
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

THE AMERICAN JOURNAL of MEDICINE®

# Multisystem Inflammatory Syndrome With Particular Cutaneous Lesions Related to COVID-19 in a Young Adult

*To the Editor:*

A previously healthy 21-year-old Caucasian man was admitted for vasoplegic shock. He denied any drug intake, did not smoke tobacco, or use illicit drugs. He presented with a fever of 39°C (102.2°F) with chest tightness, nonbloody watery diarrhea lasting for 7 days, and a rash that had developed over 3 days. On clinical examination, he was febrile (40°C [104°F]), blood pressure was 80/40 mm Hg, respiratory rate was 38 breaths/min, and oxygen saturation was 97% on ambient air. An asymptomatic rash was present over his trunk and palms, consisting of erythematous round-shaped macules with a darker and raised rim, 1-3 cm in diameter, along with bilateral conjunctivitis (Figure 1). The white cell count was 16,000/mm$^3$, with lymphocytes of 900/mm$^3$. C-reactive protein level was of 365 mg/L, procalcitonin was 3.4 ng/mL, ferritin was 1282 $\mu$g/L (normal <30), and lactate 2.4 mmol/L (normal <1.6). Renal and liver function tests were within normal range, and his troponin level was 550 ng/L (normal <34). Cutaneous biopsy showed a slightly inflammatory infiltrate in upper dermis, and direct cutaneous immunofluorescence was negative. Reverse transcription–polymerase chain reaction (RT-PCR) testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 [COVID-19]) was negative on nasopharyngeal swab, saliva, stool specimen, and skin biopsy. Extensive infectious inquiry and search for antinuclear antibodies were negative. Electrocardiogram showed diffuse negative T waves, and echocardiography displayed hyperkinetic left ventricle with normal ejection fraction, normal right cavities, and dilated noncompressible inferior vena cava. Thoracoabdominal computed tomography (CT) scan did not demonstrate pulmonary embolism or lung infection but did show signs of congestive heart failure with bilateral pleural effusion and wall thickening of the right colon with normal rectosigmoidoscopy. Treatment with volume resuscitation, noradrenaline, and antibiotics (ie, ceftriaxone and amikacin) was started and then high-flow nasal oxygenation was added because of respiratory function deterioration. Progressive clinical and biological features normalized, and the patient left the intensive care unit at day 8, while COVID-19 serology returned highly positive with immunoglobulin G (IgG) using enzyme-linked immunosorbent assay (ELISA) SARS-CoV-2 IgG Euroimmun. At 4 weeks' follow-up he was healthy, and his heart CT scan and cardiac magnetic resonance imaging were normal with no sign of myocarditis or coronary aneurysms.

We report here a young adult multisystem inflammatory syndrome (MIS) resulting from the COVID-19 virus who presented with vasoplegic shock and rash. Indeed, severe forms of COVID-19 infections affect mainly old people with underlying conditions. However, severe and systemic infections have been recently reported in children and teenagers close to atypical Kawasaki disease or toxic shock syndrome.[1-3] This syndrome was described initially and termed MIS by Riphagen,[2] in a series of 8 children and teenagers with vasoplegic shock who experienced fever (8 out of 8), rash (4 out of 8), conjunctivitis (4 out of 8), and gastrointestinal symptoms such as nonbloody diarrhea, vomiting, and abdominal pain (7 out of 8). None had significant respiratory involvement. One patient had a giant coronary aneurysm, and another died from cerebrovascular infarct. Diagnosis of COVID-19 infection relied on reverse transcription–polymerase chain reaction testing on bronchoalveolar lavage or nasopharyngeal aspirate (2 out of 8) and serology (8 out of 8). Early treatment with intravenous immunoglobulins was given to all patients, and then 6 of them received aspirin. All children were discharged from the intensive care unit within 4-6 days. Preliminary

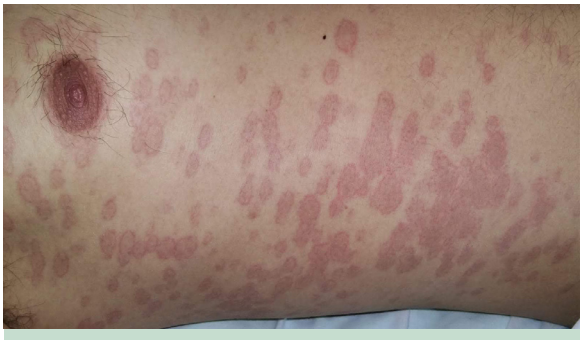

**Figure 1** Annular lesions over the trunk.

**Funding:** None.

**Conflicts of Interest:** None.

**Authorship:** All authors had access to the data and a role in writing this manuscript.

Requests for reprints should be addressed to Claude Bachmeyer, MD, Service de médecine interne, Hôpital Tenon (AP-HP), 4 rue de la Chine, 75020 Paris, France.

E-mail address: claude.bachmeyer@tnn.aphp.fr

diagnostic criteria have been subsequently proposed by the World Health Organization (WHO) in patients younger than 19 years old.[3] Our patient fulfilled the World Health Organization diagnostic criteria of MIS. However, diagnosis of SARS-CoV2 was established late on the detection of serum SARS-CoV-2 antibodies, and therefore, no specific treatment was given.

Cutaneous lesions associated with COVID-19 are present in up to 20% of patients, including maculopapular rash, urticarial lesions, petechiae, and chilblains-like lesions.[4] The annular rash in our patient was particular, and diagnosis of erythema multiforma and subacute lupus erythematosus were easily ruled out.

Parna Moghadam, MD[a]
Laurent Blum, MD[a]
Btissem Ahouach, MD[a]
Aguila Radjou, MD[b]
Céleste Lambert, MD[c]
Agnès Scanvic, MD[d]
Pascale Martres, MD[d]
Véronique Decalf, MD[e]
Edouard Bégon, MD[a]
Claude Bachmeyer, MD[f]
[a]*Unité de dermatologie, Hôpital René Dubos*
[b]*Service de réanimation, Hôpital René Dubos*
[c]*Unité d'infectiologie, Hôpital René Dubos*
[d]*Laboratoire de microbiologie, Hôpital René Dubos*
[e]*Service de cardiologie, Hôpital René Dubos, Pontoise, France*
[f]*Service de médecine interne, Hôpital Tenon (AP-HP), Paris, France*

https://doi.org/10.1016/j.amjmed.2020.06.025

## References

1. Riphagen S, Gomez X, Gonzalez-Martinez C, et al. Hyperinflammatory shock in children during COVID-19 pandemic. *Lancet.* 2020;395(10237):1607–8.
2. Belhadjer Z, Méot M, Bajolle F, et al. Acute heart failure in multisystem inflammatory syndrome in children (MIS-C) in the context of global SARS-CoV-2 pandemic [e-pub ahead of print]. Circulation. Accessed May 17, 2020.
3. World Health Organization (WHO). Multisystem inflammatory syndrome in children and adolescents with COVID-19. Available at: https://www.who.int/news-room/commentaries/detail/multisystem-inflammatory-syndrome-in-children-and-adolescents-with-covid-19. Accessed May 15, 2020.
4. Suchonwanit P, Leerunyakul K, Kositkuljorn C. Cutaneous manifestations in COVID-19: lessons learned from current evidence. *J Am Acad Dermatol.* 2020;83(1):e57–60.