



Review on Covid-19 Vaccination & Skin

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ABSTRACT

According to the study, the COVID-19 epidemic, which affected millions of individuals all over the world, has been thoroughly reviewed in this review. According to research, using ACE-2 receptors has an effect on people. Additionally, researchers also concluded that the "ACE-2 receptor shows expression in keratinocytes and sweat glands". Thus, in our review, we were evaluating and discussing SM due to the COVID-19 vaccine with SD for SM, P, SG & SP, different classification system.

Key words: SM, COVID-19, SD, P, SG & SP, different classification system.

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INTRODUCTION

In late December 2019, according to studies, China became the first country to report an "outbreak of a new coronavirus disease called COVID-19". [1] In addition, studies have demonstrated that the "SARS-CoV-2 virus, which is known to cause severe acute respiratory syndrome, was the cause of this illness". [1] In March 2020, the "World Health Organization (WHO) classified COVID-19 as a pandemic, given its swift global transmission". [1] For this reason, studies have also found that the "pathogen can get into human cells by connecting to ACE-2 through the SARS-CoV-2 spike protein (SP) on its surface". [1] Studies have also concluded that the "trimeric SP's subunits (S1, S2) play important roles in both membrane fusion and receptor binding". [1] Additionally, studies have concluded that "S1 contains the receptor-binding domain, which facilitates the protein's effective interaction with the ACE-2 receptor". [1] Additionally, researchers have discovered that "antibodies that bind to specific regions of SP, such as the N-terminal domain and the receptor-binding domain, may be able to stop viruses". [1] Hence, studies have also found that neutralizing antibodies are probably the major actors in protection against the virus. [1] Besides this, research has shown that "when people naturally get infected with SARS-CoV-2, they not only make antibodies, but they also have a strong immune response made up of T helper lymphocyte-1 cells that are specific for SP. Studies have also concluded that COVID-19 patients show substantial inter-individual variation in the size of their adaptive immune responses. Studies have concluded that up to six months after infection, memory B cells as well as CD4+ lymphocyte responses may be seen in more than 90% of patients. In addition to this, studies have shown that long-term protection and herd immunity post-infection are warranted since the levels of SARS-CoV-2-specific and neutralizing antibodies decline after around 8 months". [2,3,4,5,6] Studies have also found that "more than 170 million cases of COVID-19 have been confirmed, with about 3.6 million fatalities, as of the WHO COVID-19 dashboard accessible on June 1, 2021". [7]

In addition, India by itself was responsible for almost 95% of the cases, followed by Southeast Asia (93%), and the rest of the countries (50%) for the remaining instances, totaling 30% of all deaths worldwide. [8] Studies have also shown that "the virus was exploiting the angiotensin-converting enzyme-2 (ACE-2) receptor to infiltrate human cells, according to many studies conducted at the time, including one conducted in India". [9] In addition, it has been shown in several studies that "ACE-2 receptors are widely distributed throughout human cells". [10] Research that was carried out in 2021 concluded that "ACE-2 receptors were found to reveal their expression in keratinocytes and sweat glands. Therefore, it seems that the skin is a possible entry point for the SAR-COV-2 virus to infect its host". [11] Thus, in our review we were evaluating and discussing about Skin manifestation (SM) due to COVID-19 vaccine.

STATISTICAL DATA FOR SKIN MANIFESTATION

Studies have concluded that the occurrence of “skin symptoms in COVID-19 patients has been found to differ in different regions of the world”. The findings varied across different studies, with one Chinese study reporting a low incidence rate of approximately 0.2%, while an Italian study reported a significantly higher rate of around 20.4% among patients. [12,13]

PREVALENCE [10]

1. Chilblain like lesion = 14.3 -7.2%
2. Maculopapular Rash = 5-70%
3. Urticarial Lesion = 7-40%
4. Vesicular Lesion = 3.77 -15%
5. Livedoid -like Lesion = 6%
6. Petechiae / Purpura = 3%

CUTANEOUS SIGNS & SYMPTOMS [10,14,15,16,17,18,19,20,21,22]

1. “Maculopapular/ Morbilliform Eruption /Exanthema
2. Urticarial Eruption
3. Vesicular Eruption
4. Chilblain /Chilblain – like /Pernio-like Lesion (COVID toes)
5. Petechiae /Purpura – like Lesion
6. Livedo – like Lesion
7. Retiform Purpura Lesion
8. Erythema Multiforme – like Lesion
9. Oral Lesion
10. Nail Lesion
11. Hair Abnormalities
12. Other Lesion (Pityriasis rosea like lesion, conjunctivitis with eyelid dermatitis, periorbital dyschromia, diffuse melanoderma, erythemanodosum.)
13. Finding in Children (Similar to Kawasaki Syndrome)
14. Colour of Skin”

DIFFERENT CLASSIFICATION SYSTEM

1. “In 2020 , researchers were able to classify 5 unique categories of lesions which includes as follows:-
 - a. Maculopapular Exanthem (47%)
 - b. Urticarial Eruptions(19%)
 - c. Acral erythema with vesicles or pustules (19%)
 - d. Other Vesicular eruptions(9%)
 - e. Livedo or necrosis (6%)

Thus, in this studies, authors have concluded that there was a diverse indications of skin involved surfaced at discrete phases of ailment & it was also associated with different durations, degree & consequences”. [23]

2. “In another study , in 2020, a total of 15 patients were included in their case series, further cutaneous symptoms were classified according to their etiopathogenetic origins which includes:-
 - a. Cutaneous Vasculitides
 - b. Papulosquamous
 - c. Pityriasis Rosea
 - d. Measles -like
 - e. Papulovesicular
 - f. Urticarial
 - g. Cutaneous adverse drug response (CADR)Thus, prevalence of skin manifestation was high as 20.45%”. [24]
3. “A study in 2020, analyzed the data from 46 papers with a combined total of 998 patients from nine countries was carried out which includes: -
 - a. Vesicular Lesion (6.4%)
 - b. Maculopapular Lesion (22.7%)
 - c. Chilblain-like Lesion (40.2%)
 - d. Urticaria (8.9%)
 - e. Livedoid/Necrotic Lesion (2.8%)
 - f. Other Non- Classified skin lesion (19.8%)”. [25]

4. "A study in 2020 conducted & demonstrated about dermatologic findings in 171 COVID positive patients from 31 countries & found most common morphologies as follow:-
 - a. Morbilliform (22%)
 - b. Pernio-like(18%)
 - c. Urticarial (16%)
 - d. Macular Erythema (13%)
 - e. Vesicular (11%)
 - f. Papulosquamous (9.9%)
 - g. Retiform Purpura (6.4%)". [26]
5. "In 2020 ,a study done by Klejetman & his colleagues 6 different dermatological patterns that can be seen as follows:-
 - a. Maculopapular/morbilliform
 - b. Urticarial , vesicular
 - c. Chilblain like Petechiae
 - d. Purpura
 - e. Livedoid". [27]
6. In 2021 , another study wang & worswick subdivided the features into various types [14]
 - a. Viral Exanthem
 - b. Urticarial
 - c. Vesicular
 - d. Chilblains /Chilblains-like
 - e. Non- Chilbalins Vasculopathy related
 - f. Pityriasis Rosea-like
 - g. Erythema Multiforme like
 - h. Kawasaki/Kawasaki like disease & other

MANIFESTATION DUE TO VACCINE IN REAL WORLD

Studies have also found that skin reactions to COVID-19 vaccinations were not common in clinical trials. However, it is important to note that as efforts to immunize more people around the world continue, the number of cases of adverse reactions to the vaccine is likely to rise. Furthermore, studies have also concluded that it is possible that there will be an increase in cutaneous reactions in the future.[28] Moreover, there have been numerous studies and case series published in recent years that have examined the dermatoses linked to the COVID-19 vaccination. Having a comprehensive understanding of these symptoms can help dermatologists identify potential risks, offer proactive guidance, and start suitable treatment. Thus, below is a brief summary of the most recent non-clinical trial studies on reactive dermatoses caused by COVID-19 vaccines.[28]

Delayed Large Local Reactions

Studies have also found that the most frequently reported adverse cutaneous event outside of clinical trials is a delayed, large local response. Furthermore, studies have also concluded that this response is characterized by the appearance of an erythematous and edematous patch at the injection site, typically occurring 4 days or more following vaccination administration.[29]

Studies have also found that it is worth mentioning that a significant number of these delayed, large local responses have consistently been observed in female patients under the age of 65. Studies have also concluded that this raises an important question about the impact of gender on vaccination responses. Additionally, studies have also concluded that it is worth mentioning that women make up over 70% of the health care workforce, both nationally and globally.[30] Studies have also found that because the initial focus of vaccination was on healthcare professionals, it's possible that the observation is due to a reporting bias since women tend to visit the doctor more often. However, studies have concluded that there are likely multiple factors at play, one of which is biology. Women exhibit a robust immune response to immunizations; however, they may also experience a higher incidence of adverse effects. Studies have concluded that women tend to have stronger immunological responses to foreign antigens compared to men.[31,32,33,34,35]

Morbilliform Rash

Studies have found that the presence of lymphocytic perivascular infiltrates on histology confirms maculopapular toxidermia.[36] Studies also found that the patient's liver was damaged at the same time as the mildly elevated aspartate transaminase and gamma-glutamyl transferase enzymes, even though there were no other systemic signs.[36] In another study, a BNT162b2 vaccination recipient developed a pruritic morbilliform rash on his lower back 48 hours after injection; the rash resolved on its own within 24 hours.[37] He developed a more severe and persistent morbilliform eruption after getting the second

dosage, which affected not only his lower back but also his flanks, arms, and shoulders.[37] Studies have found that a morbilliform rash has been seen in several cases of COVID-19 infection, affecting people of all ages, from toddlers to adults. These cases have been recorded in both humans and animals.[38,39,40,41] Studies have also found that these cases had spongiosis and small perivascular lymphocytic infiltrates on histological examination, which suggests that the immune system caused the problem rather than the virus itself.[42] Studies have further concluded that, although the precise mechanism that underlies this phenomenon is not yet understood, it is quite probable that the rashes brought on by the COVID-19 vaccination are the consequence of the activation of the immune system.[28]

Urticaria

Studies have found that shortly after receiving the BNT162b2 vaccination, a female patient in the study experienced pruritic urticaria on her limbs and face.[43] However, studies have found that the patient's medical history and diagnostic tests showed a tendency toward allergic reactions and an unnoticed underlying condition of cholinergic urticaria.[43] Furthermore, studies have also concluded that it is likely that the anaphylaxis was a result of heat-induced cholinergic urticaria instead of vaccine-induced urticaria, as she experienced a sensation of heat while waiting in line for the dose. Consequently, the second dose was successfully administered in a carefully regulated environment.[43]

CONCLUSION

Various types of studies have been proving that the virus COVID-19 has been related to a variety of skin manifestations that have been described; however, further research is required to either validate or disprove these claims. The discovery of skin segregation ought to prompt clinicians and patients to have a talk about the disease and any required diagnostics. These cutaneous manifestations of COVID-19 are becoming increasingly common, and all healthcare providers should be aware of them since they may be connected to the severity of the disease, the prognosis for the illness, or the infectiousness of the illness.

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