

SARS-CoV-2: A Trigger for Kawasaki Disease or a New Syndrome?

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The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously known as novel coronavirus which emerged from China in late 2019, has a broad spectrum of multisystemic manifestations, which range from respiratory, neurologic, cardiac to gastrointestinal. Its mode of transmission is essentially through respiratory droplets. SARS-CoV-2 has a propensity to cause hyperinflammation. The patients observed with severe SARS-CoV-2 had cytokines in the range of cytokine release syndrome showing increased levels of interleukin-6, interleukin-7, tumor necrosis factors (TNF), and inflammatory chemokines which showed dysregulated activation of mononuclear phagocytes leading to hyperinflammation.¹ Previously, children younger than 18 years made up only 1.7% of national cases in the United States of America (USA), whereas 2% of a large cohort study in the United Kingdom (UK).²

However, recently, there have been a handful of cases described in the UK and USA.^{3,4} A study conducted by Riphagen et al included 8 pediatric patients presenting with features resembling those of Kawasaki disease, of which, one 14-year-old patient passed away.³ Kawasaki disease is a medium vessel vasculitis primarily affecting children. It has a constellation of features including fever, conjunctivitis, rash, lymphadenopathy, mucosal changes, and edema or erythema of the extremities. There are no specific tests to diagnose Kawasaki disease and it is mainly diagnosed clinically after ruling out other diseases and ordering relevant investigations.

These affected children presented with fever, conjunctivitis, rash and a few other atypical features such as abdominal pain, diarrhea, and vomiting. Of these 8 affected children, 2 children tested positive for SARS-CoV-2, 3 children had confirmed exposure to SARS-CoV-2, 1 child tested positive for adenovirus, and the remaining 2 tested negative and neither had any exposure.³ There was significant cardiac involvement, with

ventricular dysfunction and dilated coronary arteries, similarly as seen in Kawasaki disease.^{3,5} Most of the children had no major respiratory involvement, however they required mechanical ventilation for cardiac stabilization. Some of these children required inotropic support as well. They were treated with intravenous immunoglobulins and aspirin and a few needed extra anti-inflammatory medications and were given steroids.^{2,3}

The underlying etiology of Kawasaki disease is not known, but an infectious trigger has been suggested.⁶ These cases have now been identified as Multisystem Inflammatory Syndrome in children (MIS-C) associated with coronavirus disease 2019. According to the Centers for Disease Control (CDC), the diagnosis of MIS-C requires the fulfilment of 4 criteria which include; age lesser than 21 years, clinical presentation consistent with MIS-C (fever, multisystem involvement, laboratory evidence of inflammation, and requiring hospitalization), recent/current SARS-CoV-2 infection or exposure and when there are no alternative diagnoses. Patients who meet these criteria and also fulfil full or partial criteria for Kawasaki disease should be considered to have MIS-C.⁷ Younger children with MIS-C tend to present with Kawasaki like features, whereas older children have a presentation akin to toxic shock syndrome.⁸ Up till 30th October 2020, there have been 1163 confirmed cases of MIS-C and 20 related deaths in USA.⁹ Pediatricians throughout the world should be cautioned to be on the lookout for such cases to avoid missed diagnoses and to ensure timely treatment. It is advisable if pediatricians wear personal protective equipment at all

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times especially in the outpatient department, to avoid being exposed to the virus, given the myriad of different presentations. Additionally, to avoid overburdening of healthcare resources available, rapid measures such as establishing new pediatric intensive care units (PICUs) to prevent more deaths from happening, especially in this age group. Considering the rising burden of the virus on children in the form of MIS-C, more research and trials need to be conducted to further understand this syndrome in context of SARS-CoV-2.

Author Contributions

ARK: contributed to conception and design; contributed to acquisition; drafted manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

MOF: contributed to design; contributed to acquisition; drafted manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

RKO: contributed to design; contributed to acquisition; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.



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Supplemental Material

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