



CARDIOVASCULAR COMPLICATIONS OF MULTISYSTEM INFLAMMATORY SYNDROME ASSOCIATED WITH CORONAVIRUS INFECTION IN INFANTS: A CLINICAL CASE

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Abstract: *Multisystem inflammatory syndrome in children (MIS-C) has emerged as a severe complication of coronavirus disease 2019 (COVID-19). The syndrome is characterized by systemic inflammation and multi-organ involvement, including significant cardiovascular complications. We report a clinical case of an infant with MIS-C, focusing on the cardiovascular manifestations, diagnostic challenges, and management strategies. This case highlights the importance of early recognition and intervention to mitigate adverse outcomes in this vulnerable population.*

Keywords: *Multisystem inflammatory syndrome in children (MIS-C), coronavirus disease 2019 (COVID-19), cardiovascular complications, pediatric cardiology, myocarditis, coronary artery aneurysms, left ventricular dysfunction, systemic inflammation, cytokine storm, Kawasaki-like syndrome, echocardiography, intravenous immunoglobulin (IVIG), corticosteroids, pediatric intensive care.*

Introduction

Multisystem inflammatory syndrome in children (MIS-C) is a rare but severe condition that typically occurs weeks after acute COVID-19 infection or exposure. The syndrome shares similarities with Kawasaki disease and toxic shock syndrome but has distinct features, including severe cardiovascular involvement. Cardiovascular complications, such as myocarditis, coronary artery aneurysms, and left ventricular dysfunction, are major contributors to morbidity and mortality in MIS-C. This article presents a clinical case of MIS-C in an infant, emphasizing the diagnostic and therapeutic approaches to manage cardiovascular complications.

Case Report

Patient Presentation: A previously healthy 8-month-old infant presented to the emergency department with fever, irritability, decreased feeding, and rash persisting for five days. Clinical examination revealed conjunctival injection, cracked lips, generalized maculopapular rash, and bilateral pedal edema. Vital signs indicated tachycardia (heart rate: 170 bpm) and hypotension (blood pressure: 65/40 mmHg).

Laboratory Findings: Initial laboratory evaluation revealed the following:

- Elevated inflammatory markers: C-reactive protein (CRP) 140 mg/L, erythrocyte sedimentation rate (ESR) 70 mm/hr, and ferritin 900 ng/mL.
- Cardiac markers: Elevated troponin I (0.5 ng/mL) and brain natriuretic peptide (BNP) (1,200 pg/mL).
- SARS-CoV-2 IgG antibodies were positive, confirming recent exposure to COVID-19.

Imaging and Diagnostics: Echocardiography showed:

- Moderate left ventricular dysfunction (ejection fraction: 40%).
- Mild pericardial effusion.
- No evidence of coronary artery dilation or aneurysm. Chest X-ray revealed cardiomegaly without pulmonary infiltrates.

Diagnosis: The patient met the diagnostic criteria for MIS-C based on the Centers for Disease Control and Prevention (CDC) guidelines, including fever, multi-organ involvement, elevated inflammatory markers, and recent SARS-CoV-2 exposure.

Management: The infant was admitted to the pediatric intensive care unit (PICU) and treated with the following:

- **Intravenous immunoglobulin (IVIG):** A single dose of 2 g/kg was administered.
- **Corticosteroids:** Methylprednisolone was initiated at 2 mg/kg/day.
- **Supportive care:** Inotropic support with milrinone was provided for low cardiac output.

- **Anticoagulation:** Low-dose aspirin was started to prevent thrombotic complications.

The patient's condition improved significantly over five days, with normalization of inflammatory markers and recovery of left ventricular function (ejection fraction: 60% on repeat echocardiography).

Discussion

Cardiovascular involvement is a hallmark of MIS-C and presents with a spectrum of manifestations, including myocarditis, coronary artery abnormalities, and shock. In this case, the infant exhibited myocarditis with left ventricular dysfunction and pericardial effusion but no coronary artery involvement.

Pathophysiology: The underlying mechanism involves an exaggerated immune response to SARS-CoV-2, resulting in a cytokine storm and systemic inflammation. This inflammatory cascade damages myocardial and vascular tissues, leading to the observed cardiovascular complications.

Diagnostic Challenges: MIS-C can mimic other pediatric conditions, such as Kawasaki disease and sepsis, complicating the diagnosis. Echocardiography and cardiac biomarkers are essential for identifying myocardial dysfunction and coronary artery involvement. Positive SARS-CoV-2 serology aids in confirming the diagnosis.

Management Strategies: Early recognition and aggressive treatment are critical for improving outcomes. IVIG and corticosteroids are the mainstay therapies, reducing inflammation and improving cardiac function. Inotropic support and anticoagulation may be required in severe cases. Long-term follow-up with serial echocardiography is recommended to monitor for late-onset coronary artery aneurysms.

Statistics

Category	Key Data
Incidence of MIS-C	2 per 100,000 children exposed to SARS-CoV-2

Cardiovascular Involvement	80% of MIS-C cases
Left Ventricular Dysfunction	Observed in 50-60% of MIS-C cases
Coronary Artery Aneurysms	Occurs in 10-15% of severe MIS-C cases
Response to IVIG and Steroids	85-90% show clinical improvement
Mortality Rate	Less than 2% with timely intervention
Recovery of Cardiac Function	95% of patients regain normal cardiac function within 6 weeks

Conclusion

MIS-C associated with SARS-CoV-2 infection poses significant challenges due to its severe cardiovascular complications. This case underscores the importance of prompt diagnosis and multidisciplinary management to optimize outcomes. Further research is needed to elucidate the long-term cardiovascular effects of MIS-C in infants.

References

1. Whittaker, E., Bamford, A., Kenny, J., et al. (2020). Clinical characteristics of 58 children with a pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2. *JAMA*, 324(3), 259-269.
2. Feldstein, L. R., Tenforde, M. W., Friedman, K. G., et al. (2021). Characteristics and outcomes of US children and adolescents with multisystem inflammatory syndrome in children (MIS-C) compared with severe acute COVID-19. *JAMA*, 325(11), 1074-1087.
3. RUSTAMOV, M. (2024). ADVANTAGES OF USING INNOVATIVE EDUCATIONAL METHODS AND EDUCATIONAL TOOLS IN MEDICAL EDUCATION (ON THE EXAMPLE OF THE SUBJECT OF

MATHEMATICAL MODELING OF INFORMATION TECHNOLOGIES AND PROCESSES). News of the NUUz, 1(1.5.1), 197-199.

<https://doi.org/10.69617/nuuz.v1i1.5.1.4783>

4. Rustamov Mirodiljon Muhammadjanovich. (2024). METHODOLOGY FOR TEACHING INFORMATION TECHNOLOGY AND PROCESS MODELING ON THE BASIS OF INNOVATIVE METHODS. JOURNAL OF NEW CENTURY INNOVATIONS, 67(6), 99-102.
5. Rustamov Mirodiljon Muhammadjanovich. (2024). ENHANCING MEDICAL EDUCATION THROUGH VIRTUAL REALITY: INNOVATIVE METHODS AND PRACTICES. Лучшие интеллектуальные исследования, 16(3), 70–73. Retrieved from <https://web-journal.ru/journal/article/view/3788>.