Cardiac Biomarkers Differentiate Kawasaki Disease from Multisystem Inflammatory Syndrome in Children Associated with COVID-19

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Research Abstract Title: Cardiac Biomarkers Differentiate Kawasaki Disease from Multisystem Inflammatory Syndrome in Children Associated with COVID-19

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Multi-center study supported by the International Kawasaki Disease Registry (IKDR). The IKDR Data Coordinating Centre (DCC) is located at the Hospital for Sick Children in Toronto, Canada and maintains local research ethics board approval. All participating sites have data-sharing agreements in place with the DCC and obtain and maintain local institutional review board's approval for their site's participation.

Describe role of Submitting/Presenting Trainee in this project (limit 150 words):
Primary author

Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words

Background:
Kawasaki disease (KD) and Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-19 show considerable clinical overlap. The goal of this study was to determine if cardiac biomarkers can differentiate KD from MIS-C.

Objectives/Goal:
The goal of this study was to determine if cardiac biomarkers differentiate KD from MIS-C.

Methods/Design:
The International Kawasaki Disease Registry enrolled (n=2903) contemporaneous KD and MIS-C patients <18 years of age from 42 sites in 8 countries from January 1st, 2020, through June 30th, 2022. The study population was confined to KD patients meeting American Heart Association KD criteria with no prior COVID-19 infection and MIS-C patients meeting Centers for Disease Control and Prevention criteria with confirmed evidence of prior COVID-19 infection. Included patients had

at least one measurement of amino-terminal prohormone brain natriuretic peptide (NTproBNP) or cardiac troponin I (TnI), and echocardiographic data (n=118 KD, 946 MIS-C). KD and MIS-C groups were compared, and regression analyses used to determine associations between biomarker levels, diagnosis, and cardiac involvement.

Results:
MIS-C patients were older, presented with fewer KD clinical features, more frequent shock, respiratory support and inotrope requirement, systolic dysfunction, and intensive care unit (ICU) admission. After adjusting for significant covariates, multivariable regression analysis showed that both higher NTproBNP and TnI were associated with MIS-C versus KD. Receiver operating curves for diagnosis showed that baseline TnI level greater than >10 ug/L predicted MIS-C versus KD with a sensitivity of 58% and specificity of 77%, with TnI >20 ug/L 44% and 89%, respectively. Baseline NTproBNP >500 ng/L predicted MIS-C with a sensitivity of 74% and specificity of 54%, >1000 ng/L 61% and 72%, and >1500 ng/L 56% and 77%. Higher biomarker levels were associated with shock at presentation and ICU admission, and higher NTproBNP was associated with longer length of hospital stay. Lower left ventricular ejection fraction, more pronounced for MIS-C, was associated with higher biomarker levels. Increased likelihood and higher magnitude of coronary artery involvement, greater for KD, were not associated with either cardiac biomarker.

Conclusions:
Cardiac biomarkers are helpful in differentiating KD from MIS-C and may be clinically prognostic. Higher NTproBNP and TnI levels are predictive of MIS-C versus KD.