Performance of the Brighton Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C) Among a Large Single Center Cohort

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Background

- MIS-C is a rare, potentially life-threatening hyperinflammatory condition that follows 4 to 6 weeks after SARS-CoV-2 infection.
- The clinical features of MIS-C overlap with numerous other inflammatory conditions:
  - Kawasaki Disease
  - Toxic Shock Syndrome
  - Viral Myocarditis
  - Macrophage Activation Syndrome
- MIS-C is an adverse event of special interest following immunization.
- It is not yet clear which patients are at risk for MIS-C following SARS-CoV-2 vaccination.

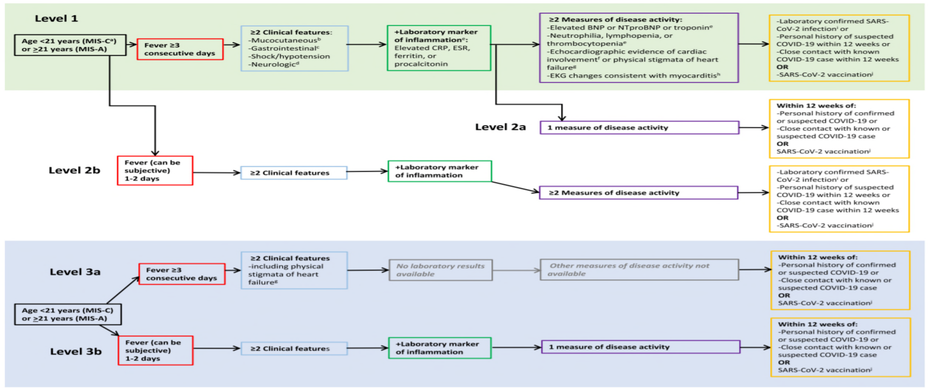
Aim

Determine the performance of the Brighton Collaboration (BC) MIS-C case definition among a large, single-center MIS-C cohort.

Methods

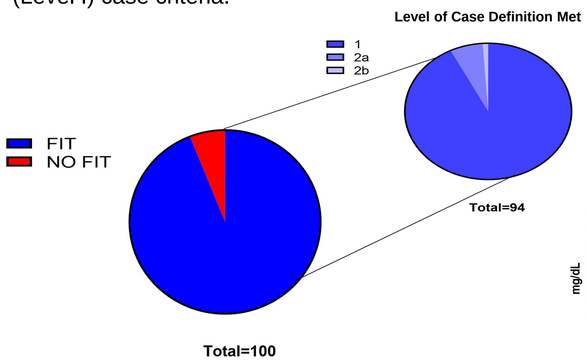
- Retrospective review.
- First 100 MIS-C cases at Texas Children's Hospital, between May 2020 and February 2021.
- All cases met the Centers for Disease Control and Prevention (CDC) case definition[1].
- Data on age, presentation, laboratory results and cardiac studies were collected and used to determine cases that fulfilled the BC case definition for MIS-C.

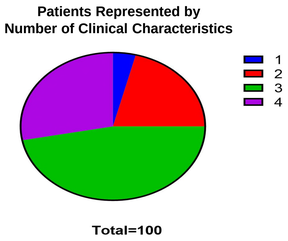
Brighton Collaboration Case Definition[2]

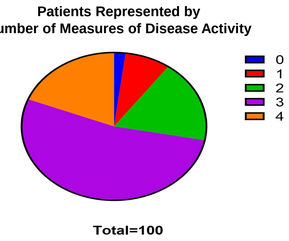


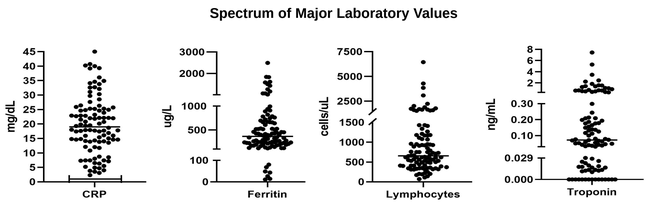
Results

Among the first 100 cases of MIS-C, 94 cases fulfilled the BC case definition for MIS-C. Of the 94 patients that met the BC definition, 87 (93%) met definite (Level I) case criteria.









Demographic Table

Table 1. Clinical and Laboratory Characteristics of the Patients

Characteristic	
Age, median (IQR), years	8 (4 - 13)
Duration of Fever, median (IQR), days	7 (5 - 8)
Positivity of SARS-CoV-2 PCR, no./total no.	56/100
Positivity of SARS-CoV-2 Antibody, no./total no.	100/100
IgG Positive	58/100
IgG and IgM Positive	36/100
Clinical Features at Presentation, no./total no.	
Mucocutaneous	82/100
Gastrointestinal	92/100
Shock or Hypotension	78/100
Neurologic	47/100
Laboratory Markers, no./total no. (%)	
Elevated C-reactive Protein	100/100
Elevated Erythrocyte Sedimentation Rate	55/61 (90)
Elevated Ferritin	93/100
Elevated Procalcitonin	66/99 (67)
Elevated BNP or NT-Pro-BNP	79/100
Elevated Troponin	67/100
Lymphopenia	84/100
Neutrophilia	77/100
Thrombocytopenia, no./total no.	57/100
Abnormal Electrocardiogram, no./total no.	21/100
Abnormal Echocardiogram, no./total no.	79/100

Conclusions

- The original MIS-C case definitions were created for surveillance.
- Modifications based on new knowledge will allow for more precise diagnosis.
- The BC case definition performed well at our institution and should be adapted to distinguish MIS-C from other inflammatory conditions or post-vaccine events.
- Future studies need to be designed to uncover correlations between clinical presentations and disease severity.

References

1. Centers for Disease Control and Prevention. Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with Coronavirus Disease 2019 (COVID-19). https://emergency.cdc.gov/han/2020/han00432.asp (2020).
2. Vogel, T. P. *et al.* Multisystem inflammatory syndrome in children and adults (MIS-C/A): Case definition & guidelines for data collection, analysis, and presentation of immunization safety data. *Vaccine* **39**, 3037–3049 (2021).