifestations of COVID-19 are varied and include maculopapular, urticarial, chilblain-like, vesicular, livedoid, and petechial lesions. Rashes are also frequent in children with multisystem inflammatory syndrome, a novel and deadly health illness that has symptoms with Kawasaki disease and is likely connected to COVID-19. Furthermore, skin wounds caused by personal protective equipment are a major issue because disrupted cutaneous barriers might allow COVID-19 infections to penetrate the skin.[17]

Freeman EE *et al.*, stated that a variety of COVID-19-related cutaneous symptoms are highlighted in the study. Some morphologies may shed light on potential immunological or inflammatory pathways in COVID-19

pathogenesis, whereas others were vague and many non-specific.[21]

The scientific knowledge of dermatological symptoms in COVID-19 patients is currently developing. Polymorphous cutaneous lesions in COVID-19 individuals may represent a whole spectrum of viral interactions with the skin, including direct viral action in infected cells, immune system hyperactivity, and hypercoagulability. Future research with better scientific documentation would aid in elucidating the pathophysiologic characteristics and prognostic variables of COVID-19 cutaneous manifestations.

Conclusion

There is significant association of presence of the dermatological manifestations among the patients with COVID-19 and post COVID-19 period. Study of these dermatological manifestations and their pathogenesis and their significance in human health is useful in avoiding misdiagnosis and proper treatment. Awareness regarding dermatological manifestations in COVID-19 is very important in the dermatologist 's viewpoint.

Reference

1. Bal A, Agrawal R, Vaideeswar P, Arava S, Jain A. COVID-19: an up-to-date review—from morphology to pathogenesis. *Indian J Pathol Microbiol.* 2020;63(3):358–65.
2. Sharma A, Tiwari S, Deb MK, Marty JL. Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies. *Int J Antimicrob Agents.* 2020;56(2):1–10.
3. de Masson A, Bouaziz J-D, Sulimovic L, Cassius C, Jachiet M, Ionescu M-A, *et al.* Chilblains is a common cutaneous finding during the COVID-19 pandemic: A retrospective nationwide study from France. *J Am Acad Dermatol.* 2020;83(2):667–70.
4. Freeman EE, McMahon DE, Lipoff JB,

- Rosenbach M, Kovarik C, Takeshita J, *et al.* Pernio-like skin lesions associated with COVID-19: A case series of 318 patients from 8 countries. *J Am Acad Dermatol.* 2020;83(2):486–92.
5. Daneshgaran G, Dubin DP, Gould DJ. Cutaneous Manifestations of COVID-19: An Evidence-Based Review. *Am J Clin Dermatol.* 2020;21(5):627–39.
6. Tan SW, Tam YC, Oh CC. Skin manifestations of COVID-19: A worldwide review. *JAAD Int.* 2021;2:119–33.
7. Marzano AV, Genovese G, Moltrasio C, Gaspari V, Vezzoli P, Maione V, *et al.* The clinical spectrum of COVID-19-associated cutaneous manifestations: An Italian multicenter study of 200 adult patients. *J Am Acad Dermatol.* 2021;84(5):1356–63.
8. Recalcati S, Gianotti R, Fantini F. COVID-19: The experience from Italy. *Clin Dermatol.* 2021;39(1):12–22.
9. Galván Casas C, Català A, Carretero Hernández G, Rodríguez-Jiménez P, Fernández-Nieto D, Rodríguez-Villa Lario A, *et al.* Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. *Br J Dermatol.* 2020;183(1):71–7.
10. Recalcati S. Cutaneous manifestations in COVID-19: a first perspective. *J Eur Acad Dermatol Venereol.* 2020 May;34(5):212–3.
11. Madigan LM, Micheletti RG, Shinkai K. How Dermatologists Can Learn and Contribute at the Leading Edge of the COVID-19 Global Pandemic. *JAMA dermatology.* 2020;156(7):733–4.
12. Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, *et al.* Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* 2020;382(18):1708–20.
13. Suchonwanit P, Leerunyakul K, Kositkuljorn C. Cutaneous

- manifestations in COVID-19: Lessons learned from current evidence. *J Am Acad Dermatol.* 2020;83(1):57–60.
14. Türsen Ü, Türsen B, Lotti T. Cutaneous side-effects of the potential COVID-19 drugs. *Dermatol Ther.* 2020;33(4):e13476.
 15. Pangti R, Gupta S, Nischal N, Trikha A. Recognizable vascular skin manifestations of SARS-CoV-2 (COVID-19-19) infection are uncommon in patients with darker skin phototypes. *Clin Exp Dermatol.* 2021;46(1):180–2.
 16. Lin P, Zhu S, Huang Y, Li L, Tao J, Lei T, *et al.* Adverse skin reactions among healthcare workers during the coronavirus disease 2019 outbreak: a survey in Wuhan and its surrounding regions. *Br J Dermatol.* 2020;183(1):190–2.
 17. Singh H, Kaur H, Singh K, Sen CK. Cutaneous Manifestations of COVID-19: A Systematic Review. *Adv wound care.* 2021;10(2):51–80.
 18. Marzano A V, Cassano N, Genovese G, Moltrasio C, Vena GA. Cutaneous manifestations in patients with COVID-19: a preliminary review of an emerging issue. *Br J Dermatol.* 2020;183(3):431–42.
 19. Matar S, Oulès B, Sohier P, Chosidow O, Beylot-Barry M, Dupin N, *et al.* Cutaneous manifestations in SARS-CoV-2 infection (COVID-19): a French experience and a systematic review of the literature. Vol. 34, *Journal of the European Academy of Dermatology and Venereology : JEADV.* England; 2020. p. e686–9.
 20. Freeman EE, McMahon DE, Fitzgerald ME, Fox LP, Rosenbach M, Takeshita J, *et al.* The American Academy of Dermatology COVID-19 registry: Crowdsourcing dermatology in the age of COVID-19. *J Am Acad Dermatol.* 2020;83(2):509–10.
 21. Freeman EE, McMahon DE, Lipoff JB, Rosenbach M, Kovarik C, Desai SR, *et al.* The spectrum of COVID-19-associated dermatologic manifestations: An international registry of 716 patients from 31 countries. *J Am Acad Dermatol.* 2020;83(4):1118–29.
 22. Herrero-Moyano M, Capusan TM, Andreu-Barasoain M, Alcántara-González J, Ruano-Del Salado M, Uceda MES, *et al.* A clinicopathological study of 8 patients with COVID-19-19 pneumonia and a late-onset exanthema. *J Eur Acad Dermatology Venereol.* 2020;
 23. Bouaziz JD, Duong T, Jachiet M, Velter C, Lestang P, Cassius C, *et al.* Vascular skin symptoms in COVID-19: a French observational study. *J Eur Acad Dermatol Venereol.* 2020;34(9):e451–2.