

# Acute urticaria as the initial presentation of COVID-19 in a pediatric patient



Nicole K. Le, MD, MPH,<sup>a</sup> and Joel P. Brooks, DO, MPH<sup>b,c</sup>  
Tampa, Florida and Washington, District of Columbia

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## INTRODUCTION

Cutaneous manifestations have been commonly identified with a variety of viral infections, including influenza, respiratory syncytial, and adenoviruses.<sup>1</sup> Although uncommonly the presenting symptom, the current COVID-19 pandemic has revealed multiple associated dermatologic findings, including macular and papular, urticarial, chilblain-like acral, vesicular, livedo reticularis-livedo racemosa-like, and purpuric patterns.<sup>2-4</sup> The typical presenting symptoms of COVID-19 include fever, chills, cough, shortness of breath, fatigue, myalgia, headache, ageusia, and anosmia.<sup>5,6</sup> We report a pediatric patient whose initial presenting symptom of COVID-19 was acute urticaria.

## CASE REPORT

A 5-year-old Hispanic girl with no significant medical history was seen for the evaluation of acute urticaria. Approximately 1 month previously, the patient developed hives after returning home from her father's house, where she spent the weekend. Her initial symptoms were hives across her entire body, sparing her face (Fig 1). She was treated with oral and topical diphenhydramine at the recommendation of her pediatrician. Her hives were moderately pruritic, and they worsened after she showered. Two days after her hives began, she developed fever, with her temperature reaching 101.6 °F. Her fever was treated with acetaminophen, but it continued to persist along with her hives for the next 3 days.

As her symptoms continued to worsen, she presented to the emergency department 5 days after her symptoms began but was treated for idiopathic



**Fig 1.** Patient with urticarial eruption on the trunk due to COVID-19.

urticaria with H1 blockade and discharged home. Two days later, she developed a cough. She returned to the emergency department 11 days after her initial presentation because of her persistent hives, fevers, and cough. Her SARS-CoV-2 polymerase chain reaction test result was positive, and she underwent additional evaluation for COVID-19 (Table 1). Her prothrombin time was 14.1 seconds, international normalized ratio was 1.08, activated partial thromboplastin time was 36 seconds, fibrinogen level was 329 mg/dL, and D-dimer level was 0.75 µg/mL. In addition, her C-reactive protein level was 1.08 mg/dL, troponin level was <0.02 ng/mL, ferritin level was 88 ng/mL, and N-terminal brain natriuretic peptide level was 25 pg/mL. As the patient was clinically stable, she was discharged home with

From the Morsani College of Medicine, University of South Florida<sup>a</sup>; Division of Allergy and Immunology, Children's National Hospital, Washington, District of Columbia<sup>b</sup>; and Department of Pediatrics, George Washington University School of Medicine and Health Sciences.<sup>c</sup>

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Correspondence to: Joel P. Brooks, DO, MPH, 5028 Wisconsin Ave Suite 430, Washington, DC 20016. E-mail: [jbrooks@childrensnational.org](mailto:jbrooks@childrensnational.org).

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**Table I.** The initial laboratory evaluation

Laboratory findings	Measured values	Reference range
WBC (K/mcL)	5.57	4.86-13.18
Hemoglobin (g/dL)	11.8	10.2-12.7
Hematocrit (%)	31.7	31.2-37.8
Platelets (K/mcL)	265	189-394
Absolute neutrophil count (K/mcL)	3.55	1.60-8.29
Absolute lymphocyte count (K/mcL)	1.52	1.25-5.77
Absolute monocyte count (K/mcL)	0.47	0.24-0.92
Absolute eosinophil count (K/mcL)	0	0.03-0.46
ESR (mm/hr)	13	0-20
CRP (mg/dL)	1.08	0.05-1.00
PT (seconds)	14.1	12.2-14.2
aPTT (seconds)	36	23.3-35.7
INR	1.08	0.91-1.09
Fibrinogen (mg/dL)	329	179-469
D-dimer ( $\mu$ g/mL)	0.75	<0.54
Troponin I (ng/mL)	<0.02	<0.04
Ferritin (ng/mL)	88	22-158
NT BNP (pg/mL)	25	<1157
SARS-CoV-2 PCR	Detected	Not detected

aPTT, Activated partial thromboplastin time; CRP, C-reactive protein; ESR, erythrocyte sedimentation rate; INR, international normalized ratio; NT BNP, N-terminal pro-brain natriuretic peptide; PT, prothrombin time; SARS-CoV-2 PCR, severe acute respiratory syndrome coronavirus 2 polymerase chain reaction; WBC, white blood cell.

supportive care. She continued to receive acetaminophen and was transitioned to cetirizine instead of diphenhydramine. Her symptoms persisted for the following week before resolving and have not reoccurred.

It was later determined that the patient's father was ill with COVID-19 when she stayed with him the weekend prior to developing urticaria. Over the course of the 11 days prior to her COVID-19 diagnosis, several immediate and extended family members developed COVID-19 infections, which were eventually traced back to exposure to the patient. She presented for follow-up to an outpatient allergy practice for further evaluation of her acute urticaria. As she was now asymptomatic with her hives resolved with the rest of her viral symptoms, she was advised to continue using cetirizine as needed.

## DISCUSSION

The prevalence of urticarial eruptions in patients with COVID-19 has been reported to be between 3.4% and 14.8%.<sup>2,7,8</sup> These eruptions occur after the

development of COVID-19. Urticarial rash is likely due to systemic eosinophilia along with degranulation of mast cells and release of histamine from basophils.<sup>1,9</sup> The underlying etiology by which a virus can trigger urticaria remains unknown. Several mechanisms have been proposed, including cross-reaction between viral immunoglobulin (Ig) M and IgG with mast cell IgE, which favors mast cell degranulation.<sup>10</sup> Another proposed pathway is the possibility of circulating immune complexes, which stimulate basophils into producing vasoactive amines and activating complement, leading to increased vascular permeability.<sup>10</sup>

The unique ways in which SARS-CoV-2 interacts with the immune system are still being elucidated, and this is another example of how infections can trigger rare immunological manifestations. This case represents the first documented report of urticaria as the presenting symptom of COVID-19 in a pediatric patient and shows how quickly COVID-19 can spread through an unsuspecting family. Therefore, clinicians should consider testing for COVID-19 as part of their differential diagnosis if patients present with acute onset of idiopathic urticaria in the absence of other known causes.

## REFERENCES

1. Wedi B, Raap U, Wiczorek D, Kapp A. Urticaria and infections. *Allergy Asthma Clin Immunol.* 2009;5(1):1-2.
2. Recalcati S. Cutaneous manifestations in COVID-19: a first perspective. *J Eur Acad Dermatol Venereol.* 2020;34(5):e212-e213.
3. Marzano AV, Cassano N, Genovese G, Moltrasio C, Vena GA. Cutaneous manifestations in patients with COVID-19: a preliminary review of an emerging issue. *Br J Dermatol.* 2020;183(3):431-442.
4. Galvan Casas C, Catala A, Carretero Hernandez G, et al. Classification of the cutaneous manifestations of COVID-19: a rapid prospective nationwide consensus study in Spain with 375 cases. *Br J Dermatol.* 2020;183(1):71-77.
5. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet.* 2020;395(10223):497-506.
6. Pierron D, Pereda-Loth V, Mantel M, et al. Smell and taste changes are early indicators of the COVID-19 pandemic and political decision effectiveness. *Nat Commun.* 2020;11(1):1-8.
7. Daneshgaran G, Dubin DP, Gould DJ. Cutaneous manifestations of COVID-19: an evidence-based review. *Am J Clin Dermatol.* 2020;21(5):627-639.
8. Sameni F, Hajikhani B, Yaslianifard S, et al. COVID-19 and skin manifestations: an overview of case reports/case series and meta-analysis of prevalence studies. *Front Med (Lausanne).* 2020;7(573188):1-14.
9. Dastoli S, Bennardo L, Patruno C, Nistico SP. Are erythema multiforme and urticaria related to a better outcome of COVID-19? *Dermatol Ther.* 2020;33(4):e13681.
10. Imbalzano E, Casciaro M, Quartuccio S, et al. Association between urticaria and virus infections: a systematic review. *Allergy Asthma Proc.* 2016;37(1):18-22.