

Case Report

COVID-19 and Kawasaki Disease in a 4-year-old Child: A Case Report



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ABSTRACT

Background and Aim: Although Kawasaki disease syndromes have previously been linked to other viral infections, patients with higher levels of pro-inflammatory markers than different cohorts reflect a particularly strong immunological reaction to SARS-CoV-2. This article examines a comorbidity between Kawasaki and COVID-19 in a 4-year-old child who complained of fever.

Case Report: We describe the case of a 4-year-old child admitted and diagnosed with classic Kawasaki disease, who also screened positive for COVID-19 in the setting of fever and minimal respiratory symptoms. The patient has been treated per treatment guidelines with intravenous immunoglobulin and high-dose aspirin and subsequently effervesced with a resolution of her clinical symptoms, with instruction to quarantine at home for 14 days from the date of her positive test results for COVID-19.

Conclusion: Considering that the results of this case report are essential for other pediatric care professionals with COVID-19, the understanding of clinical demonstration patterns continues to evolve. More information on the clinical course of children with COVID-19, especially in cases where the disease coincides with the Kawasaki disease, is necessary.

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Introduction

In early December 2019, several patients with unknown pneumonia were reported in Wuhan, China, in the center of Hubei Province [1]. The rapid spread of the coronavirus 2019 (COVID-19) caused by acute respiratory coronavirus 2 syndrome (SARS-CoV-2) has led to a global epidemic that has affected almost every person of all ages. However, only 2% of the cases described were in patients under 20 years of age, and the disease is less common in children than adults [2, 3]. Based on the results of an epidemiological study, 731 COVID-19 cases were confirmed in the pediatric population, with more than 90% of patients having mild to moderate symptoms [4]. In the pandemic conditions of the new virus, patients who complain of fever, COVID-19 is described as one of the possible diagnoses so that other fever-related illnesses may be diagnosed later [5, 6]. Kawasaki disease is an acute inflammatory disease of the blood vessels that affects small and medium-sized arteries in patients, especially children under 5 years of age [7, 8]. This disease is characterized by fever, followed by vasodilation and inflammation of the mucous present [9]. The diagnosis of this disease and treatment with intravenous immunoglobulin (IVIG) prevents coronary vascular aneurysms, and without timely treatment in 25% of children with Kawasaki disease, this complication occurs [10, 11]. Accordingly, early diagnosis and treatment of this disease are essential in the COVID-19 epidemic. This article examines a comorbidity between Kawasaki and COVID-19 in a 4-year-old child who complained of fever.

Case Presentation

A 4-year-old and 4-month-old girl had no underlying disease and had a fever and abdominal pain for the previous six days. During this time, the patient's fever had an intermittent pattern and was relatively improved with acetaminophen; however, the patient again had a fever that lasted for two consecutive nights before the visit. During this time, the patient did not have a cough or cold or contact with someone suspected of having COVID-19. Abdominal pain in the periumbilical and hypogastric areas was cramped and was not accompanied by diarrhea, nausea, or vomiting. It was also not associated with eating or defecating. Also, the patient had no urination for 5 days and had to see a doctor twice. She was treated on an outpatient basis after receiving cefixime and cotrimoxazole but did not recover. For the past 4 days, she has been suffering from sprained ankles on her arms, the front and

back of her abdomen, chest, and face. She had no drug or food allergies and no family history of the diseases. She was born at 38 weeks with a weight of 2800 g and did not have an evolutionary disorder. The vaccination of the patient was also done according to the national plan. The initial vital symptoms were as follows: Blood pressure=80/45, pulse rate=125, respiration rate=30, temperature=38.2, body weight=15 kg.

The patient had non-purulent bilateral conjunctivitis, dry mucus, and no tears on examination. No lesions were observed on oral examination; however, the tongue protrusions were bold and strawberry colored (Figure 1). The bottom of the throat was also normal on review. Maculopapular lesions on the face and anterior and posterior chest were published (Figure 2). The subject had no neck lymphadenopathy, no supraclavicular or noisy lungs, pulmonary and vesicular hearing, and regulated S1 and S2 cardiac hearing. The abdomen was soft on examination, but there was a slight tenderness in the deep touch of the hypogastric and periumbilical. It was slightly edematous extremities (Figure 3). The patient was admitted to the infectious disease ward with the above conditions and received supportive treatment. Routine tests were requested for the patient, the results of which are provided in Table 1.

First, according to testing, blood urea nitrogen, creatinine, and edema azotemia pre-renal were considered for the patient; the nephrology consultation request was that the patient ultrasound of the kidneys and urinary tract were asked to answer ultrasound was normal and the patient, according to the dehydrated and high levels of blood urea nitrogen and creatinine, was diagnosed with acute renal failure and underwent serum therapy and supportive therapies. However, due to the edema around the eyes and high creatinine and thrombocytopenia, the patient was also diagnosed with hemolytic uremic syndrome, which, due to the lack of high hemoglobin and high urinary incontinence after serum administration and no slippage and no evidence of this in the patient's pharmaceutical benefits scheme, this diagnosis was rejected for the patient. The next day, the patient developed hypotension and loss of SPO₂ and was immediately transferred to the intensive care unit. The patient's heart advice was requested. After undergoing echocardiography (mild tricuspid regurgitation) and electrocardiogram (normal sinus rhythm), she did not have any heart problems and was discharged from cardiac service. Infectious counseling was also requested for the patient, based on the patient's initial history of Kawasaki diagnosis, which was based on the Kawasaki criteria for skin lesions, strawberry tongue, conjunctivitis, edema of the

Table 1. Patient tests at the beginning of the visit

Hematology	Biochemistry	Urinalysis	Urine Culture	Coagulation	PBS
WBC (10 ³ /L): 10800	Urea (mg/dL): 97	Color: Yellow			
RBC (10 ⁶ /L): 4.19	Cr (mg/dL): 1.3	SG: 1.015			
Hb (mg/dL): 10.8	Na (mEq/L): 131	PH: 6			
MCV (fL): 74	K (mmol/L): 3.3	PR: Negative			
PLT (K/ μ L): 46000	BS (mmol/L): 155	Sugar: Positive		PT: 13	Anisocytosis: Few
ESR (mm/hr): 49	Total PR (g/dL): 4.66	Ketone: Negative	Negative	INR: 1	Poikilocytosis: +
	CRP (mg/L): 75.3	Nitrite: Negative		PTT: 31	Burr cell: +++
	Random urine/PR (mg/dL): 39	WBC: 1-2			
	Random urine/Ca (mg/dL): 4	RBC: 0-1			
	Random urine/Cr (mg/dL): 45.4	Epithelial cell: 2-3			
	Alb (g/dL): 2.5	Bacteria: Not seen			

Abbreviations: WBC: White blood cells; PBC: Primary biliary cirrhosis; Hb: Hemoglobin; MCV: Mean corpuscular volume; PLT: Platelet count; ESR: Erythrocyte sedimentation rate; Cr: Creatinine; Na: Sodium; K: Potassium; BS: Blood sugar; PR: Pulse rate; CRP: C-reactive protein; Ca: Calcium; Alb: Albumin; SG: Specific gravity; PT: Prothrombin time; INR: International normalized ratio; PTT: Partial thromboplastin time.

extremities, and para-clinical findings, including thrombocytopenia, hypoalbuminemia, and high responsiveness. It had an acute phase with fever for more than 5 days. Also, according to the complaint of fever for several days, SPO₂ drop, and test results (Table 1), 19 patients underwent chest x-rays and computed tomography scans of the lung according to the COVID-19 epidemic. The chest x-rays showed evidence of brief pleural effusion. As a result, computed tomography scans of the grand glass lesions were bilateral and multifocal in both lungs (Figure 4). A polymerase chain reaction test was requested for the patient. The results of the polymerase chain reaction test for COVID-19 were positive for the patient, and the patient with a concurrent diagnosis of COVID-19 Kawasaki was treated with antiviral drugs. In addition, for patients diagnosed with COVID-19, the Kawasaki is treated with antiviral medications. Meanwhile, the national standard for the treatment of COVID-19 and intravenous immunoglobulin for the treatment of Kawasaki. The patient was treated for three days in the intensive care unit, which was transferred to the COVID-19 care unit with improved respiratory distress and increased SPO₂. She was treated for four days, and with the improvement of her general condition and the normalization of the test results, the patient was once again asked for a chest computed tomography scan. According to the patient's para-clinical results and the improvement of clinical symptoms, she was discharged from the hospital with the recommendation to continue treatment at home and in-home quarantine.

Discussion

Kawasaki is an acute vasculitis in childhood and one of the leading causes of acquired heart disease in children

in developed countries, with 50% of cases occurring in children under 2 years of age and 80% in children under 5 years of age [12]. Kawasaki diagnosis in patients with fever for 5 days is considered with at least 4 out of 5 clinical criteria in the absence of an alternative clinical diagnosis. The pathology of Kawasaki disease is still unknown, and various theories have been put forward, including the possibility of infection by microorganisms that secrete toxins, or a process that is secreted by superantigens. Immunity can be triggered by intermediaries, such as a bacterium or virus, as in previous studies by intermediaries from the coronavirus family of viruses or other viruses, including (adenoviruses, herpes, Epstein-Barr, etc.) [13]. They had a respiratory viral infection about 30 days before the diagnosis [14, 15]. A study of intracellular airborne infusion in the ciliated cells of the bronchial epithelium of patients with Kawasaki suggested the role of an unknown RNA virus. On April 7, 2020, a 6-month-old infant was diagnosed with Kawasaki disease and confirmed by COVID-19, which is effectively treated with intravenous immunoglobulin. Meanwhile, at the end of the same month, various authors described similar phenotypes of Kawasaki disease that present with unusual manifestations [16]. According to the available data, very few reports of COVID-Kawasaki coincidence occurred at the time of the global coronavirus epidemic. In a report on the case, a 6-month-old infant who had complained of fever and respiratory symptoms and reported that Kawasaki had a comorbidity after the hospitalization, doctors reported that COVID-19 Kawasaki had comorbidity, high doses of intravenous immunoglobulin and aspirin were prescribed for this patient. She was released from quarantine after her general condition improved [10]. Therefore, attention has been paid to the possible link between COVID-19 and Kawasaki



Figure 1. Conjunctivitis patient's eyes and strawberry tongue



Figure 2. Maculopapular rashes on the patient's chest



Figure 3. Edema of the extremities in the patient

and other anti-inflammatory conditions. On April 26, doctors in London, England, were advised to increase the number of patients with multidrug-induced inflammatory disease in children with features of overlapping toxic shock syndrome and atypical Kawasaki disease, as published in an article published on May 7, 2020. The report of 8 children in a severe inflammatory crisis was reported [17]. Kawasaki was also diagnosed in 20

children in the COVID-19 crisis in Italy [18]. In France, the health minister also reported that about 15 children with Kawasaki disease symptoms were hospitalized in Paris, France [19]. According to these reports, even larger-scale observational studies have a challenging interpretation. Therefore, if there is a possible causal relationship between these two issues, then it is essential in several respects that there are proven therapeutic meth-

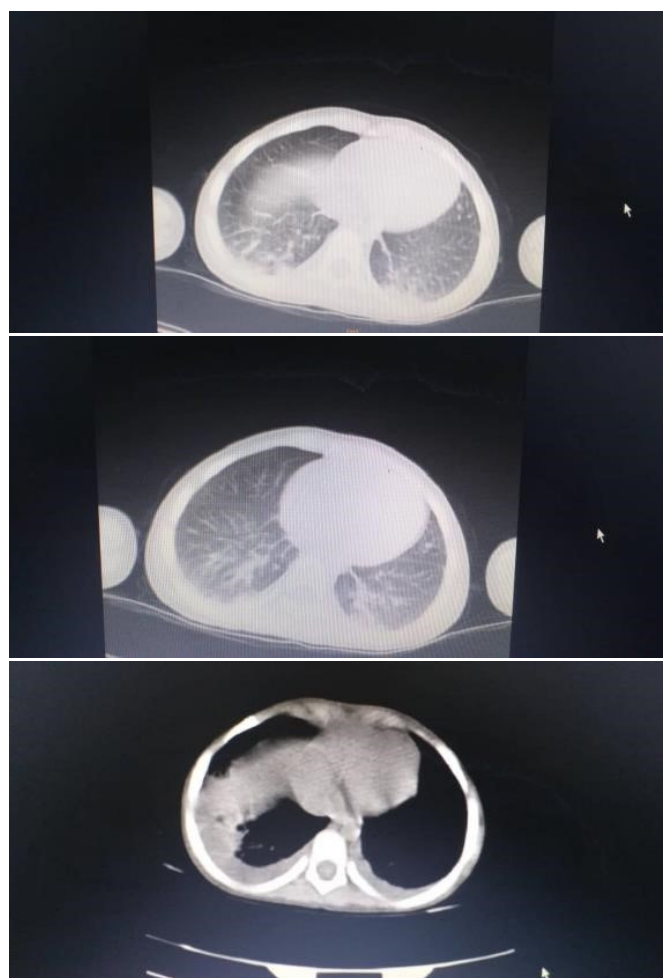


Figure 4. Chest computed tomography scan, ground glass

ods for Kawasaki disease; therefore, delays in diagnosis or failure to diagnose this disease lead to complications. It includes coronary artery aneurysms [20]. Also, information on the prevalence of COVID-19 in children has generally been lower, and cases associated with Kawasaki's clinical features are rare [21-23]. Prolonged fever and the presence of rash are among the main symptoms of Kawasaki disease, which is observed in 41% of patients with fever and rash in 3% of children with COVID-19 [24]. Therefore, children with COVID-19 with prolonged fever and other clinical features of Kawasaki should be considered in terms of the simultaneous presence of these two diseases. The case we studied had a mild clinical course due to its COVID-19 infection. During the hospitalization, there were no significant symptoms in the respiratory system other than a drop in SpO_2 levels within a few hours, and the patient was placed under respiratory support at the pediatric intensive care unit. On the other hand, with the spread of COVID-19 disease, clinical criteria for COVID-19 testing should be

limited to those with respiratory symptoms due to the high cost and limited number of kits. Therefore, it is necessary to pay attention to various clinical manifestations in the COVID-19 crisis to diagnose this disease and other diseases in time. COVID-19-Kawasaki synchronization is essential regarding whether the manifestations, results, and treatment response differ from different Kawasaki types. In addition, acute COVID-19 infections, like other viruses, may be associated with Kawasaki disease.

Conclusion

Considering that the results of this case report are essential for other pediatric care professionals with COVID-19, the understanding of clinical demonstration patterns continues to evolve. It is necessary for more information on the clinical course of children with COVID-19, Especially in cases where the disease coincides with Kawasaki.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research. The patient's information was confidential, and his consent was obtained during the investigation.

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Authors' contributions

All authors contributed equally to prepare this study.

Conflict of interest

The authors declared no conflict of interest.

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