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Cutaneous manifestations of COVID-19 in children: Four case presentations

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Informed Consent
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Abstract

The dermatological signs of Coronavirus disease 2019 (COVID19) in children are uncommon and different from adults. The majority of infected children were asymptomatic, and cutaneous symptoms of infection in children usually appear several weeks after the disease. This article describes four different cutaneous manifestations of COVID-19 in children, including chilblains, erythema multiforme-like lesions (EM), urticaria, and vesicular rash in terms of recalling to mind COVID-19 infection.

Keywords: COVID-19 in children, Chilblains, Covid-toe, Erythema multiforme, Urticaria

Introduction

Dermatological symptoms of Coronavirus disease 2019 (COVID-19) in children are uncommon (0.25 to 3 percent) [1, 2]. Unlike adults, the majority of children with COVID-19 infection are asymptomatic. The skin lesions caused by COVID-19 in children differ from adults. The urticaria, maculopapular and vesicular rash may be seen in people of all ages while chilblains, erythema multiforme-like lesions (EM), and cutaneous manifestations of pediatric inflammatory multisystem syndrome are more frequently seen in children [1]. The latency time between the appearance of general symptoms and the appearance of cutaneous symptoms in symptomatic cases ranges from a day to weeks. As a result, cutaneous symptoms of COVID-19 in children are typically late indicators of infection, appearing after several weeks [3]. In this article, four different cutaneous manifestations of COVID-19, including chilblains, EM, urticaria, and vesicular rash are described.

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Case presentation

Written informed consent was acquired from the patient's parents. This study was prepared in accordance with CARE standards.

Case 1

In the absence of any systemic symptoms, a 15-year-old male patient presented with chilblain-like erythema (Figure 1), swelling and pain in toes, and ecchymotic lesions in the toenails. There were no vesicles or pustules. The drug history was unfavorable. He was not exposed to any exanthematous diseases. Except for muscle soreness and cough, clinical signs of bacterial or viral illness were not observed. The blood tests were normal, except an elevated D-dimer level. His PCR for SARS-CoV-2 was positive four weeks ago following family interaction. The medication was generic, consisting of paracetamol. Without therapy, the lesions vanished within 15 days.

Figure 1: Chilblain like erythema accompanied by swelling and pain in the toes and ecchymotic lesions in toenails.

Case 2

A four year-old girl patient presented with erythema multiforme like lesions accompanied by swelling in her arms and legs (Figure 2). Lesions consisted of confluent macules and plaques of different sizes, some with hemorrhagic or a small central crust. She had no previous history of erythema multiform, no recent lip sores, no new medications, and no vaccinations before the onset of the skin lesions. Solely, her asymptomatic father was in treatment of COVID-19 infection because of being PCR positive for SARS-CoV-2. Her PCR for SARS-CoV-2 was negative and immunoglobulin (Ig) G and IgM antibodies against SARS-CoV-2 were resulted as negative. There was no serological evidence of other viral infections. Significantly elevated interleukin-6 (IL-6), D-dimer, lactate dehydrogenase (LDH), C-reactive protein(C-RP) levels and lymphocytopenia were the signs of COVID-19 disease in blood tests. The patient received only symptomatic treatment. Lesions were resolved within two days.

Figure 2: Erythema multiforme like lesions accompanied by swelling in arms. Lesions consisted of confluent macules and plaques of different sizes, some with hemorrhagic or a small central crust

Case 3

A 17-year-old girl was presented with erythematous, swollen, irregular shaped urticaria on the skin of the thigh and lower leg (Figure 3). Five weeks ago, his PCR was positive for SARS-CoV-2 due to family interaction. The patient did not have a history of drug use, allergy, or chronic disease. Except for an elevated D-dimer level, the general blood test was normal. There was no evidence of other viral infections at laboratory investigation. The patient received only oral antihistamine because of pruritus. Lesions resolved within seven days.

Figure 3: Erythematous, irregular, swollen urticaria on the skin of the thigh and lower leg

Case 4

A 12-year-old boy was presented with disaggregated vesicular eruptions in some areas and persisted for nearly one week. Lesions were formed on his trunk and arms (Figure 4). He recovered from COVID-19 infection seven weeks ago. Except for an elevated D-dimer, the general blood test was normal. There was no evidence of other viral infections at laboratory investigation. The patient received only symptomatic treatment for lesions and all of them disappeared within ten days.

Figure 4: Disaggregated vesicular eruptions in some areas, generally in trunk and arms

Discussion

During the COVID-19 outbreak, there have been reports of chilblains (COVID toe) as acral ischemic lesions [4]. Patients are mainly isolated at home, and interestingly, the first patient has no previous pernio history. Lesions in children under the age of ten are uncommon [4, 5]. Children are normally asymptomatic, however they may have local pain and itching. Chilblains were usually seen in the feet, but also reported as erythematous swelling in fingers, as seen in our patient. Splinter hemorrhages were found in our patient's nails. Chilblains were commonly seen in the feet, but also documented in fingers. The lesions on our patient's feet were erythematous, with increased edema and nail splinter hemorrhages. PCR for COVID-19 was frequently negative in children with COVID-associated chilblains, and immunoglobulin (Ig) G and IgM antibodies against SARS-CoV-2 were detected in a very restricted number of patients [4, 5]. Our patient's COVID-19 PCR test was positive four weeks ago due to familial interactions. As it appeared in our patient, all children have a favorable prognosis, with spontaneous regression of the lesions without complications [4].

Erythema multiforme is a self-limiting hypersensitivity reaction that manifests as a skin eruption with symmetrical erythematous lesions known as iris or target lesions. Systemic infection is the most common cause of EM [6]. *Herpes simplex virus (HSV)* and *Mycoplasma pneumonia* are the two pathogens most commonly related in children with EM. SARS-CoV-2 infection has been associated with an EM-like eruption both in adults and children [6, 7]. Children with EM were generally reported with asymptomatic infection. PCR for SARS-CoV-2 is generally negative and skin biopsies demonstrated endothelial immunohistochemistry stain positivity to SARS-CoV-2 spike protein [8]. While the clinical signs of COVID-19 were not seen in our patient except fever, significantly high levels of interleukin-6, procalcitonin, D-dimer, C-reactive protein suggested infection. Family interaction played the main role in this.

Urticaria presents with pruritic, circular, swollen lesions which persisted 24 hours. It was formed on the trunk [6]. The most common causes of urticaria are infections (parvovirus, rhinovirus, rotavirus, *Epstein–Barr virus* allergens, hepatitis, *Streptococcus*, *Mycoplasma*, *Helicobacter pylori*), allergens, insects and drugs [6, 9]. In addition to these, urticaria represents about 10%–20% of the cutaneous manifestations in patients with COVID-19. Most reported cases of children with urticarial rash appeared in asymptomatic cases [6, 9]. Generally, patients were not tested but had household contact with confirmed cases of COVID-19, as similar to our patient. The urticaria in COVID-19 is likely to be associated with systemic eosinophilia, which in turn leads to better outcomes of COVID-19 infection according to some studies [10], whereas eosinopenia is more frequently observed and may have a prognostic value in more severe cases of infection. Eosinophilia was not seen in our patient and no evidence of other viral infections were found in blood tests.

The vesicular eruption reported in COVID-19 was a varicella-like papulovesicular rash that was mostly on the trunk and rarely on the limbs [6, 11]. The vesicular exanthema was reported in 4% -15% of confirmed or suspected COVID-19 cases [6]. Vesicular lesions are thought to appear in early stages of COVID-19 disease compared with other skin manifestations occurring later [12]. Our patient's lesions appeared in the late stage of infection disparately from the literature.

Because there are no particular biomarkers or laboratory tests for COVID-19 diagnosis, patients have high CRP and LDH levels, low albumin levels and lymphopenia. Except significantly elevated D-dimer levels in most cases, various coagulation markers were found to be within the normal range in youngsters [13]. Our findings show that PCR may be positive when cutaneous symptoms coexist with clinical illness, but sensitivity is relatively low. The lesions occur several days after, and PCR is usually negative. The presence of IgM and IgG by immunoassay has very little diagnostic relevance to cutaneous symptoms of COVID-19 in children. According to the findings, when cutaneous symptoms coexist with symptomatic illness, PCR may be positive, but sensitivity is quite low. Testing is frequently negative when the lesions occur much later. The detection of IgM and IgG by immunoassay has very little diagnostic value in children with cutaneous symptoms of COVID-19 [13]. All patients showed elevated D-dimer levels in coagulation tests, while one patient also had elevated IL-6, CRP and LDH levels with lymphocytopenia. After family interaction, three of them had a positive PCR test for COVID-19 in bygone four and a half weeks.

Conclusion

Children with COVID-19 have an asymptomatic course and usually discovered through contact. Emerging skin lesions may hold a hint for COVID-19. Chilblains, EM, urticaria, and vesicular eruption are the most commonly reported skin pathologies in children, and they are significant in terms of recalling COVID-19.

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