

# Multisystem Inflammatory Syndrome Associated with SARS-CoV-2 Infection, More Than a Pediatric Syndrome

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## Case Description

Patient: 27-year-old previously healthy African female

### Symptoms:

Five days of rigors, diarrhea, diffuse maculopapular rash, and oliguria.

### Physical exam:

Fatigued, ill-appearing, tachycardic, abdomen diffusely tender, maculopapular rash on the medial sections of the extremities.

### Vitals:

BP 84/52 | HR 111 | Temp 36.7 °C (98 °F) (Oral) | RR 27 | SpO2 97%

### Labs:

Absolute lymphocytes 420 cells/uL, creatinine 5.6 mg/dL, troponin I 0.43 ng/mL

Inflammatory markers: ESR 33 mm/hr, CRP 344 mg/L, D-dimer 2818 ng/mL, ferritin 1082 ng/mL

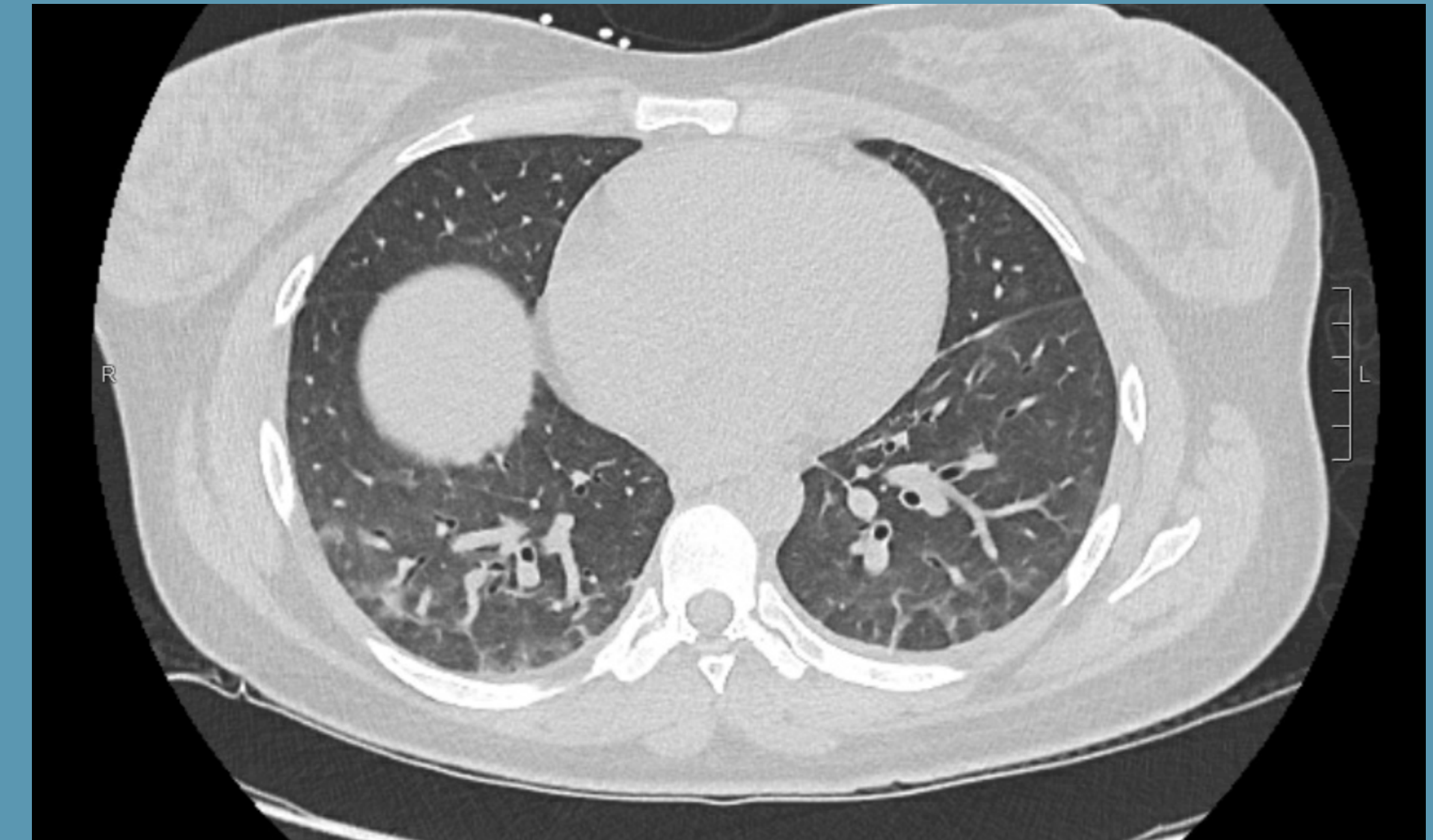
## Data

### COVID testing:

- Three consecutive COVID nasal swab PCR tests were collected over a three-day period and returned negative.
- Subsequent antibody testing did return grossly positive for COVID IgG 11 days after the start of her symptoms.

### Imaging:

- Echocardiogram showed mild to moderate global hypokinesis, left ventricular ejection fraction 40-45%, mildly dilated right ventricle, mild tricuspid regurgitation, and pericardial effusion.
- CT chest showed bilateral patchy ground-glass opacities and small bilateral pleural effusions.
- CT abdomen/pelvis with small ascites



## Treatment Course

- Patient was transferred to the COVID ICU in the setting of mixed hypovolemic, vasoplegic, and cardiogenic shock.
- She was given vasopressors, heparin for anticoagulation, and later stress dose corticosteroids.
- A course of empiric broad-spectrum antibiotics was completed despite culture data not elucidating a bacterial source.
- Testing for viral and bacterial infections, as well as rheumatologic and malignant causes was negative.
- The patient slowly improved with supportive care. Suspicion returned to COVID as other causes were eliminated.
- Remdesivir, tocilizumab, and convalescent plasma were not given as COVID testing had been negative while she was inpatient.
- Disposition: 7 days in the ICU and 13 days total in the hospital before discharging home.

## Key Points

- This case highlights that MIS can occur in adults.
- Further studies are needed to determine the following for MIS:
  - Pathophysiology
  - Prevalence (PCR positive or negative)
  - Accuracy of diagnostic criteria
  - Treatment (steroids, IL-6 inhibitors, etc.)
- We hope that this case will raise clinician awareness of MIS-A and, by doing so, impact outcomes.

## Multisystem Inflammatory Syndrome in U.S. Children and Adolescents (MIS-C)

NEJM article, 186 cases of MIS-C from 26 states in three months.

### MIS-C Diagnostic Criteria:

- Hospitalization
- < 21 years old
- Fever for > 24 hours
- Lab evidence of inflammation
- Evidence of SARS-CoV-2 Infection
- Multisystem organ involvement:
  - GI (92%)
  - Cardiovascular (80%)
  - Hematologic (76%)
  - Mucocutaneous (74%)
  - Respiratory (70%)

14/186 patients developed MIS-C an average of 25 days after COVID symptom onset.

### Treatment (No efficacy data):

- IVIg, steroids, IL-6 inhibitors (tocilizumab), anticoagulation

## Case Series of Multisystem Inflammatory Syndrome in Adults with SARS-CoV-2 Infection – UK and US, March-August 2020

CDC Case Series of 27 patients suspected to have MIS-A

### MIS-A Diagnostic Criteria:

- Hospitalization
- > 20 years old
- Lab evidence of inflammation
- Evidence of SARS-CoV-2 Infection within 12 weeks
- Absence of severe respiratory illness
- One or more severe extrapulmonary organ involvement:
  - GI
  - Cardiovascular
  - Hematologic
  - Mucocutaneous

Patients developed MIS-A an average of 2-5 weeks after COVID symptom onset. 8/27 had no preceding COVID symptoms.

### Treatment (No efficacy data):

- IVIg, steroids, IL-6 inhibitors (tocilizumab), anticoagulation

## References

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- Feldstein, L., Horwitz, R., Collins, J., & Newhams, M. (2020). Multisystem inflammatory syndrome in u.s. children and adolescents. *New England Journal of Medicine*, 383, 334-346. doi:10.1056/NEJMoa2021680
- Morris, S., Schwartz, N., Stogsdill, P., & Robinson, S. (2020). Case Series of Multisystem Inflammatory Syndrome in Adults Associated with SARS-CoV-2 Infection — United Kingdom and United States, March–August 2020. *Centers for Disease Control and Prevention MMWR*, 69(40), 1450-1456. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6940e1.htm>