

Paediatric multisystem inflammatory syndrome and COVID-19: another novel syndrome?

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To the Editor—Children and infants initially appeared to be largely spared from the coronavirus disease 2019 (COVID-19) pandemic. However, the United Kingdom and United States have recently reported an apparent rise in the number of children presenting with multisystem inflammatory disease, some of whom also tested positive for COVID-19.¹

A multisystem inflammatory syndrome in children potentially associated with COVID-19 has been reported, with the following suggested definition: persistent fever, inflammation, evidence of single or multi-organ dysfunction; may fulfil full or partial criteria for Kawasaki disease; severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) polymerase chain reaction testing maybe positive or negative and other microbial causes excluded.²

About 50% of these patients have no microbiological evidence of COVID-19 infection, which fits into one of the hypothetical scenarios in our epidemiological analysis based on early data from the United Kingdom, suggesting a statistically significant correlation between COVID-19 and Kawasaki disease (P=0.0048) [Table].^{3,4} The pathophysiology of COVID-19 is likely to be a hyperinflammatory process of a massive cytokine storm; however, this clinical presentation can also be vasculitic in nature as there is evidence of SARS-CoV leading to vasculitis.^{4,5} This apparent link could also be due to the similarities in clinical presentation between COVID-19 and other sepsis syndromes including systemic inflammatory response syndrome, severe acute respiratory syndrome, toxic shock syndrome, Kawasaki disease

shock syndrome, and multi-organ dysfunction syndrome.

Although this phenomenon is reported in Western countries, the majority of cases are non-Caucasians.⁶ As the incidence of Kawasaki disease is up to 10 times higher in Asian than in Western populations, it is inconceivable that this phenomenon could only be observed in Western countries, unless there is an underlying genetic, environment predisposition, presentation of a new variant of the SARS-CoV-2 virus, or misinterpretation of data.³

We postulate that SARS-CoV-2 may just happen to be one of the many respiratory viruses that can cause a multisystem inflammatory syndrome in children. The ‘novel phenomenon’ is in fact septic or toxic shock syndrome associated with viral triggered inflammation, potentially attributed to a new variant of SARS-CoV-2. However, we shall remain sceptical before any definitive conclusions can be drawn. Meanwhile, we caution the loose coining of too many confusing abbreviations or syndromes associated with SARS-CoV diseases, such as SARS, MERS (Middle East respiratory syndrome), COVID-19, MIS-C (multisystem inflammatory syndrome in children), PIMS/PIMS-TS (paediatric inflammatory multisystem syndrome), COVID toe syndrome, and COVID skin syndrome.⁷

Author contributions

All authors contributed to the drafting of the letter and critical revision for important intellectual content. All authors approved the final version for publication and take responsibility for its accuracy and integrity.

TABLE. Statistical models for KD in paediatric patients with COVID-19.^{3,4}

Assumptions	OR (95% CI) for KD	P value
1523 Paediatric cases of COVID-19 in the UK are concurrent with 12 KD cases KD prevalence is 7 in 100 000 children in the UK Of 12 KD cases, 6 cases are COVID-19 positive and 6 are COVID-19 negative	5.64 (1.5-21.1)	0.0048*
8 Children are COVID-19-positive; 4 are COVID-19-negative	11.24 (3.01-51.10)	0.000077*
5 Children are COVID-19 positive; 7 are COVID-19-negative	4.02 (1.00-14.72)	0.025*
4 Children are COVID-19 positive; 8 are COVID-19-negative	2.81 (0.62-10.51)	0.09
Under-reporting of COVID-19 in the UK, and paediatric cases of 3000	2.85 (0.76-10.69)	0.09
3000 COVID-19 cases, but in the 12 KD cases, 8 are COVID-19 positive and 4 are COVID-19 negative	5.71 (1.53-25.92)	0.0036*

Abbreviations: 95% CI = 95% confidence interval; COVID-19 = coronavirus disease 2019; KD = Kawasaki disease; OR = odds ratio

* Fisher exact test; P<0.05 is significant

Conflicts of interest

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