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REVIEW ARTICLE

Cutaneous manifestations and COVID-19 infection in children and teenagers: an integrative review

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Skin Abnormalities, Coronavirus Infections, Child, Adolescent.

Abstract

The study aims to analyse the cutaneous manifestations described in the literature so far, in children and adolescents, related to COVID-19. An integrative review was carried out using the descriptors and combinations in the English language*: skin abnormalities, coronavirus infection, child*, and *adolescent*. The inclusion criteria were articles that related skin manifestations in children and adolescents with COVID-19. The analysis and synthesis of the data obtained in a descriptive manner, characterizing the cutaneous manifestations analyzed. The study ended with 5 articles and it was observed that patients in the pediatric age group with COVID-19 may present diverse skin lesions as a single manifestation or accompanied by mild symptoms, and that these may be similar to those of other diseases common in childhood and adolescence.

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INTRODUCTION

In December 2019, there were some cases of pneumonia reported from Wuhan, China, caused by a new Severe Acute Respiratory Syndrome coronavirus 2 (SARS COV-2) and the resulting disease was called COVID-19[1,2].

The first registered patient confirmed in Brazil with coronavirus was known in March 2020. Since then, the number of cases has progressively increased, reaching 1,344,000 confirmed cases in June 2020[3].

There are some dermatological diseases that may worsen skin symptoms in patients with COVID-19, and other infectious diseases as well[4]. Exanthematic skin rashes related to COVID-19 have so far been highly variable and heterogeneous. The lesions were mainly erythematous, urticarial and vesicular, similar to chickenpox. Petechiae and reticular yeasts can also be found[5,6]. The most recently reported injuries were similar to those in the legs, but mainly in the trunk. Some case series of adult patients with skin manifestations have been published, almost all related to COVID-19, with little information in children and adolescents[7].

Due to the scarcity of information, the objective of this study is to analyze the skin manifestations related to COVID-19 described in the literature so far in children and adolescents.

MATERIALS AND METHODS

We ran our search in the Medical Literature Analysis and Retrieval System on-line databases (MEDLINE). We used the following keywords and their combinations in English as search criteria for the articles: skin abnormalities, coronavirus infections, child and adolescent. We found 76 articles in MEDLINE. The inclusion criterion was: full articles published in English, associating skin manifestations associated with COVID-19 infections, published between January and June 2020. We evaluated the titles and abstracts of the 76 papers to select those that would be read in full. The inclusion criterion for reading in full was the approach used with the children and adolescents. We selected seven articles to read in full, and we excluded two of them because it was not possible to access the full text. The study then included 05 papers. The analysis and synthesis of the data obtained were performed in a descriptive manner, characterizing the skin manifestations analyzed. We organized the information in the papers by means of a table containing the following topics: origin, title of the article, authors, journal and theme. (Chart 1)

RESULTS AND DISCUSSION

Only two of the five articles included in the study presented cases where the only manifestations that occurred were skin lesions[7,8]. All the cases presented evolved with total disappearance of the lesions and cure of the disease, without the need for admission to the intensive care unit[7,8,9,10,11]. The resolution time of the skin manifestations varied from 01 to 05 weeks.

In the report published in Spain with two children, where the skin lesions occurred initially on the face and later spread to the trunk and limbs, the conditions were mild and the lesions resolved in 05 days[8]. In Italy, in a series published with 88 patients, eight of them developed the lesions at the beginning of the disease symptoms, with the trunk being the most affected region. The pruritus was mild or absent, and the lesions improved in a few days[12].

In a retrospective Spanish study with 22 children and adolescents with dermatophytosis, the lesions appeared after an average of fourteen days of the first respiratory symptoms, located in the fingers and toes in the form of erythematous and purpuric macules, and all cases improved substantially in 3 to 5 weeks[9]. In Thailand, there was a patient who had a petechial rash similar to dengue due to local epidemiology, and the diagnosis of COVID-19 was later confirmed[13].

In the published Italian series of 22 adult patients with varicella-like papular-vesicular rash, the time to onset of the skin symptoms was 3 days after the onset of general symptoms, and the average time to improvement was 8 days. The rash manifested as sparse lesions in 72% of the cases, and diffuse in 27%, with half of the cases containing vesicles. Itching occurred in 40%, and the mucous membranes were not affected[7]. In China, at the beginning of February, a patient described with skin changes in a family with more infected people was reported without mentioning his age. The patient presented urticarial lesions, without fever or cough, which were initially treated with antihistamines[14]. Another report describes an Italian patient with varicelliform lesions of benign evolution[10].

In an Italian case report, a 13-year-old male child with erythematous-violet lesions on both feet, evolved from lesions to vesicles, purples and blackened crusts in seven days[10]. This case can be compared to the case from Spain, where a rash with erythematous and purpuric macules was presented[9].

There is an Italian study describing two cases of children, aged 14 and 18 years with a skin manifestation of the tinea pedis type, with lesions in the form of macules and erythematous-violet papules on the dorsum of the feet, one with a necrotic aspect and bloody crusts, and the other with ulcerative aspect. The time for the disappearance of lesions with complete healing was 7 to 20 days[11]. One Spanish paper described a cutaneous manifestation in a child with erythematous, confluent maculopapular rash, without pruritus, which started in the trunk and extended to the upper limbs and lower limbs, including the palmar region, associated with liver disease. The symptoms lasted for 5 days and resolved without sequelae[15].

All studies referring to the skin manifestations in children and adolescents listed in this review started from confirmed cases of COVID-19. The number and size of studies included in the review were small, which limits the conclusion. Future studies may expand the results found.

Chart 1. Articles collected in the MedLine databases on skin lesions in children with suspected COVID-19 from January to June 2020.

Origin: MEDLINE. **Title:** *Cutaneous manifestations in the current pandemic of coronavirus infection disease (COVID 2019)*. **Authors:** Olivé W M, Espiau W, Hally W W, Carballo L, Patos V G **Journal:** An Pediatric (England ED). 2020 Jun; 92 (6): 374–375. **Theme:** Two cases of 2-month-old and 6-year-old children with a positive result for SARS-CoV-2 are reported, presenting skin manifestation alone or in association with mild symptoms. The 2-month-old female child had a fever associated with acute itchy urticaria on the face and upper limbs, spreading to the trunk and lower extremities, lasting 4 days. The 6-year-old male child had a low fever and, around 2 weeks, erythematous, confluent and non-pruritic maculopapular eruption appeared on the trunk and neck, spreading to the cheeks, upper and lower limbs, lasting 5 days. In both cases, there were no other manifestations, and symptomatic treatment was performed with resolution of the lesions in 5 days.
Procedência: MEDLINE. **Title:** *Chilblains in children in the setting of COVID-19 pandemic*. **Authors:** Andina D, Morel L N, Arribas M B, Tristán G J, Cadenas J A A, Pellitero S E, Martín A H, Espi M T, Colmenero I, Torrelo A. **Journal: Pediatric Dermatol. 2020 May 22; 00: 1– 6**. **Theme:** A retrospective review was carried out with 22 children and adolescents aged 6 to 17 years with dermatophytosis, where the sequence of cases coincided with the peak period of COVID-19 in Spain. The lesions appeared after an average of fourteen days of the first respiratory symptoms, located in the fingers and toes, in the form of erythematous and purpuric macules, associated with a purple edema. Nine of these patients had pruritus and seven had mild pain. Regarding the symptoms of COVID-19, all the cases were asymptomatic or mildly symptomatic, with cough or rhinorrhea. Thirteen patients had a history of close contact with a symptomatic adult, and only one patient out of nineteen who underwent the SARS-CoV-2 CRP test tested positive, associating the low number to the likely low viral load. The treatment was based on analgesics, antihistamines and corticosteroids depending on the case, and in all of them there was a marked improvement in symptoms in 3 to 5 weeks.
Procedência: MEDLINE. **Título:** *Varicella-like exanthem as a specific COVID-19-associated skin manifestation: multicenter case series of 22 patients*. **Authors:** Marzano AV, Genovese G, Fabbrocini G, et al. **Journal:** J Am Acad Dermatol. 2020 Jun; 83 (1): 280-28. **Theme:** A series of vesicular rashes was described in 22 patients with COVID-19 - confirmed by nasopharyngeal swab. The average latency time from systemic symptoms to the rash was 3 days, with an average duration of skin manifestations of 8 days. In all patients submitted to skin biopsy (n = 7), the histological findings were consistent with viral infection, but there was no demonstration of SARS-CoV-2 by the polymerase chain reaction in the lesional skin due to the specific unavailability of the indicator. Of these 22 patients, only one was a child - 8 years old, female, whose lesion was papulovesicular in the trunk, dispersed, without pruritus, lasting 7 days. The latency time was 3 days, associated with fever and cough. The case was resolved.
Procedência: MEDLINE. **Título:** *Acute acro-ischemia in the child at the time of COVID-19.* **Autores:** Mazzotta F., Troccoli T. **Journal:** Eur J Pediatr Dermatol. 2020;30(2):71-4. **Theme:** Case report of a 13-year-old male child with erythematous-purple lesions on both feet. Lesions with a diameter of 5 to 15 mm evolved over the following seven days to blisters, purpled and blackened crusts. Two days after the beginning of the skin manifestations, the patient presented fever, headache, myalgia, itching and burning. He was diagnosed with a spider bite, and the treatment was done with macrolides and topical medication. The child evolved with lesion regression. The test to confirm SARS-CoV-2 was not performed. However, the mother presented symptoms suggestive of COVID-19 six days before the skin spots appeared.
Origin: MEDLINE. **Title:** *Silent COVID-19: what your skin can reveal?* **Authors:** Guarneri C, Rullo EV, Pavone P, Berretta M, Ceccarelli M, Natale A, Nunnari G. **Journal:** Lancet Infect Dis. 2020 May; : S1473-3099 (20) 30402-3. **Theme:** Three cases of children aged 14 and 18 years with a skin manifestation of the tinea pedis type are described and the result for SARS-CoV-2 was positive, with 2 asymptomatic cases and 1 case with fever (38.5°C). The lesions were erythematous-purple macules and papules on the dorsum of the feet, one with a necrotic aspect and hematic crusts, and the other with an ulcerous aspect. The time for lesion disappearance with complete healing was 7 to 20 days. The treatment was expectant.

CONCLUSION

Skin manifestations associated with COVID-19 infection may be the only presentation of the disease, be accompanied by mild symptoms and/or may be similar to the manifestations of other diseases common in childhood and adolescence.

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