



Multispecialty Approaches to Treating MIS-C

A joint effort between GNYHA and the New York Region of Solutions for Patient Safety (SPS)
Presented in collaboration with the NYS Department of Health and the NYC Department of
Health and Mental Hygiene

GREATER NEW YORK HOSPITAL ASSOCIATION

*Over 100 years of helping hospitals deliver the
finest patient care in the most cost-effective way.*

Special Thanks



**Department
of Health**



Children's Hospitals'
Solutions for
Patient Safety
Every patient. Every day.

IVIG Webinar Tomorrow



Intravenous Immunoglobulin Supply Availability Webinar

June 4, 2020

2:00 PM - 3:00 PM EDT

The webinar will discuss the pre-COVID-19 and current supply landscape for IVIG, and review the existing structures used to manage the IVIG supply.

<https://www.gnyha.org/event/intravenous-immunoglobulin-supply-availability-webinar/>

A Message from the NYS Department of Health



Howard A. Zucker, M.D., J.D.
New York State Health Commissioner

MULTISYSTEM
INFLAMMATORY
SYNDROME IN
CHILDREN
IN NYC

Ellen H. Lee, MD

Medical Director

General Surveillance

Bureau of Communicable Disease Control

NYC Department of Health and Mental Hygiene

EARLY REPORTS OF MIS-C



27 April 2020

PICS Statement: Increased number of reported cases of novel presentation of multi-system inflammatory disease

COVID-19



Guidance: Paediatric multisystem inflammatory syndrome temporally associated with COVID-19

Most children are asymptomatic or exhibit mild symptoms from COVID-19 infection. However, in the last two months a small number of children have been identified who develop a significant systemic inflammatory response. All children have been diagnosed and managed appropriately along standard referral pathways. Affected children may require paediatric intensive care and input from paediatric infectious diseases, cardiology, and rheumatology.

NYC HEALTH DEPARTMENT RESPONSE TO MIS-C



2020 Health Alert #13: Pediatric Multi-System Inflammatory Syndrome Potentially Associated with COVID-19

- Fifteen cases compatible with multi-system inflammatory syndrome have been identified in children in New York City hospitals.
- Characterized by persistent fever and features of Kawasaki disease and/or toxic shock syndrome; abdominal symptoms common
- Cases may require intensive care unit admission for cardiac and/or respiratory support
- Polymerase chain reaction testing for SARS-CoV-2 may be positive or negative
- Early recognition and specialist referral are warranted
- Immediately report cases to the New York City Health Department
Line: 866-692-3641

May 4, 2020

Dear Colleagues,

A pediatric multi-system inflammatory syndrome (MIS-C) is also being observed among children elsewhere in the United States. Clinical features are not yet fully defined but have been noted to include features of Kawasaki disease and/or toxic shock syndrome, but have been noted to include features of Kawasaki disease and/or toxic shock syndrome. The full spectrum of disease is not yet known. Persistent fever, rash, and other symptoms (CRP, troponin, etc.) have been seen among affected children. Some children have been admitted to pediatric intensive care units and may require respiratory support. Only severe cases may have been reported.

The NYC Health Department contacted PICUs in Manhattan and Bronx on May 4, 2020, and identified 15 cases of MIS-C.



2020 Health Advisory #16: Updated Reporting Requirements for Multisystem Inflammatory Syndrome in Children Associated with COVID-19 (Formerly Pediatric Multisystem Inflammatory Syndrome)

- Maintain vigilance for Multisystem Inflammatory Syndrome in Children (MIS-C) and refer patients to specialty care promptly, including to critical care if warranted.
- Immediately report cases of possible MIS-C to the New York City Health Department's Provider Access Line: 866-692-3641.

May 18, 2020

Dear Colleagues,

The New York City Health Department requests your assistance investigating multisystem inflammatory syndrome in children (MIS-C) associated with COVID-19. This syndrome, previously referred to as pediatric multisystem inflammatory syndrome or PMIS, was first reported by the NYC Health Department on May 4 in [Health Alert #13](#). The Centers for Disease Control and Prevention issued [Health Alert 432](#) on May 14, naming the syndrome MIS-C and providing a case definition. As of May 17, 2020, 145 patients meeting criteria for suspected MIS-C have been reported in New York City. Patients ranged in age from 0-21 years. One death has been reported. The NYC Health Department is investigating each report to determine if the patient meets full criteria for MIS-C.

Please immediately report all cases of suspected MIS-C to the NYC Health Department by calling the Provider Access Line: 866-692-3641.

CDC CASE DEFINITION FOR MIS-C

Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C)

- An individual aged <21 years presenting with feverⁱ, laboratory evidence of inflammationⁱⁱ, and evidence of clinically severe illness requiring hospitalization, with multisystem (≥ 2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); **AND**
- No alternative plausible diagnoses; **AND**
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

ⁱFever $\geq 38.0^{\circ}\text{C}$ for ≥ 24 hours, or report of subjective fever lasting ≥ 24 hours

ⁱⁱIncluding, but not limited to, one or more of the following: an elevated C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), fibrinogen, procalcitonin, d-dimer, ferritin, lactic acid dehydrogenase (LDH), or interleukin 6 (IL-6), elevated neutrophils, reduced lymphocytes and low albumin

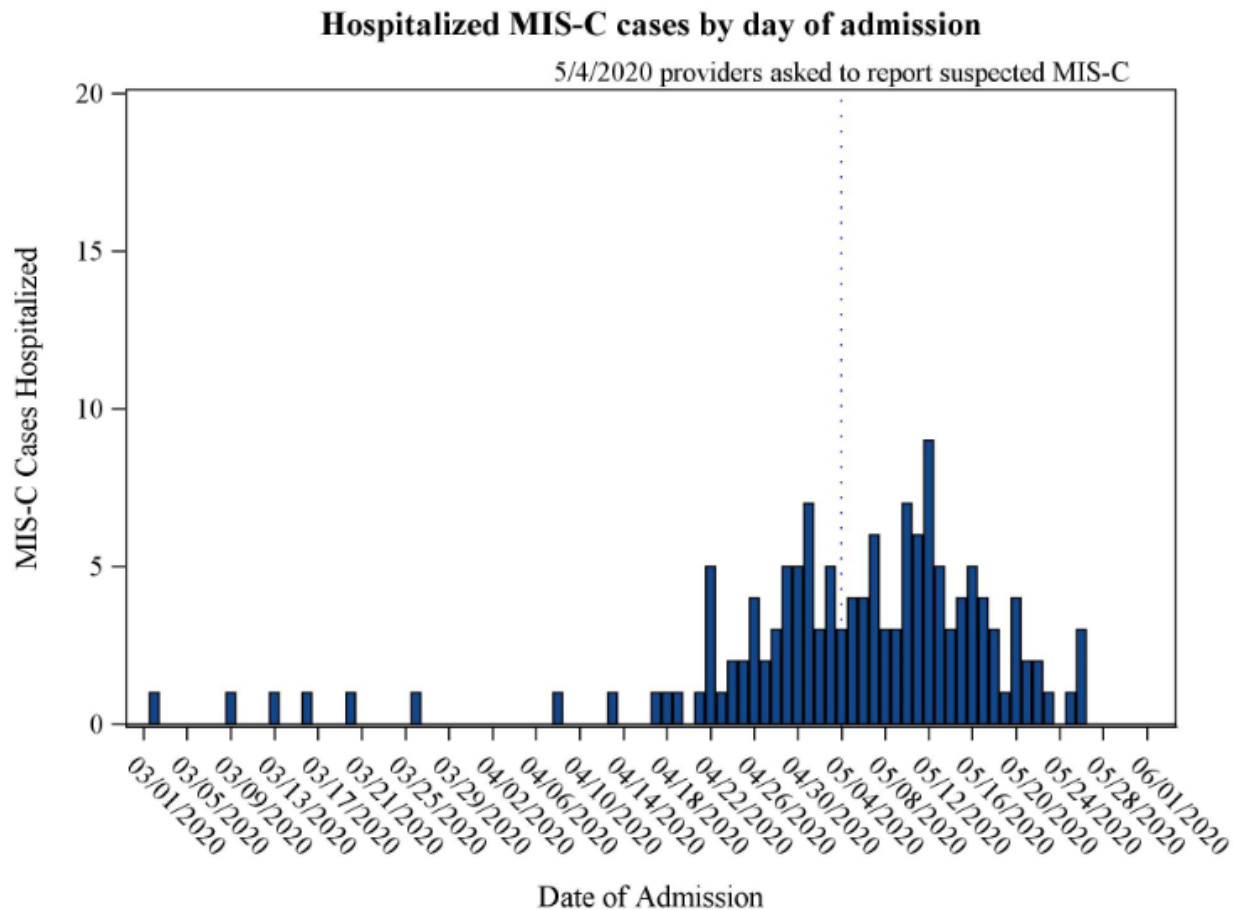
Additional comments

- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

MIS-C
REPORTS TO NYC
HEALTH
DEPARTMENT
(06/02/2020)

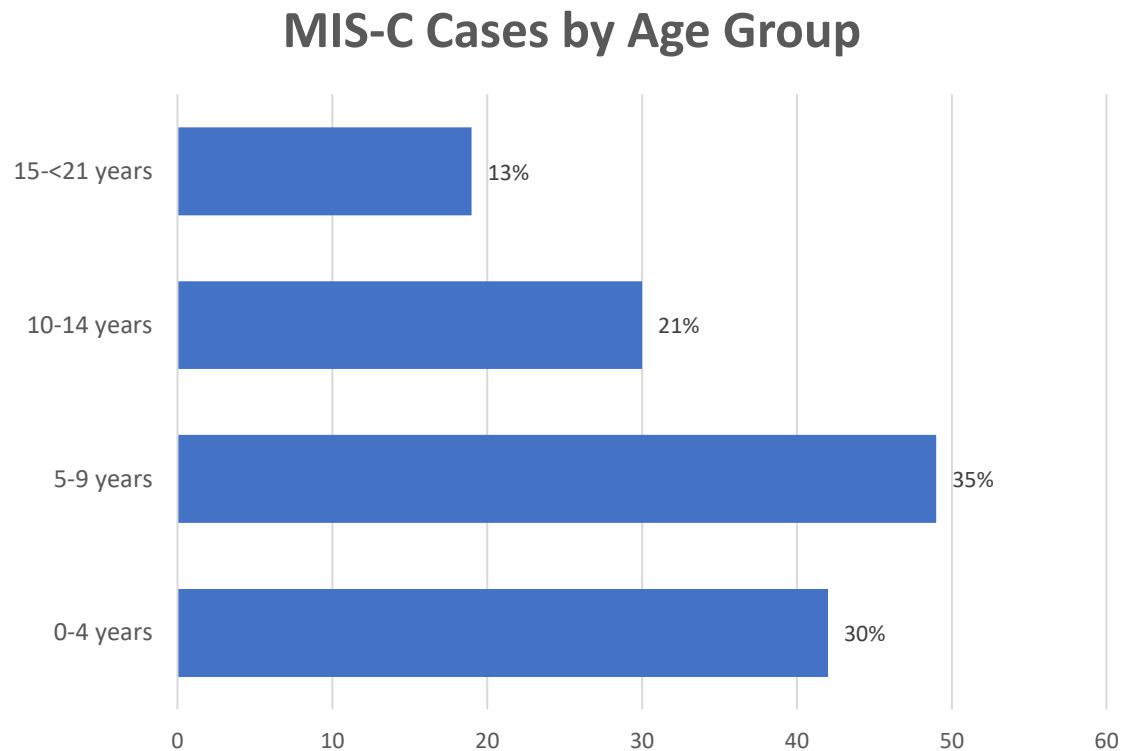
- NYC Health Department initiates case investigation upon receipt of report
- All data are preliminary and subject to change
- Counted as case if patient meets CDC MIS-C case definition
 - 220 reports of suspected MIS-C have been received
 - 141 have met the CDC case definition for MIS-C
 - 44 did not meet criteria
 - 35 still under investigation
- 1 death reported

MIS-C CASES BY HOSPITALIZATION DATE, NYC 06/02/20



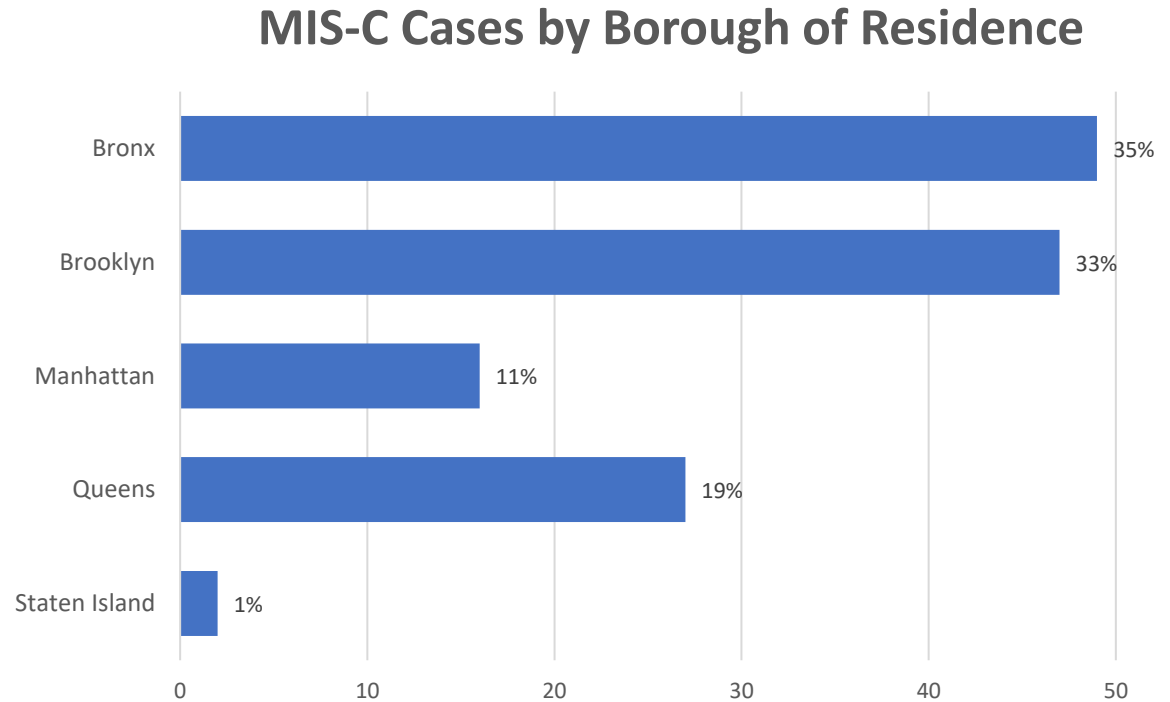
Data are preliminary and subject to change

MIS-C CASES BY AGE GROUP, NYC 06/02/20



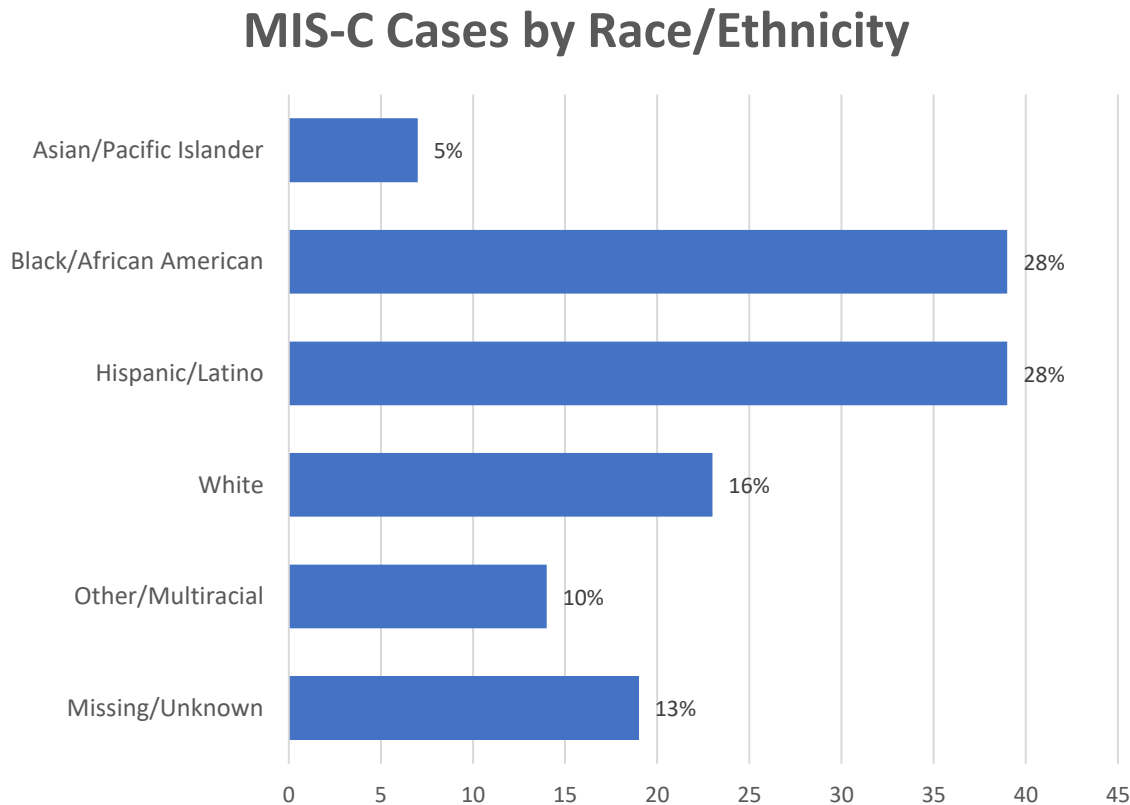
Data are preliminary and subject to change

MIS-C CASES BY BOROUGH, NYC 06/02/20



Data are preliminary and subject to change

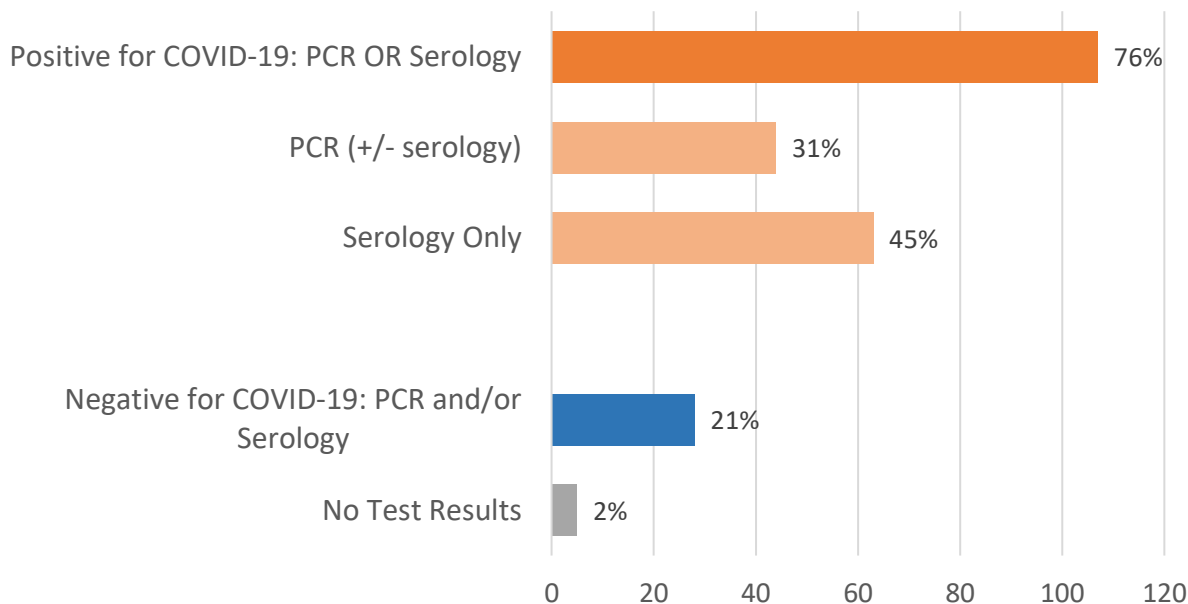
MIS-C CASES
BY
RACE/ETHNICITY,
NYC
06/02/20



Data are preliminary and subject to change

COVID-19 TEST RESULTS AMONG MIS-C CASES, NYC 06/02/20

MIS-C Cases and SARS-CoV-2 Results



Data are preliminary and subject to change

REPORTING MIS-C TO NYC HEALTH DEPARTMENT

- Call the Provider Access Line: **(866) 692-3641** to report any patient who meets criteria for MIS-C
- Report all suspected cases, regardless of laboratory evidence of SARS-CoV-2 infection
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection
- Reporting to NYC required by New York State Sanitary Code and NYC Health Code

NYC HEALTH
DEPARTMENT
MIS-C
REPORTING
REQUIREMENTS
(ALIGNED WITH NYS)

ANY INDIVIDUAL AGED <21 YEARS WHO MEETS CLINICAL + GENERAL LABORATORY CRITERIA AND DOES NOT HAVE AN ALTERNATE DIAGNOSIS

CLINICAL CRITERIA (ALL 3 REQUIRED):

1. ≥ 1 day of subjective or measured fever ($\geq 100.4^{\circ}\text{F}/38^{\circ}\text{C}$)
2. Hospitalization
3. Either:
 - ≥ 1 of the following:
 - Hypotension or shock (cardiogenic or vasogenic)
 - Features of severe cardiac illness (including myocarditis, pericarditis, or valvulitis, significantly elevated troponin/pro-BNP, or coronary artery abnormalities)
 - Other severe end-organ involvement including neurological or renal disease (excluding severe respiratory disease alone)

OR

- ≥ 2 of the following:
 - Maculopapular rash
 - Bilateral non-purulent conjunctivitis
 - Mucocutaneous inflammatory signs (mouth, hands, or feet)
 - Acute GI symptoms (diarrhea, vomiting, or abdominal pain)

NYC HEALTH
DEPARTMENT
MIS-C
REPORTING
REQUIREMENTS
(ALIGNED WITH NYS)

ANY INDIVIDUAL AGED <21 YEARS WHO MEETS CLINICAL + GENERAL LABORATORY CRITERIA AND DOES NOT HAVE AN ALTERNATE DIAGNOSIS

GENERAL LABORATORY CRITERIA:

≥ 2 of the following:

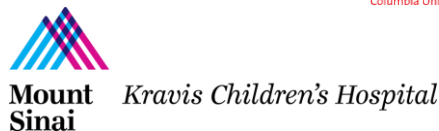
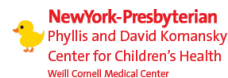
- Neutrophilia
- Lymphopenia
- Thrombocytopenia
- Hypoalbuminemia
- Elevated C-reactive protein (CRP)
- Elevated erythrocyte sedimentation rate (ESR)
- Elevated fibrinogen
- Elevated D-dimer
- Elevated ferritin
- Elevated lactic acid dehydrogenase
- Elevated interleukin 6 (IL-6)
- Elevated procalcitonin

NYC HEALTH DEPARTMENT COVID-19 RESOURCES

- Provider page: on.nyc.gov/covid19provider
- Data page: on.nyc.gov/covid19data
- Weekly webinars: Fridays, 2 PM (sign up on provider page)
- Dear Colleague COVID-19 newsletters (sign up for *City Health Information* subscription at: nyc.gov/health/register)
- NYC Health Alert Network (sign up at <https://www1.nyc.gov/site/doh/providers/resources/health-alert-network.page>)
- Provider Access Line: **866-692-3641**



Children's Hospitals'
Solutions for
Patient Safety
Every patient. Every day.



Today's SPS Organizing Team



Maria Lyn Quintos-Alagheband, MD, FAAP
NYU Winthrop Hospital
NYU Langone Health



Patricia Hametz, MD
Children's Hospital at
Montefiore
Montefiore Health System



Snezana Nena Osorio, MD, MS
Komansky Children's Hospital
New York-Presbyterian Hospital



Anu Subramony, MD, MBA
Cohen Children's Medical
Center
Northwell Health

Learning Goals



- At the end of the webinar, participants will:
 - Recognize the spectrum of presentations of COVID 19 -associated Multisystem Inflammatory Syndrome in Children (MIS-C), and how to differentiate from other disease entities
 - Identify the manifestations and complications of MIS-C
 - Understand the rationale for various treatment options for manifestations of the disease
 - Appreciate the prognosis and possible sequelae of MIS-C

Today's Panelists



□ **Karen Acker, MD**

- Assistant Professor of Clinical Pediatrics, Pediatric Infectious Diseases, and Hospital Epidemiologist at NewYork-Presbyterian/Weill Cornell Medical Center

□ **Suchitra Acharya, MD**

- Director of the Hemostasis and Thrombosis Center and Program Head of the Bleeding Disorders and Thrombosis Program at Cohen Children's Medical Center

□ **Dawn Wahezi, MD, MS**

- Chief of Pediatric Rheumatology and Director of the Pediatric Rheumatology Fellowship Program at the Children's Hospital at Montefiore

□ **Rachel Weller, MD**

- Assistant Professor of Pediatrics and Member of the MIS-C Inpatient/Outpatient Cardiac Consult Team at NewYork-Presbyterian/Morgan Stanley Children's Hospital

Case Study #1



- 24-month child presented to the Emergency Room with an acute onset of fever to 103 F for 3 days and mild abdominal pain. The child is active and playful, has normal intake.
- Physical examination normal without skin rashes or mucosal involvement
- Lab Results:
 - normal CBC
 - mildly elevated CRP 4mg/dl (Normal: <1)
 - ferritin 200 ng/dl (Normal: 25-200)
 - B type Natriuretic Peptide (BNP) 40 pg/ml (Normal: < 41).
 - Covid 19 (SARS-CoV-2) PCR negative and Covid 19 Serologies are pending
- Questions:
 - Can we discharge this child to home with close follow up?
 - He remains well at home. Does he need ECHO?

Case Study #2



- ❑ 8-year-old child is admitted to the floor with fever for 5 days, rash, abdominal pain and loose stools for one day.
- ❑ His vital signs are stable
- ❑ The patient does not meet criteria for Kawasaki Disease (KD) or atypical KD.
- ❑ Echo has normal function and no coronary artery dilation.
- ❑ Lab Results:
 - ❑ WBC is normal with mild lymphopenia ($2500/\text{mm}^3$) and thrombocytopenia ($100 \times 10^3 /\text{mcL}$)
 - ❑ BNP is 800 pg/ml with normal troponin
 - ❑ CRP is 15mg/dl
 - ❑ ferritin is 500ng/dl
 - ❑ D-dimers are at upper limit of normal.
- ❑ Questions:
 - ❑ Do we need to treat this child, or can we observe?
 - ❑ Patient eventually gets better and goes home, does this patient need follow up echo?
 - ❑ Who else should the patient follow up with?

Case Study #3



- 14 year old female (BMI 38) with history of fever for 5 days, rash, perilimbic conjunctival injection, nausea and vomiting
- Admitted to the PICU for hypotension on vasopressors
- Lab Results:
 - CRP 30 mg/dl
 - Ferritin 1000 ng/dl
 - BNP 1500 pg/ml
 - Respiratory Viral Panel neg
 - Procalcitonin 12 ng/ml
 - Fibrinogen 1059 mg/dl
 - D dimer 5024 mcg/ml
 - COVID PCR -, IgG +
 - Echo - normal anatomy, depressed LV function and prominent coronary arteries
 - Started on prophylactic enoxaparin (lovenox)
- Questions:
 - How should this patient be treated?
 - When do you expect findings to normalize (ECHO, Inflammatory markers, D-dimers)?
 - Should we continue anticoagulation at home? Which medication to use and for how long?



Type in “Questions” box

Contact GNYHA



Zeynep Sumer-King

VP, Regulatory and
Professional Affairs

zsumer@gnyha.org

Durward Rackleff

Sr. Director, Quality &
Patient Safety

drackleff@gnyha.org