

CASE REPORT

ATRIAL PARA-SYSTOLE AS A LATE PRESENTATION IN AN INFANT WITH COVID MYOCARDITIS

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Myocarditis has been reported as a presentation of COVID 19 in children. Cardiac tissue inflammation could enhance the automaticity of the cells and develop different types of arrhythmias. Atrial para-systole is a very rare type of arrhythmia mostly observed in patients with right isomerism or post-cardiac transplantation. Whereas, we report atrial para-systole arrhythmia in an infant with normal cardiac and visceral anatomy which is affected by COVID-19 and presented with tachycardia and heart failure.

Keywords: myocarditis, COVID-19, arrhythmia, atrial para-systole

Citation: Dalili SM, Alizadeh B, Ghiasi SSG, Rahimpour F. Atrial Para-Systole as a Late Presentation in an Infant with COVID Myocarditis. Pak Heart J. 2022;55(03):305-306. DOI: <https://doi.org/10.47144/phj.v55i3.2252>

INTRODUCTION

Since the beginning of the COVID-19 pandemic, various types of involvement such as myocarditis are more likely to occur related to COVID-19. Studies have previously shown that myocardial involvement produces a high rate of mortality and morbidity in affected COVID-19 patients; however, understanding the precise mechanism of why a virus may invade the heart is not clearly defined. Cytokine storm, an integrated part of the body's immune response is one of the possible proposed pathophysiologies. A direct virus-mediated invasion of the myocardial tissue related to angiotensin-converting enzyme 2 (ACE2) is also considered. Whether cardiac involvement is caused by inflammatory mediators or a direct virus-mediated invasion, myocarditis could be developed.

Cardiac arrhythmias and heart failure are the well-known complications developed in children with acute myocarditis. All different types of tachy- and bradyarrhythmias could be induced by myocarditis and low voltage QRS and abnormal ST-T changes are also recorded in patients' ECGs.¹⁻⁴

CASE REPORT

A 14-month-old-boy 7 kg presented with tachycardia. Recent febrile illness, recurrent diarrhea, and vomiting were found in the last 10 days of his history. Within the first day of his admission, the positive covid-19 IgG test and the polymerase chain reaction (PCR) of recent days were revealed positive.

The child was extremely ill and lethargic, was presented with irregular fluctuated heartbeats with cyclic episodes of brady- and tachyarrhythmia jumping from 40 up to 250 beats per minute.

Echocardiography revealed dilated ventricles with LVEF (left ventricular ejection fraction) of 45%. Two morphologically distinct P-wave forms with various intervals were observed in tachyarrhythmia episodes, which were not further suppressed by each other; however, only one P-wave conducted the depolarization to the ventricle (originating from the normal location of the Sino-atrial node in the right upper part of the right atrium) (Figure 1).

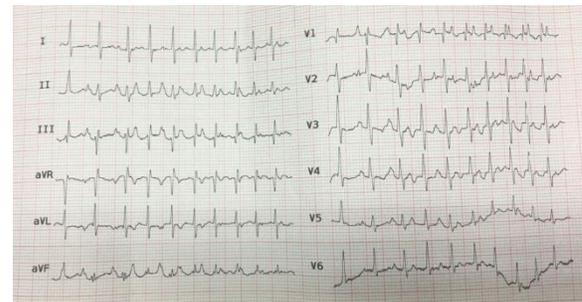


Figure 1: The ECG which was taken during tachycardia showed 2 distinct forms of the P wave

On the first day of admission, due to the ill and toxic condition of the patient and low EF, we started Dobutamin with a dose of 7mcg/kg/min. As tachycardia increased over 200 beats per minute, Amiodarone with the dose of 5mg/kg/loading was added. As the clinical condition stabilized, Dobutamine was gradually tapered whereas the Amiodarone following the continuation of tachyarrhythmia was preserved (5mcg/kg/min). Furosemide with the dose of 1mg/kg/day by controlling electrolytes and blood pressure was infused. Moreover, Carvedilol with dose of 0.05 mcg/kg/dose divided every 12 hours were begun and Amiodarone step by step was reduced. At last Captopril with a dose of 1mg/kg/day was added, thus

the rhythm was converted to sinus and the patient was in good health condition (Figure 2).

Eventually, after two weeks of hospitalization, the patient was discharged from the hospital in acceptable good medical condition with a prescription for Captopril, Carvedilol and Furosemide tablets with the last doses.

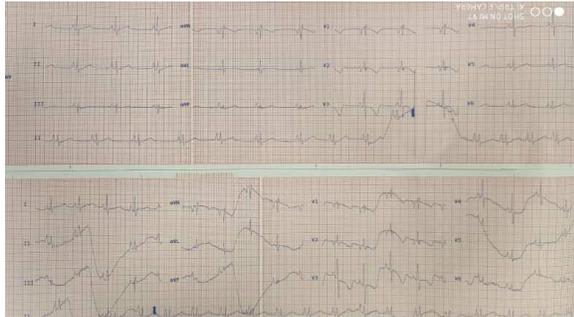


Figure 2: Rhythm converted to sinus after medical treatment

DISCUSSION

Although atrial para-systole is a very rare arrhythmia, few case reports are available in recent studies.¹ Based on the literature, the incidence of parasystole arrhythmia was considered 0.13% at all and it has shown two times more common in males.²

As all we know, in this arrhythmia, more than one focus is firing the atrium, each one in an individual distinct interval. The main, SA node is in its normal focus and the other could suppress or escape the suppression to become dominant pacemaker. As the atrium chamber in children is so small and has no intrinsic electrical barriers, this condition is too rare to occur.

The exact difference between COVID19 -associated myocarditis and the other types is not clear. Pavri et al.³, reported abnormal PR interval in half percentage of studied patients with COVID-19 presentation which varies in lengthening.³ Wang et al.⁴, considered

tachycardia with the incidence of 72% as the most common ECG abnormalities in patients with SARS COVID-19, also bradycardia was noted with a less common rate of about 2-15%. Moreover, Branch block arrhythmia, atrial fibrillation (AF), premature beats, prolonged QT interval, and sudden cardiac death (SCD) were also found.⁴

The mechanism by which sinus tachycardia is a concomitant of non-conducted parasystole p waves could be inflammation and the resulting inter-atrial block. An inter-atrial block (IAB), a very rare condition in children is a conduction delay between the two atria (P-wave duration ≥ 110 ms in adults and ≥ 90 ms in children), which is hard to diagnose.⁵

In conclusion, COVID19-induced myocarditis could develop several forms of arrhythmia. The presentation of our study of an unusual arrhythmia in a small child should be a suspicion of COVID-19 involvement.

AUTHORS' CONTRIBUTION

SMD and FR: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. BA and SSG: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

Conflict of interest: Authors declared no conflict of interest.

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