Approach to Diagnosis and Management of Children with Suspected MIS-C

Team assessment:
- H&P
- COVID EXPOSURE AND DX
- DIFFERENTIAL DX
- EVIDENCE OF SHOCK OR SEPSIS

POSSIBLE MIS-C WITHOUT SHOCK
- fever >100.4 for 4+ days
- 2+ clinical/historical features
- Evaluate for Kawasaki Disease

Testing as clinically indicated:
- CBC, CMP, ESR, CRP, COVID PCR
- and serology
- Consider Blood culture

Lab, Exam and VS measuring:
- Also Tolerating PO
- PCP if in 24-48 hr
- if reasessing Discharge Home

If Lab Results show:
- CRP>3
- ESR>39
- Lymphopenia <1K
- Pt>150K
- Na<135

If unable to discharge admit and consider:
- Lab, Exam and VS measuring
- Also Tolerating PO
- PCP if in 24-48 hr
- if reasessing Discharge Home

Additional testing:
- Troponin
- EKG
- CXR
- ECHO (urgent vs. emergent)
- Ferritin, PT/TT/fibrinogen
- consider Cultures and antibiotics

Admit and Consult Cardiology
- Rheumatology
- Infectious Disease

Examples of infections in this category:
- sepsis: vancomycin + ceftriaxone*
- toxic shock syndrome: vancomycin + ceftriaxone + clindamycin
- Rickettsial infection: doxycycline

*these are typical empiric regimens. Some patients may require broader therapy or different empiric regimen.

Clinical/Historical Features
- Rash
- Polymorphic, maculopapular, petechial, NOT vesicular

GI Symptoms
- Diarrhea, abdominal pain, vomiting

Extremity changes
- Edema of the hands and feet in acute phase

Oral Mucosal Changes
- Erythema and cracking of lips, strawberry tongue, and/or erythema of oral and pharyngeal mucosa

Conjunctivitis
- Bilateral bulbar conjunctival injection without exudate

Lymphadenopathy
- Cervical > 1.5 cm, unilateral

Neurologic Symptoms
- Headache, irritability, lethargy, AMS

Epidemiologic Link to COVID
- Patient with history of COVID disease or close contact with known
- Positive COVID case in past 4 weeks, or person placed in quarantine

References:
The following initial testing is recommended in concert with Infectious Diseases, Cardiology and Rheumatology consultations and symptom presentation:

Labs:
- SARS-CoV-2 PCR and serology for IgG
- CBC, CMP, U/A, UCx, Blood Cx
- ESR/CRP, ferritin, troponin, PT/PTT/fibrinogen
- Evaluation for other sources of infection:
  - RPP (e.g. adenovirus)
  - If history suggests increased risk of tick bites, Ehrlichia blood PCR/RMSF serology panel
  - If history and exam suggestive, rapid strep and culture (e.g. scarlet fever)
  - Consider Monospot, EBV serology panel, CMV IgM/IgG
- LP if indicated clinically

- The below labs should be considered for patients with suspected MIS-C. Not all of these labs will be necessary for all patients. Please use your clinical judgment based on patient symptoms and planned management when ordering, bearing in mind the turn-around time for the lab:
  - BNP
  - IL-6
  - D-dimer
  - Procalcitonin
  - Lactate
  - Triglycerides

Other Diagnostic Studies/Imaging:
- EKG
- CXR
- ECHO (discuss with cardiology emergent vs urgent ECHO)

Fluids/Treatment:
- Often fluid refractory, consider clinical cardiac state when determining volume of fluids
- Epinephrine or norepinephrine for hemodynamic support
- IVIG and aspirin if meeting criteria for Kawasaki Disease or incomplete Kawasaki Disease.
  - Otherwise, for those MIS-C patients with signs of possible cardiac involvement, including:
    - unexplained persistent tachycardia
    - ECG abnormalities suggesting carditis
    - elevated troponin
    - echo changes (whether it be abnormal function or pathologic valve regurgitation)
    - patients with clinical findings of CHF or poor cardiac output

IVIG should be considered due to initial reports indicating its potential role in improving cardiac function, as well as potentially mitigating further development of coronary vasculitis. Risks and benefits should be considered for individual patients based on the overall clinical picture. This decision should be made in consultation with cardiology and primary attending.

If IVIG is to be administered, the prescribing practitioner and primary team should be aware of the more common adverse effects as well as the less common, but more serious adverse effects as they are commonly unrecognized in the setting of critical illness. The most common adverse effects occur soon after infusion and can include headache, flushing, chills, myalgia, wheezing, tachycardia, lower back pain, nausea, and hypotension. The serious adverse effects include hemolysis, anaphylaxis, and aseptic meningitis that may be delayed or shortly after beginning the infusion. A full list of potential adverse effects can be found here for your reference (IVIG ADEs).

- Broad spectrum antibiotics for patients meeting sepsis criteria: vancomycin, ceftriaxone; add clindamycin to antibiotic regimen if concern for toxic shock
- Consider, based on patient symptoms and in discussion with Cardiology, Rheumatology and Infectious Diseases, further treatment may include:
  - Lovenox (enoxaparin) or aspirin
  - Anakinra
  - Solumedrol/Decadron/Steroid