A new vasculitis at the time of COVID-19.

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Summary
The authors describe a vasculitis observed for the first time during the COVID-19 pandemic, which affected children towards the end of the first decade of life and teenagers, however, in good health, prevailed on the feet and resembled chilblains, but in the absence of exposure to the cold and predisposing constitutional factors. When it was possible to perform swabs and serological tests these were often negative; the probable relationship with COVID-19 was based on the history, on the concomitance between lesions never observed previously and a new infection, on the presence of vasculitic lesions of the same type but much more serious in patients with severe forms of COVID-19.

Keywords
Feet, hands, vasculitis, COVID-19.

Five weeks after the first autochthonous case of COVID-19 was reported in Italy, the authors observed numerous cases of vasculitis, previously unobserved and self-healing in a few weeks, in children and adolescents. The current work examines the clinical features of the new vasculitis and discusses its differential diagnosis.

Clinical features
40 days after the first autochthonous case of COVID-19 reported in Italy, we observed an “epidemic” of acute and self-healing vasculitic lesions of the hands and feet in asymptomatic children and adolescents. These lesions constituted a novelty that led us to establish a link with the other much more severe novelty, i.e. COVID-19, which also occurred almost simultaneously. This vasculitis was not the only cutaneous manifestation at the time of COVID-19, as various types of rash and urticaria were described. Unlike the latter, however, it is very characteristic and never observed in the past; therefore, it could be a marker for epidemiological investigations. Here we describe this new skin entity and discuss the differential diagnosis from a clinical point of view, the only one currently possible in the period of health emergency in our district.

The family history is important because in 10% of cases we see the same skin manifestations in siblings, simultaneously or at a distance of about one week, while we have not seen them in parents, even when the latter reported suspicious contacts or had had full-blown COVID-19.

The personal history is characteristic: we are dealing with healthy children and teenagers who have never suffered from acrorhigosisis, acrocyanosis, chilblains or vasculitis and who have no other problems besides skin manifestations. The cutaneous lesions arise in full well-being, rarely a few days after mild flu symptoms.

The symptoms reported by the patients are often important and characterized by itching, burning, difficulty in joint movements when there is involvement of the hands, more frequently pain when the feet are affected.
Fig. 1, 2, 3, 4: Erythematous, cyanotic (Fig. 1), purpuric (Fig. 2), bullous (Fig. 3), necrotic (Fig. 4) isolated lesions with multiple foci of the feet.

The clinical manifestations affected the feet (Fig. 1, 2, 3, 4) and/or hands, most often one or the other in isolation, were multifocal and often asymmetric, appearing a few at a time in 2-3 days, then undergoing a different evolution from the initial erythema (Fig. 1) to infiltration or exudation or ecchymosis (Fig. 2, the same patient as in Fig. 1 after 4 days), and eventually self-healing in 12-20 days.

At the level of the feet, in addition to being more frequent, the lesions were more severe, evolving more often towards infiltration, formation of blisters, bruising and superficial necrosis. The toes, the heel and the plantar surface were affected; these locations were usually not affected simultaneously. As regards the toes, the lesions prevailed in some of them, often sparing others interposed, sometimes affecting the whole toe and ending abruptly at the metatarso-phalangeal level or other times being rounded, a few millimeters in size lesions; at the level of the heel the lesions were more often multiple, close together, of a few millimeters, ecchymotic (Fig. 5) or superficially necrotic (Fig. 6); at the plantar level, the lesions were most often coarse, ecchymotic and infiltrated (Fig. 7, 8).

On the hands, erythematous (Fig. 9), erythematous-violet or erythematous-infiltrative (Fig. 10) lesions prevailed.

**Discussion**

The here described lesions do not correspond to any known disease; in some cases they remind and must be differentiated from chilblains, acrocyanosis, ischemic lesions of meningococcal sepsis or protein C deficiency, dermatomyositis, chilblain lupus erythematosus, antiphospholipid antibody syndrome, acute hemorrhagic edema of infancy and from vasculitis, such as Schoenlein-Henoch disease.
Fig. 5, 6, 7, 8: Erythematous-cyanotic (Fig. 5, 7), crusty (Fig. 6), purpuric (Fig. 8) lesions of the ankles (fig. 5, 6), of the lateral surface of the feet and plantar (Fig. 7, 8).

Perniosis is the condition most similar to the here described lesions; however, it stands out because it is linked to the cold and occurs in teenagers who have particular stigmata such as acrorhigosis and acrocyanosis. Acrocyanosis does not have an acute course and is not associated with infiltrative, ecchymotic and exudative manifestations; it also affects the hands and feet in a widespread manner. Protein C deficiency occurs early in life and is characterized by major

Fig. 9, 10: The hands are less frequently affected and have erythematous-edematous and cyanotic lesions with blurred limits (Fig. 9, 10).
necrotic lesions. Meningococcal sepsis is accompanied by general symptoms and presents severe gangrenous lesions. The lesions of the hands may recall those of dermatomyositis, but the other skin, muscle and laboratory signs of the disease are missing; the same is true of chilblain lupus erythematosus and antiphospholipid antibody syndrome which are characterized by specific laboratory alterations. In the first two years of life, the differential diagnosis must be made from hemorrhagic edema of infancy; however, the latter has lesions also outside the hands and feet. Schoenlein-Henoch disease affects the legs more frequently than the feet and is however associated with other joint, abdominal and renal symptoms.

In the literature there are some recent papers that speak of ischemic and ecchymotic lesions of the fingers and more frequently of the toes, in patients suffering from very severe, often lethal forms of COVID-19 (1, 3, 4) and claim that these manifestations are an expression of clotting disorders. The here described manifestations are likely to be the expression of mild forms of COVID-19 in children and adolescents (2).

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References