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CASE REPORT

COVID-19 in a neonate with congenital heart disease: case report

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Abstract

On March 11, 2020, the World Health Organization pandemiced the COVID-19. Currently in Brazil, more specifically in the midwest region, the pandemic is at the peak of the curve of new cases, including among neonates, who introduce clinical manifestations different from those previously reported in other age groups, rarely requiring hospitalization in an intensive care unit due to a multisystemic condition, which came to be called the pediatric multisystemic inflammatory syndrome (MIS) related to COVID-19. In this report, the authors demonstrate the case of a newborn with congenital heart disease, with a rare unfavorable evolution after infection by sars-cov-2 in the first days of life.

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INTRODUCTION

On March 11 , 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Since then, hospitals and medical scientific societies have started a rapid race to develop and implement protocols and guidelines for the care of infected patients and protection of health workers. These contingency plans were mainly focused on the adult population, especially at an initial moment when it was believed that children were not severely affected by the disease[1,2].

The neonatal age group and especially the neonatal intensive care units (NICU) were, at first, relatively spared, therefore, very little is known about disease transmission in the neonatal age group, including vertical transmission and the possible manifestations and outcomes of the disease. COVID-19 in newborns.

Despite the lower involvement of younger age groups, with the progression of the pandemic and the greater number of countries and people affected, it has been observed that the pediatric group may present unfavorable evolutions , which have not yet been fully elucidated[3,4].

In the Midwest region, the pandemic is at the peak of the curve and new cases, including among neonates, who have been presenting clinical manifestations different from those previously reported in other age groups[5].

In the case of children , there is a growing number of reports of patients who developed a severe systemic condition later on, requiring hospitalization in a Pediatric Intensive Care Unit (PICU) with multisystemic manifestations of the disease, which came to be called Sys. Pediatric Multisite Inflammatory Inflammatory Syndrome (SIM-P) related to COVID-19[6,7].

Although SIM-P manifests in older children, it is possible that it occurs before one year of age, with the exception of the neonatal age group[1], which even for the manifestation of acute disease has been difficult to prove the diagnosis, especially of the vertical transmission, as well as the role of comorbidities associated with more severe outcomes[8,9].

In this report, the authors demonstrate the case of a newborn with congenital heart disease, with an unfavorable evolution after SARS-COV-2 infection in the first days of life, who, although not classified as a SIM-P, evolved with clinical manifestations . similar, however, in the acute phase of the disease, mischaracterizing this diagnosis, but evolving in an atypical way both for COVID-19 and for early neonatal sepsis and the congenital heart disease that it presented.

CASE REPORT

The patient was born on 05/26/2020, with a fetal diagnosis of complex congenital heart disease (single ventricle with pulmonary atresia and *situs inversus totalis*), by elective cesarean section at 39 weeks of gestational age, being transferred to a referral hospital for cardiac surgery with three days of life. At the time, he had only symptoms compatible with heart disease: cyanosis and hypoxemia, tachypnea without dyspnea, absence of visceromegaly, mild metabolic acidosis, and normal blood count and C-reactive protein. The neonate received prostaglandin and did not need ventilatory support, being offered oxygen in the form of a nasal catheter. On the third day of life, the newborn (NB) was admitted to the referenced hospital, where, as a protocol screening for all hospital admissions to the Neonatal Intermediate Care Unit (NICU), the SARS-CoV2 survey was carried out by the RT-PCR, which detected the presence of the virus in the patient's nasopharynx. The parents were asymptomatic and were tested, after the newborn's positive result, by the RT-PCR method, with negative results for both.

On the fourth day of life, the NB had an axillary temperature of 37.9ºC. The blood count was still normal, but the C-reactive protein (CRP) was starting to rise. Cardiac surgery was canceled and the child was maintained on prostaglandin, with oxygen saturations between 75 - 85%.

On the seventh day of life, after 48 hours of fever maintenance, there was an increase in CRP associated with leukocytosis with neutrophilia. Computed tomography of the chest was performed, which did not show pulmonary changes suggestive of COVID-19. The NB no longer had fever and was kept under observation until the 11th day of life, when he presented lace-like skin with a vascular appearance. showed vascular injury. However, on the 13th day of life, the axillary temperature returned to 38ºC , laboratory tests were collected for infectious screening and Cefepime was started, due to the diagnostic hypothesis of late neonatal sepsis. At On this occasion , the NB was still on room air, with central access, receiving a diet by orogastric tube and was stable until the 15th day of life (12 days after RT-PCR positive for SARS-CoV2), when then , presented respiratory and hemodynamic worsening, metabolic acidosis, laceration in the chest and limbs, in addition to poor peripheral perfusion. The newborn was intubated and started to receive Dobutamine, in addition to the association of Vancomycin to expand the spectrum of coverage for late neonatal sepsis.

In this On this occasion , the blood count showed leukocytosis (34,500 total leukocytes), without a shift to the left, the C-reactive protein had doubled to 92.7 mg/L (VN<5 mg/L), in addition to an increase in ferritin 786.2 ng/mL (no transfusion history), transaminases (TGO 189 IU/L, TGP 243 IU/L) and lactate 7.1 mmol/L. After 48 hours, ferritin increased to 3687 ng/ml, in addition to DHL (1462 IU/L) and D-dimer (8471 ng/ml), with leukocytosis persisting (36,000 total leukocytes).

For the follow-up of congenital heart disease, a new Doppler Echocardiogram was performed, which showed an image suggestive of thrombus or vegetation in one of the valves . tricuspid . Enoxaparin 2 mg/kg/day was started, in

addition to the association of gentamicin, expanding the antimicrobial spectrum for infective endocarditis. On this occasion, hydrocortisone 5 mg/kg/dose, 6/6h was started, being subsequently replaced by methylprednisolone, at an attack dose of 10 mg/kg followed by maintenance of 2 mg/kg, aiming to address the possible inflammatory process. clinically presenting multisystemic river.

After six days, he evolved with clinical improvement and was extubated on 06/15/20, placed on nasal CPAP. RT-PCR for SARS-CoV2 was repeated and the result was negative.

After 48 hours of extubation, there was further clinical and laboratory worsening, with skin laceration, metabolic acidosis and hypotension, and the patient was reintubated and vasoactive drug was restarted. Antibiotic was switched from Cefepime to Meronem. Blood cultures performed so far were negative.

After nine days of evolution, on 06/26/20, already one month old, the child stabilized and, even with leukocytosis, with respiratory and hemodynamic improvement, was extubated. Given the clinical stability, palliative surgery (modified Blalock-Taussig) was performed four days later, on 06/30/20. On the third postoperative day, the patient was extubated, however, after two days, he developed a new septic condition, pulmonary hemorrhage and died at 40 days of life.

Comments

Despite the large number of people infected with SARS-COV-2 in the world, the proportion of pediatric patients with more significant clinical manifestations is low, between 1%-1.7%[1], reaching less than 0.3% in under one year of age [1,2]. In the neonatal age group, clinical manifestations related to COVID -19 are even more difficult to correlate, since they resemble the usual severe conditions of the period, such as sepsis and enterocolitis[1]. In the case of this patient, complex congenital heart disease is still a confounding factor. The authors report a case of a newborn with positive RT-PCR on the fourth day of life, collected for preoperative screening of cardiac surgery who later evolved with a clinical picture that, despite being justified by the heart disease associated with sepsis, cannot the possibility of a diagnosis of COVID-19 is ruled out. Some points drew attention, such as the significant elevation of D-dimer and ferritin , however, they are unspecific markers present in inflammation, whether due to sepsis, disseminated intravascular coagulation, hypoxia or thrombotic events such as what happened with this patient. patient. The D-dimer, in particular, had never been a commonly controlled test in the usual conditions in Neonatology, including imprecise normality values for gestational age and life span, making the analysis difficult by the authors. However, despite the little experience of neonatologists with the routine management of D-dimer in the evolution of sepsis and congenital heart diseases, the presentation of a neonatal septic condition rich in thrombotic events , involving not only valves heart defects, as well as vasculitis of an unusual appearance in the neonatal period (Figure 1). In addition, the temporality of clinical events does not present a temporal correlation with laboratory tests for the control of neonatal sepsis with the same precision that occurs in view of the clinical experience that neonatologists already have. Finally, we do not know the meaning of this detectable RT-PCR for SARS-CoV2, which may represent the cause of the clinical evolution similar to sepsis in this neonate or be a mere finding in a screening test, and the moment of contamination of the neonate, mainly because we do not know the real impact of vertical transmission, as well as the incubation period and the best time to collect RT-PCR in neonates with more infected, especially if oligosymptomatic.



Figure 1. Patient with lace-like skin.

In addition to the rare acute clinical conditions described in neonates as a result of COVID-19, severe late manifestations such as the pediatric multisystem inflammatory syndrome related to COVID-19[6,7] representing a r excessive pro-inflammatory response, through the cytokine storm, which can lead to systemic inflammatory disorders and the dysfunction of multiple organs[1]. However, the syndrome is related to an older age group and a later evolution, which should, at first, be ruled out in this patient or even questioned if, in the face of bacterial sepsis, the presence of SARS-CoV2 could in NB , optimize the inflammatory response, working the virus in synergism with the bacterial agent. Precisely because of the character more related to the inflammation triggered by SARS-CoV2 than to the infectivity itself, studies on therapeutic resources have focused more on the use of anti-inflammatory drugs than antivirals. Given this, in the current epidemiological context and with evidence scientific evidence so scarce for the correct diagnosis and treatment of severe COVID-19 in Pediatrics, especially in Neonatology, with the serious evolution of our patient and the need for rapid clinical improvement so that the surgical approach of the heart disease could occur as soon as possible, the compassionate use of corticosteroids was attempted, in doses aimed at addressing the multisystem

inflammatory syndrome , despite the clinical history and age group not being adequate for the diagnosis of SIM-P. Coincidentally or not, after the use of corticosteroids, what the authors observed was an improvement in inflammatory responses, with a reduction in some laboratory markers and clinical and systemic improvement , although it is not possible to attribute this improvement to the use of corticosteroids.

Still on the transmission of SARS-CoV2 in the perinatal period, there is no convincing evidence of frequent vertical transmission, therefore, it is more acceptable to understand the infection in the neonatal age group, even if early, such as postnatal transmission, contraception . through the child's caregivers, including the parturient with a diagnosis prior to delivery, or even the health professionals of the neonatal team that provides care to the neonate[1]. In the case described by the authors, the most likely transmission is that it occurred after birth, given that the parents had a negative RT-PCR for SARS-CoV2 in the same period in which it was detected in the newborn.

Another factor that makes discussions about the diagnosis and treatment of newborns with RT-PCR positive for SARS-CoV2 even more difficult is the association with neonatal comorbidities, which are favorable to triggering severe inflammatory responses, such as prematurity and congenital malformations . diseases, especially complex congenital heart diseases. We still do not know the real role of comorbidities in the evolution of COVID-19 in Neonatology and the risk group for worse disease outcomes has not yet been well defined . Munoz et al[10] described a case report of a late preterm NB, with a mother colonized with B streptococcus, who, after discharge, returns to the hospital with a clinical picture of late neonatal sepsis, but with positive RT-PCR for SARS-CoV2 , making it difficult to conclude the etiology of the condition and demonstrating the difficulty we find in the diagnosis and clinical evolution of these neonatal cases. However, it is common agreement that, regardless of the etiology found in severe neonatal clinical conditions, care should be maintained in accordance with the previous guidelines in Neonatology.

And not least, it is necessary to consider the care with the health team of the units that receive the neonates infected by SARS-CoV2, being prudent the recommendation so that care can be routinely added, such as the isolation of patients and the proper use of safety equipment. individual protection by the entire team that provides care to patients hospitalized in neonatal units[1].

The lack of knowledge about the disease in neonates, especially the role of vertical transmission, suggests care in the conclusion of the observations described here, and this report serves to reflect on possible possibilities of diagnosis and evolution of COVID-19 in neonates.

REFERENCES

1. Shalish W, Lakshminrusimha S, Manzoni P, Keszler M, Sant'Anna GM. COVID-19 and neonatal respiratory care: current evidence and practical approach. Am J Perinatol. 2020 Jun;37(8):780-91.
2. Yonker LM, Neilan AM, Bartsch Y, Patel AB, Regan J, Arya P, et al. Pediatric SARS-CoV-2: clinical presentation, infectivity, and immune responses. J Pediatr. 2020 Ago;227:45-52.e5.
3. Lu X, Zhang L, Du H, Zhang J, Li YY, Qu J, et al. SARS-CoV-2 infection in children. N Engl J Med. 2020 Abr;382(17):1663-5.
4. Mehta NS, Mytton OT, Mullins EWS, Fowler TA, Falconer CL, Murphy OB, et al. SARS-CoV-2 (COVID-19): what do we know about children? A systematic review. Clin Infect Dis. 2020 Mai;71(9):ciaa556.
5. Dantas A, Santana A, Jesus E, Rego J, Almeira R, Deus T et al., Boletim epidemiológico COVID-19 N° 19 12/08/2020 Situação epidemiológica (04/02 a 08/08/2020).Secretaria de saúde do estado de Goiás. Disponível em: https://www.saude.go.gov.br/files/boletins/epidemiologicos/BoletimEpidemiologicoCOVID-19N1908082020.pdf [access in 2020 Aug 17].
6. Dufort EM, Koumans EH, Chow EJ, Rosenthal EM, Muse A, Rowlands J, et al. Multisystem inflammatory syndrome in children in New York State. N Engl J Med. 2020 Jul;383(4):347-58.
7. Sáfadi M, Silva C. Síndrome inflamatória multissistêmica em crianças e adolescentes provavelmente associada à COVID-19: uma apresentação aguda, grave e potencialmente fatal. Departamentos Científicos de Infectologia (2019-2021) e de Reumatologia (2019-2021), Sociedade Brasileira de Pediatria. 20 de maio de 2020. Disponível em: https://www.sbp.com.br/fileadmin/user_upload/22532d-NA_Sindr_Inflamat_Multissistemica_associada_COVID19.pdf [access in 2020 Jul 20]
8. González-Dambrauskas S, Vásquez-Hoyos P, Camporesi A, Díaz-Rubio F, Piñeres-Olave BE, Fernández-Sarmiento J, et al. Pediatric critical care and COVID-19. Pediatrics. 2020 Jun;146(3):e20201766.
9. Zhang L, Peres TG, Silva MVF, Camargos P. What we know so far about coronavirus disease 2019 in children: a metaanalysis of 551 laboratory--confirmed cases. Pediatr Pulmonol. 2020 Ago;55(8):2115-27.
10. Munoz AC, Nawaratne U, McMann D, Ellsworth M, Meliones J, Boukas K. Late-onset neonatal sepsis in a patient with Covid-19. N Engl J Med. 2020 Mai;382(19):e49.