Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of the Formosan Medical Association xxx (xxxx) xxx

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.jfma-online.com

Correspondence

The novel coronavirus (COVID-19) and the risk of Kawasaki disease in children

The novel coronavirus disease (COVID-19) has been identified as a pandemic by the World Health Organization (WHO) after 11th of March, 2020. Typical symptoms like dry cough, sore throat, fatigue and low-grade fever as well as atypical symptoms like cerebral hemorrhage and infarction have been reported in COVID-19 patients. As data about the involvement of adults are quite abundant, the data about the children getting this disease are rare. COVID-19 is supposed to affect children less than adults and children make 1–5% of the cases of the COVID-19. Compared to the adults, children get milder disease and the mortality among them are not high.[1] As there are not enough studies on COVID-19 in children, presentations of the symptoms in children are quite unknown.

Kawasaki disease (KD) is an acute systemic febrile disease that mostly affects children that are less than 5 years of age. Cough, vomiting, sterile pyuria and diarrhea is very common in KD patients. The exact etiology of KD is not fully described, but the infectious disease, especially the ones that are caused by the respiratory viruses, such enteroviruses, adenoviruses, rhinoviruses and coronaviruses have been reported as the predisposing factors in KD. As the prevalence of KD in Asian countries are more than western countries, especial attention is needed in the occurrence of this disease in the time of viral pandemics in Asian countries.[2]

After some studies reported KD in COVID-19 patients, the public attention has been drawn to this disease and whether KD can be considered as the presentation feature of COVID-19 in children. In a study in Italy, Verdoni et al.[3] divided all the patients who were diagnosed with a Kawasaki-like disease in the past 5 years to two groups. Group 1 were the patients with Kawasaki-like disease before the beginning of the COVID-19 epidemics and group 2 were the patients with the same presentation after the epidemics. They found 30-fold increase in the Kawasaki-like disease after the COVID-19 epidemics. They also found out that more severe cases have been found after the COVID-19 outbreak and KD patients during this epidemic were older than before. These children had more signs of cardiac involvement as well as macrophage activation syndrome features. Thus, the concluded that COVID-19 epidemic is associated with severe cases of KD.

Rivera-Figueroa et al.[4] reported the occurrence of KD in a 5-year old child with positive COVID-19. Although the patient had been transferred to the pediatric intensive care unit due to hypotension, after intravenous immunoglobulin (IVIG) therapy the patient finally recovered and discharged from the hospital after 6 days of stay. In another report, Jones et al.[5] reported KD as the first presentation in a 6 month old patient who was fully immunized and previously healthy. This patient also has been discharged after receiving IVIG and high-dose aspirin.

Although studies about KD and COVID-19 are rare, and they cannot infer a causality link between COVID-19 and KD, more studies can be suggested on this field. But due to the importance of KD presentation in the children and the fact that delays in diagnosis and referral contributes significantly to the mortality in KD cases, especial attention shall be drawn to the cases with Kawasaki-like symptoms referring to the hospitals and clinics during the viral epidemics like COVID-19.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

References

1. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults [Internet]. *Acta Paediatr* 2020 Jun 1;**109**(6):1088–95. Available from: http://www.10.1111/apa.15270.
2. Chang L-Y, Lu C-Y, Shao P-L, Lee P-I, Lin M-T, Fan T-Y, et al. Viral infections associated with Kawasaki disease [Internet] *J Formos Med Assoc* 2014;**113**(3):148–54. Available from: http://www.sciencedirect.com/science/article/pii/S0929664614000035.
3. Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M, et al. An outbreak of severe Kawasaki-like disease at the Italian

https://doi.org/10.1016/j.jfma.2020.05.030

Please cite this article as: Alizargar J, The novel coronavirus (COVID-19) and the risk of Kawasaki disease in children, Journal of the Formosan Medical Association, https://doi.org/10.1016/j.jfma.2020.05.030

epicentre of the SARS-CoV-2 epidemic: an observational cohort study [Internet] *Lancet* 2020. Available from: http://www.sciencedirect.com/science/article/pii/S014067362031103X [In press].
4. Rivera-Figueroa EI, Santos R, Simpson S, Garg P. *Incomplete Kawasaki disease in a child with Covid-19*. Indian Pediatr; 2020 May.
5. Jones VG, Mills M, Suarez D, Hogan CA, Yeh D, Bradley Segal J, et al. COVID-19 and Kawasaki disease: novel virus and novel case. *Hosp Pediatr* 2020 Apr [In press].

Javad Alizargar
Research Center for Healthcare Industry Innovation, National Taipei University of Nursing and Health Sciences, Taipei City 112, Taiwan

E-mail address: jaz.tmu@gmail.com

14 May 2020

Please cite this article as: Alizargar J, The novel coronavirus (COVID-19) and the risk of Kawasaki disease in children, Journal of the Formosan Medical Association, https://doi.org/10.1016/j.jfma.2020.05.030