



# Dyshidrotic Eczema as a Manifestation of COVID-19

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## Abstract

The SARS-CoV-2 pandemic represents a challenge in all medical specialties due to the variety of signs and symptoms observed in infected patients. Although the main symptoms of the disease are related to an acute respiratory syndrome, other organs may be affected. Skin manifestations in childhood described in the literature are divided into: Chilblain-like lesions, as the most frequent manifestation of COVID-19 in children and young adults, followed by other dermatological manifestations such as: Erythema multiform, urticaria and as part of the Multisystem Inflammatory Syndrome (MIS). The authors report the first case reported in the literature, of a 10-year-old patient who presented a clinical picture of dyshidrotic eczema associated with viral infection by the Coronavirus 19.

**Keywords:** Dyshidrotic Eczema; Dermatitis; Coronavirus Infections; Inflammatory Injury

## Introduction

Dyshidrotic Eczema (DE) is characterized by the appearance of vesicular lesions that affect the extremities of the limbs, usually located in the fingers, palms and soles of the feet, with bilateral and symmetrical involvement. It can be acute, chronic or relapsing. It represents about 20% of hand dermatoses and predominates in the age group from 20 to 40 years old and in about 5% of children under 10 years of age. They affect both sexes and are predominantly in Caucasian. Its classification is: idiopathic or true, when there is no determination of the etiopathogenic agents; and dyshidrosiform eruptions, when there is a determinate causal factor [1].

Dyshidrosis and dyshidrosiform eruptions are characterized by the formation of localized vesicles, whose vesicle content is usually colorless, being characteristic the lack of erythema. In the evolution of the clinical picture, there may be secondary infection and the process takes on the classic configuration of eczema, ceasing to be an exclusively vesiculobullous process, with erythema, edema, papules, erosions, crusts and desquamation also appearing. And often, the lesions become purulent and inflammatory erythema occurs. The evolution of the condition is, on average, 3 weeks, when the lesions become dry and disappear, but in some patients, the process becomes chronic [2].

## Case Presentation

Male, 10 years old, resident in the city of Piracicaba, state of São Paulo. It started with a sudden picture of intense desquamation in the palm regions. On physical examination, he presented intense desquamation in the palmar regions, presence of vesicles with colorless content and mild pruritus (Figure 1, 2). He had no lesions in the plantar regions. In the patient's anamnesis, he was previously healthy, denied a history of atopy and had not used any medication in the last month. The mother reported that it was the first time that the patient had this dermatological clinical condition. The patient was evaluated by a dermatologist who diagnosed him as dyshidrotic eczema, and a moisturizing cream was prescribed. About eight hours after the appearance of the dermatological lesions, he began to present symptoms of an upper respiratory infection with a runny nose and asthenia. On physical examination, he was subfebrile with a temperature of 37.4 degrees Celsius. The child went into isolation and waited for the third day of symptoms to undergo the RT-PCR test, which was detected positive for SARS-CoV-19. The patient evolved with mild symptoms such as: Asthenia in the late afternoon, loss of appetite, mild myalgia and a runny nose in the first three days. He was medicated only with common analgesics, with no further fever in the days following isolation. On the tenth day of illness, he presented complete resolution of the dermatological clinical picture (Figure 3); and at this time, being a mild case, it was no longer considered a transmitter of the disease. The mother kept in contact with her child throughout the entire time, presented mild symptoms such as asthenia and myalgia, performing the RT-PCR test twice (3<sup>rd</sup> and 6<sup>th</sup> day of symptoms), both results being negative. The investigation of antibodies against COVID-19 was

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**Figure 1:** Desquamation on the left palm with the presence of vesicles (black arrow).



**Figure 2:** Dyshidrotic eczema on the palms of the hands.



**Figure 3:** Improvement of skin lesions on the 10<sup>th</sup> day of illness.

carried out by the patient's mother, in the 1<sup>st</sup> and 4<sup>th</sup> month after the end of isolation, being also negative on both occasions.

## Discussion

DE is a dermatosis characterized by vesicular lesions that affect the extremities of the limbs. The main etiological factors are: Viral, bacterial, fungal infections, mycid, endotant, contact, atopy and emotional factors. In the case report, the patient presented a dyshidrosiform eruption, probably triggered by viral infection by the coronavirus, preceding the most common clinical manifestations of

this respiratory syndrome.

Viral infections can produce specific or non-specific clinical manifestations as a result of the direct action of the virus or even immune-mediated reactions. In the patient's anamnesis, the use of previous medications or other endotants was ruled out as possible etiological factors of the dyshidrosis eruption and as personal or family antecedents, there was no history of atopic eczema, being important to rule out this cause since dyshidrotic eczema can, many times be part of the atopy picture.

The binding of SARS-CoV-2 virus with the angiotensin 2 receptor represents the main mechanism for viral infection in human cells. The virus contains four structural proteins (transmembrane protein, S, M and N); it is through protein S that the virus infects the human cell. This protein is divided into 2 portions: S1 and S2; and among these portions is the RBD (receptor binding domain) which is the fraction of the virus that binds to the angiotensin-converting enzyme type 2 receptor. However, in COVID-19, the RBD is not exposed in the distal part of the S1, but it is encrypted. For the exposure of this fraction to occur, cleavage between portions S1 and S2 is necessary. This is accomplished by a protease, TMPRSS2 (Transmembrane Serine Protease 2), which is found in large quantities in the lung epithelium and is more common in men. After binding occurs, the virus is internalized along with the angiotensin receptor, and by the action of a human cathepsin, this structure breaks down, leading to exposure of viral RNA in the cytoplasm of the human cell [3].

There are few theories that explain the pathophysiology of vesicular lesions in COVID-19. Created et al. postulated a hypothesis that: The vesicular eruption could be the result of hyperactivation of the immune system, leading to the known "cytokine storm", also involving the skin. The same study describes the possibility of the direct cytopathic effect of SARS-CoV-2 on the dermal vessels of the endothelium, leading to the appearance of vesicular lesions [4]. Skin manifestations in childhood described in the literature are divided into: Chilblain-like lesions, as the most frequent manifestation of COVID-19 in children and young adults, followed by other dermatological manifestations such as: Erythema multiform, urticaria and as part of the Multisystem Inflammatory Syndrome (MIS) [5,6].

## Conclusion

Vesicular lesions have been described as "specific manifestations" of COVID-19 [4]. The case reported here shows that dermatological lesions may precede the respiratory condition of COVID-19, and in view of this pandemic, it is important to know about these dermatoses, which may be part of the clinical picture of the viral infection, and thus, we can make the hypothesis infection by Coronavirus 19, enabling an early diagnosis, isolation and subsequent treatment.

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