Residência RP Pediátrica
Publicação Oficial da Sociedade Brasileira de Pediatria
ISSN-Online: 2236-6814

Submitted on: 06/30/2020
Approved on: 07/08/2020

CASE REPORT

Case report: multisystem inflammatory syndrome associated with SARS-CoV-2 infection in pediatrics

Camilla Almeida Sampaio[1], Erika Rayane Souza Amorim[1], Genilda Barbosa de Almeida Sampaio[2], Wanessa Ferreira Vanderlei dos Anjos Bohrer[3], Camila Gomes Vasconcelos[4], Ilma Ferreira Oliveira[5], Ana Carolina Ruela Pires[1,5]

Keywords:
Mucocutaneous Lymph Node Syndrome, Coronavirus Infections, Pediatrics.

Abstract

Introduction: The multisystemic inflammatory syndrome in pediatrics is a new entity with acute and severe presentation, which association with SARS-CoV-2 infection virus from COVID-19 has been questioned. The criteria to define a case of such syndrome were determined and published by Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO). One form of presentation of this entity is Kawasaki disease, either in the classic or incomplete forms, and/or associated with toxic shock. **Objectives:** Report a case of a SARS-CoV-2 seropositive patient, who developed Multisystemic Inflammatory Syndrome, Kawasaki-like disease. **Case Report:** Preschooler, 4-years-old, male, arrives at the pediatric consultation with a history of 12-hours fever without other associated symptoms, but previously infected by SARS-CoV-2. On physical examination, he was feverish 38.3ºC, active, eupneic, with mild oropharyngeal hyperemia. In the subsequent 24 hours, fever persisted, and complaints of abdominal pain started, thus he was taken to a pediatric emergency room for diagnostic investigation. A worsening of the pain and significant reduction in activity were observed, with prostration, decreased food acceptance and diuresis. Four days after the onset of the fever, he developed signs of cardiac decompensation (shock), liver lowering, tachycardia with the presence of third sound, HR 186bpm, being taken to the pediatric ICU and a laboratory investigation was started to confirm a post-COVID-19 multisystemic inflammatory syndrome pediatric. **Conclusion:** Improving knowledge about the COVID-19 infection manifestations in children and its complications is necessary, since it is believed that there is a relationship between multisystemic inflammatory syndrome and SARS-CoV-2 infection in children.

[1] CESMAC University Center, Medicine - Maceió - Alagoas - Brazil.
[2] Professor Osvaldo Brandão Vilela - State General Hospital (HGE), Pediatrics - Maceió - Alagoas - Brazil.
[3] Professor Alberto Antunes University Hospital, Cardiology - Maceió - Alagoas - Brazil.
[4] Santa Casa de Misericórdia de Maceió Hospital, Physical Therapy - Maceió - Alagoas - Brazil.
[5] State University of Health Sciences of Alagoas (UNCISAL), Pediatrics - Maceió - Alagoas - Brazil.

Correspondence to:
Ilma Ferreira Oliveira.
Universidade Estadual de Ciências da Saúde de Alagoas (UNCISAL). Rua Dr. Jorge de Lima, 113 - Trapiche da Barra, Maceió - AL, Brasil. CEP: 57010-300.
E-mail: ilmaferreira_oliveira@yahoo.com.br

DOI: 10.25060/residpediatr-2020.v10n3-391

This work is licensed under a Creative Commons Attribution 4.0 International License.

INTRODUCTION

A new disease emerged in December 2019, in the city of Wuhan, China[1]. In the following January, the first case occurred outside of China, and in March a pandemic was declared by the WHO[2].

This disease has SARS-CoV-2 as its etiologic agent. Transmission happens through aerosol droplets from symptomatic patients during the incubation period in asymptomatic individuals[3-5].

Although there is no high incidence in pediatrics, a new acute and severe presentation with the possibility of a causal association with SARS-CoV-2 - which affects children and adolescents, was initially published in the United Kingdom[6], called Pediatric Multisystem Inflammatory Syndrome (MIS), it also happened in Italy[7] and in the United States[8].

CASE REPORT

A 4-year old male preschooler had fever for 12 hours without other symptoms. With a relevant history, he had positive IgM and IgG serology for Sars-CoV-2, with two falling IgM values.

On physical examination, he was feverish, at 38.3ºC, active, eupneic, with mild oropharyngeal hyperemia. Other organs and systems had no changes. He was prescribed antipyretics, increased water intake and return for reevaluation.

In the subsequent 24 hours, the fever persisted and he complained of abdominal pain. Physical examination did not show changes in his initial condition, requiring complete blood count and CRP (Table 1), and rapid dengue test (negative). However, since his abdominal pain worsened, we ordered an acute abdomen routine (chest/abdomen radiography were within the normal range); however, his total abdominal USG showed a mesenteric adenitis.

After intravenous analgesia, the patient was taken home. After 24 hours his pain got worse, he also had prostration, decreased appetite and diuresis.

The patient was taken to the hospital, put under venous hydration, analgesia and clinical monitoring. Four hours after admission, the patient evolved with signs of cardiac decompensation (shock) - edema in the face, limbs and abdominal wall, lowering of the liver, tachycardia, HR 186 bpm, with a 3rd heart sound. He was then taken to the pediatric ICU, where he was started on dobutamine, furosemide, Captopril, and we started laboratory investigation for post-COVID-19 SIMP.

His echo-Doppler showed a medium left coronary aneurysm (Z-score> 5.23 SD), diffuse non-aneurysmal dilation of the left and circumflex anterior descent arteries, signs of pericardial effusion and left ventricular systolic dysfunction, in addition to mild pleural effusion - strongly suggesting Kawasaki disease (Kawasaki-like).

During the course of the disease, he presented lip erythema and a diffuse rash. He showed no signs of significant respiratory impairment, and he used supplemental oxygen under a nasal catheter for a few hours.

Table 1. Patient's laboratorial progress.

TESTS	3rd day on fever	Cardiogenic shock	48 hours after Immunoglobulin	Discharged from the ICU
Red blood cells	**4,60 106/ mm³**	**4,36 106/ mm³**	**3,99 106/ mm³**	**4,57 106/ mm³**
Hemoglobin	**12,8 g/dL**	**11,8 g/dL**	**10,8 g/dL**	**12,1 g/dL**
Hematocrit	**38%**	**34,9 %**	**33,0 %**	**37,2 %**
MCV	**83,0 fL**	**80,0 fL**	**83,0 fL**	**81,4 fL**
HCM	**27,9 pg**	**27,1 pg**	**27,0 pg**	**26,5 pg**
CHCM	**33,8 g/dL**	**33,8 g/dL**	**32,7 g/dL**	**32,5 g/dL**
RDW	**14,2 %**	**11,7 %**	**15,4 %**	**12,2 %**
D dimer	n.d.	> 4ug/mL	2,56 ug/mL	0,75 ug/mL
Dehydrogenase lactate	n.d.	685 U/L	589 U/L	630 U/L
Fibrinogen	n.d.	509 mg/dL	516 mg/dL	324 mg/dL
Ferritin	n.d.	419,3 mg/ dL	492,5 ng/L	n.d.
PRO-BNP	n.d.	n.d.	3101,0 pg/ mL	199,5 pg/ mL
LACTATE	n.d.	20 mg/dL	n.d.	n.d.
Triglycerides	n.d.	n.d.	243mg/dL	255mg/dL
Albumin	n.d.	2,51 mg/dL	n.d.	n.d.
Serum urea	n.d.	14 mg/dL	20mg/dL	n.d.
Creatinine	n.d.	0,32 mg/dL	0,29mg/dL	n.d.
Platelets	180.000/ mm³	173.000/ mm³	276.000/ mm³	640.000/ mm³
Total CK	n.d.	42,44 U/L	n.d.	35,02
CRP	n.d.	129,4 mg/L	119,2 mg/L	21,3 mg/L
TGO	n.d.	39 U/L	39 U/L	67 U/L
TGP	n.d.	33 U/L	25 U/L	45 U/L
ESR - (30 min)	n.d.	12 mm	42 mm	48 mm
TROPONIN	n.d.	n.d.	0,023 ng/mL	0,011 ng/ mL

n.a. = not available

He was then given intravenous immunoglobulin (2.0 g/kg) and anticoagulant therapy with enoxaparin. The clinical response was dramatic, with the disappearance of fever, improvement in cardiac performance, reduction of 50% in the size of the coronary trunk aneurysm, pericardial effusion resorption and ventricular function improvement.

We then moved him from anticoagulant therapy with heparin to ASA, at a dose of 5mg/kg/day, and maintained his furosemide and captopril. He was discharged from the hospital on the 9th day after admission, with a schedule for a new echocardiogram, which showed a discrete and diffuse dilation of the left main coronary artery, without hemodynamic repercussions. We suspended his ACE inhibitor and he is currently using ASA, and is asymptomatic.

DISCUSSION

Kawasaki's disease is a self-limited vasculitis, with no defined etiology, with coronary artery aneurysms as its main complication. It affects children and young infants, preferably under 5 years of age, and males[9,10].

AHA is defined as persistent fever lasting more than 5 days, associated with four more clinical signs, including some reported in the present case (erythema and fissure of the lips, and skin rash)[11]. Kawasaki's disease can also be atypical: fever and two or three symptoms (classic presentation), where laboratory changes are also considered indirect signs - elevated CRP, elevated ESR, platelet count, leukocytosis, anemia, hypoalbuminemia - and abnormal echocardiogram, mandatory examination due to the high incidence of coronary vasculitis[11].

The reported case contemplates a clinical presentation that strongly refers to this new post-COVID-19 SIMP, since it fulfills the diagnostic criteria of the syndrome according to the CDC and the WHO (Table 2).

Treatment is not curative, but must be instituted as early as possible, before the 10th day of fever onset: EV immunoglobulin - 2.0 g/kg single dose, ASA initially at an anti-inflammatory dose of 80 to 100 mg/kg/day; and 48 to 72 hours after the fever subsides a dose of 3 to 5 mg/kg/day, as thromboprophylaxis[7].

The asymptomatic evolution in relation to SARS-CoV-2 infection is noteworthy, including the non-deterioration of respiratory function in parallel with the severity of systemic symptoms, corroborating the majority of reported cases.

It is important to highlight the speed in the evolution of inflammatory tests (CRP - elevation of more than 100 times in 48 hours) and the excellent response to intravenous immunoglobulin, since there was remission of the fever 24 hours after medication, as well as an improvement in cardiac performance and a significant reduction in vascular injuries (aneurysms).

CONCLUSION

Despite the little scientific evidence available, we believe that there is a pediatric multisystem inflammatory syndrome, probably associated with the SARS-CoV-2 infection, with some similarities with Kawasaki disease. Thus, it is

Table 2. Comparing the diagnostic clinical criteria advocated by the CDC, the WHO and those seen in the patient.

	CDC	WHO	CLINICAL CASE
Age	**< 21 years**	**0 to 19 years**	**4 years**
Fever	Documented >38,0ºc ≥ 24h or subjective ≥ 24h	≥ 3 days	Documented fever > 38,0 ° C for ≥24 hours
Inflammation	High CRP High ESR High Fibrinogen High Procalcitonin High D-dimer High Ferritin High LDH High IL-6 Neutrophilia Lymphocytopenia Hypoalbuminemia	High inflammation markers (ESR, CRP or Procalcitonin)	High CRP High ESR High Fibrinogen High D-dimer High Ferritin High LDH
Hospitalization	Severe disease with hospitalization	-	Hospitalization in ICU
Organ involvement	2 or more: Cardiovascular Respiratory Renal Neurological Hematological, Gastrointestinal Dermatological	At least 2: Dermatological Renal Cardiovascular Hematological gastrointestinal	Cardiovascular Respiratory Hematological Gastrointestinal
Alternative diagnosis	No plausible alternative diagnosis	No other obvious cause of inflammation	No alternative diagnosis
Exposure to Infection/Sars-Cov-2	Recent or current infection or exposure to sars-cov-2: - SARS-CoV-2 RT-PCR positive - Positive serology - Positive antigen test - Exposure to COVID-19 in the 4 weeks prior to symptoms onset	Evidence of infection: - SARS-CoV-2 RT-CRP positive - Positive serology - Positive antigen test - Contact with an individual with COVID-19	- Positive serology - Exposure to COVID-19 in the 4 weeks prior to symptoms onset

important to be alert to diagnose this entity, having clinical suspicion mainly geared towards the clinical presentation of Kawasaki Disease, so that the treatment is instituted early and we are successful in the management of this disease.

REFERENCES

1. Ren LL, Wang YM, Wu ZQ, Xiang ZC, Guo L, Xu T, et al. Identification of a novel coronavirus causing severe pneumonia in human: a descriptive study. Chin Med J (Engl). 2020 Mai;133(9):1015-24.
2. World Health Organization (WHO). WHO Director-General's opening remarks at the mission briefing on COVID-19 [Internet]. Geneva: WHO; 2020 Abr; [acesso em 2020 May 20]. Disponível em: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mission-briefing-on-covid-19---16-april-2020
3. Hoehl S, Rabenau H, Berger A, Kortenbusch M, Cinatl J, Bojkova D, et al. Evidence of SARS-CoV-2 infection in returning travelers from Wuhan, China. N Engl J Med. 2020 Mar;382(13):1278-80.
4. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Engl J Med. 2020 Mar;382(10):970-1.
5. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al. SARS-CoV-2 viral load in upper respiratory specimens of infected patients. N Engl J Med. 2020 Mar;382(12):1177-9.
6. Mahase E. Covid-19: concerns grow over inflammatory syndrome emerging in children. BMJ. 2020;369:m1710.
7. Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M, et al. An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study. Lancet. 2020 Jun;395(10239):1771-8.
8. Daskalakis DC. 2020 Health Alert #13: pediatric multi-system inflammatory syndrome potentially associated with COVID-19 [Internet]. New York: New York City Health Department; 2020; [acesso em 2020 Jun 02]. Disponível em: https://www1.nyc.gov/assets/doh/downloads/pdf/han/alert/2020/covid-19-pediatric-mult i-system-inflammatory-syndrome.pdf
9. Rossi F, Silva M, Kozu K, Camargo LF, Rossi F, Silva C, et al. Extensive cervical lymphadenitis mimicking bacterial adenitis as the first presentation of Kawasaki disease. Einstein. 2015;3(3):426-9.
10. Silva CA, Hilário MO, Fonseca AR, Saad-Magalhães C, Sztajnbok FR, Carvalho MF, et al. Doença de Kawasaki [Internet]. Rio de Janeiro: Sociedade Brasileira de Pediatria (SBP); 2020; [acesso em 2020 Jun 02]. Disponível em: https://www.sbp.com.br/fileadmin/user_upload/_22196c-DocCient_-_Doenca_de_Kawasaki.pdf
11. Newburger JW, Takahashi M, Gerber MH, Gewitz M, Tani LY, Burns JC, et al. Diagnosis, treatment, and long-term management of Kawasaki disease: a statement for health professionals from the Committee on Rheumatic Fever, Endocarditis and Kawasaki disease, Council on Cardiovascular Disease in the Young, American Heart Association. Circulation. 2004 Out;110(17):2747-71.