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CASE REPORT

Acute pericarditis secondary to COVID-19 in newborn: case report

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Coronavirus Infections, Pericarditis, Newborn.

Abstract

Objectives: To describe the case of a newborn with COVID-19 who developed acute pericarditis evidenced by echocardiogram. **Methods:** The information contained in this description was obtained by reviewing medical records and interviewing a medical team. **Discussion:** In neonates, SARS-CoV-2 infection is usually asymptomatic or presents with mild symptoms. Acute pericarditis is a benign and self-limiting condition if not associated with pericardial effusion and constriction. Its main etiology in the pediatric group is viral and because it is not very symptomatic, one of the possibilities is that the finding in COVID-19 is underdiagnosed. **Conclusion:** Isolated acute pericarditis associated with infection by the novel coronavirus is a rare disorder not reported in the pediatric population. Studies are needed to better assess the prevalence and cardiological outcomes in this group

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INTRODUCTION

SARS-CoV-2 is an RNA virus whose transmission occurs through droplets and contact with contaminated surfaces[1]. In the neonatal population, the clinical picture is nonspecific, characterized by fever, dyspnea, tachycardia, respiratory distress, apnea, lethargy and vomiting[2]. In older children and adolescents, in addition to the flu, there may be gastrointestinal symptoms and rash, although the majority is asymptomatic[3,4].

With regards to a cardiac involvement, it is believed that COVID-19 causes direct injury to the cardiac muscle, especially in adults. For this reason, it is common to have arrhythmias, such as ventricular tachycardia and ventricular fibrillation associated with this condition[5]. In children, the increase in cardiac enzymes is more discreet, the symptoms/signs are nonspecific, and the development of arrhythmias is less prevalent[5,6]. Congenital heart diseases with hemodynamic repercussions are predictors of higher risk and disease severity[6].

CASE REPORT

One premature female newborn (NB), gestational age of 33 weeks and 3 days, born vigorous from a normal delivery with Apgar score 9 and 10 in the 1st and 5th minute, respectively. Her birthweight was 1,756 grams. Her maternal history showed a risk of infection due to urinary tract infection in the 30 days prior to delivery.

In her first hour of life, she had a mild respiratory distress and was placed in an oxygen halo and transferred to the Conventional Intermediate Care Unit (UCINCo). Due to her infection's risk, we ordered laboratory tests and chest X-rays, which showed no changes.

On the 3rd day of life, the oxygen halo was removed and the newborn presented mild respiratory distress again. Laboratory tests were requested, blood culture was collected and antibiotic therapy with ampicillin and gentamicin was started. The results showed leukopenia associated with thrombocytopenia and bilirubinemia, and she was started on phototherapy. Her blood culture revealed an infection by Staphylococcus haemolyticus and she was maintained in antibiotics for 7 days.

She stayed for 4 more days in the UCINCO, with good progress on weaning from oxygen therapy, progression of diet through an orogastric tube (OGT) and the phototherapy was suspended. Then she was transferred to the Kangaroo Intermediate Care Unit (UCINCa).

On the 12th day of life, she developed mild tachydyspnea and cyanosis. Due to the current pandemic during the hospitalization period, newborns and mothers were placed under contact and aerosol precautions. RT-PCR was collected for COVID-19 test by a naso-oropharyngeal swab, which resulted in detectable virus. On the following day, the NB maintained mild tachydyspnea and presented two episodes of cyanosis, with a slight decrease in lung radiotransparency upon her chest radiography. Laboratory tests showed no changes, urine culture was negative and blood culture was considered contaminated.

The virus is believed to have been transmitted through cross-infection, originating from another asymptomatic NB who shared the same ward, whose RT-PCR was also positive for COVID-19. The mothers were not tested due to the lack of symptoms and were properly isolated from other patients.

Two days after the diagnosis of the new coronavirus, there was a heart murmur (2+/6+) on physical examination. Her echocardiogram showed a pericardial thickening in the left ventricular posterior and lateral walls, meaning acute pericarditis (Figure 1).

She remained for another 10 days in the UCINCa until she progressed to an oral diet. She remained in good general condition, on exclusive breastfeeding, with adequate weight gain and eupneic in room air. She was discharged without the need for drug therapy and was referred for outpatient follow-up with a pediatrician and pediatric cardiologist, who requested a new echocardiographic examination after 15 days.

The second echocardiogram (Figure 2), showed pericardial thickening in the left ventricular posterior and lateral walls, associated with diffuse mild effusion. The pediatric cardiologist maintained a conservative approach. A third echocardiogram was performed and the previous findings persisted. We chose to start her on corticosteroid therapy (Prednisolone) and to have outpatient follow-up every two weeks to assess the pericarditis progression.

DISCUSSION

Acute pericarditis is an inflammation of the pericardium - the fibrous membrane that surrounds the heart. Its etiology

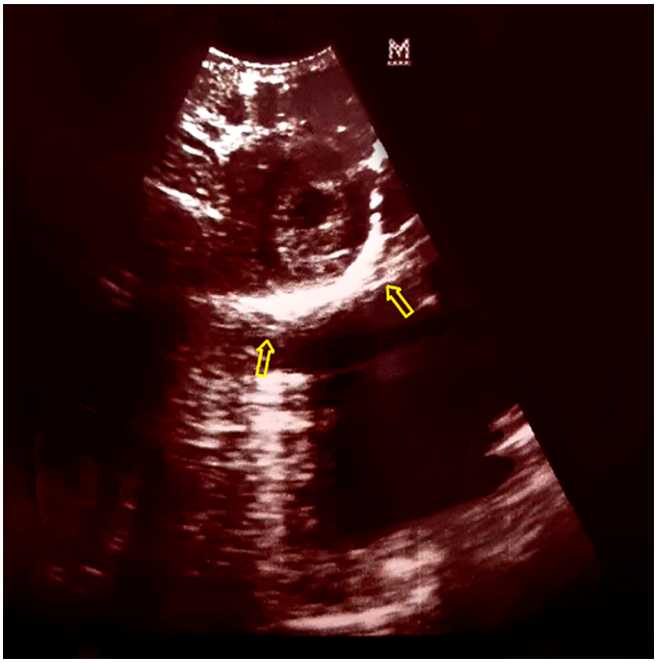


Figure 1. Pericardial thickening in the left ventricular posterior and lateral walls (arrows).

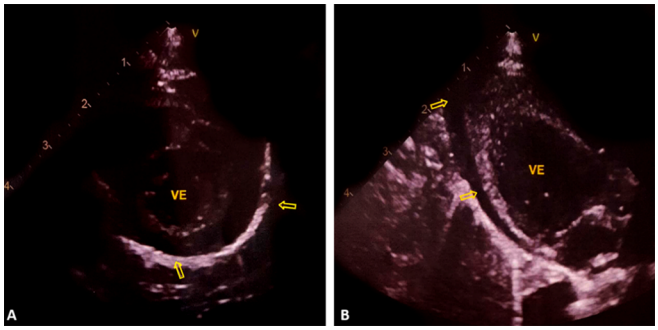


Figura 2. A Thickened pericardium (arrows) in the posterior and lateral regions of the left ventricle; B- Mild pericardial effusion (arrows).

is divided between infectious and non-infectious, with viral pericarditis being the most common, mainly associated with enteroviruses, Epstein barr, herpes simplex and influenza[7].

This disease is usually benign and self-limiting, presenting greater severity when it progresses with stroke or pericardial constriction. In the pediatric population, it is more frequent in male adolescents[8]. Acute pericarditis presents as a febrile syndrome with upper airway involvement, chest pain and pericardial friction, which in most cases is transient[7,8]. It is often associated with myocarditis, and for this reason, it should always be investigated in the presence of ventricular dysfunction[7].

Infection with the new coronavirus primarily affects the respiratory system; however, systemic inflammatory involvement has been reported. SARS-CoV-2 is believed to invade cardiac cells by means of the angiotensin II-converting enzyme (ACE-2) present in the vascular endothelium, via endocytosis. The virus uses the ACE-2 receptor occupying binding sites and promotes cell destruction, thus preventing the counter-regulating mechanism of angiotensin II production and, consequently, generating an exacerbated inflammatory reaction[5].

Adults have higher mortality and morbidity when infected, especially if they present risk factors such as arterial hypertension, diabetes, cardiac pathologies and cerebrovascular diseases. Children, on the other hand, manifest less severe symptoms - the majority of whom are asymptomatic - justified by the greater activity of the innate immune response against viral pathogens, and by reduced ACE-2 activity, which makes it difficult for the virus to invade the intracellular environment[9,10].

Cardiovascular involvement is more frequent in children with previous pathologies, such as congenital heart disease, pulmonary hypoplasia, hemoglobinopathies, malnutrition and immunodeficiencies. The virus causes direct injury to the myocardium and the main laboratory finding in this age group is the increase in procalcitonin, unlike in adults, there would be a significant increase in troponins[6].

Literature reports on acute pericarditis secondary to COVID-19 are scarce, exclusively described in adult patients and usually associated with myocarditis. Marschall et al.[11] and Tung-Chen[12] reported cases of two 35-year-old adults who presented infection with the new coronavirus and acute pericarditis, without myocardial involvement or ventricular dysfunction. Two other authors[13,14] showed acute pericarditis because of myocarditis and cardiac tamponade in adults who had a previous history of cardiovascular diseases. Since it is self-limited and not very symptomatic, one of the possibilities is that acute pericarditis is underdiagnosed in these cases, including in children.

CONCLUSION

Acute pericarditis due to COVID-19 is an uncommon echocardiographic finding, and it is often associated with myocarditis in adults. In the pediatric population, there are no reports of isolated pericarditis, despite the fact that it is constantly associated with viruses. The case report described is relevant because it is a rare disorder, not often addressed in the medical literature in this age group. Further studies are recommended in order to assess the prevalence and possible cardiological outcomes of pericarditis secondary to COVID-19 in children.

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