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Viral Myocarditis After Dengue Virus Infection: Case Report

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1. Summary

Dengue is an endemic national arbovirus since the 1980s. In Brazil, it constitutes an important public health problem. The Ministry of Health informs that, until the epidemiological week 35 of 2022, there were 1,337,413 probable cases of dengue (incidence rate of 627.0 cases per 100,000 inhabitants) in Brazil. In 2023, Presidente Prudente, located in the western region of the State of São Paulo, is experiencing an alarming situation that seems to get worse every new week with a sharp increase in the number of cases, with the record of the eighteenth death (until 27/04) by dengue. It is among the three cities with the highest number of notifications in the country (it is the third, after Londrina and Foz do Iguaçu, in the State of Paraná) and has already surpassed 13 thousand cases (until 04/27). Among the various complications resulting from arbovirus infection, there is myocarditis. An inflammation of the heart muscle in response to aggression caused by exposure to external antigens such as viruses or autoimmune diseases. Although arbovirus myocarditis is an acute condition, most patients remain with chronic heart disease such as chronic heart failure. It is important to be aware of this possible complication of arboviruses, especially in endemic areas. The objective of this report is to present the case of a patient who evolved with worsening cardiac performance after a mild episode of dengue. This is the clinical case of an elderly patient with a previous diagnosis of chronic heart failure and who, after being infected with dengue, presented clinical decompensation, evolving with worsening cardiac performance, being diagnosed by cardiac magnetic resonance with viral myocarditis and in an IgM serological test. for dengue reagent. Among all these myocarditis triggers, viral infection is the most prevalent. Myocarditis can manifest itself in different ways, ranging from mild and oligosymptomatic to severe, associated with ventricular arrhythmias, hemodynamic instability and cardiogenic shock. It should be considered as a decompensating factor for heart failure in previously stable patients without other clearly identified precipitating factors.

2. Keywords:
Myocarditis; dengue; viral infection, arbovirus.

3. Introduction

Dengue is an endemic arbovirus since the 1980s. In Brazil, it constitutes an important public health problem. The Ministry of Health (MS) informs that, until the epidemiological week 35 of 2022, there were 1,337,413 probable cases of dengue (incidence rate of 627.0 cases per 100,000 inhabitants) in Brazil. Compared to 2019, there was a 9.8% reduction in cases registered for the same period analyzed. When compared to the year 2021, there was an increase of 195.9% cases until the respective week [1]. In Presidente Prudente, from January to September 2022, according to the epidemiological surveillance of the municipality, 6,875 positive cases were confirmed. The survey also points to 334 cases under investigation and 6,216 discarded. The peaks were recorded in April and May, with 2,081 and 2,783 cases, respectively, which account for 70% of the positive cases. Transmission occurs through the bite of the Aedes aegypti mosquito infected by one of the 4 serotypes of the virus [2]. Early identification of dengue cases is of vital importance for timely decision-making and implementation of measures, mainly aimed at preventing deaths. Dengue virus infection causes a disease with a broad clinical spectrum, ranging from inapparent forms to severe cases, which can progress to death [3]. Among these, the occurrence of hepatitis, liver failure, encephalitis, myocarditis, hemorrhages and shock stands out [4]. Cardiovascular involvement in arboviruses has been demonstrated, especially in dengue, which is the most prevalent arbovirus in Brazil [5]. However, it is little studied, underdiagnosed and commonly occurs in a self-limited manner, mainly due to the diverse clinical presentation, little endomyocardial biopsy and lack of sensitive and standardized histological criteria [6].

4. Justification

Although arbovirus myocarditis is an acute condition, most patients remain

with chronic heart disease such as chronic heart failure. It is important to be aware of this possible complication of arboviruses, especially in endemic areas.

5. Goal

The objective of this report is to present the case of a patient who evolved with worsening cardiac performance after a mild episode of dengue.

6. Methodology

By reviewing the physical and electronic medical records of a patient treated at a tertiary hospital, in addition to an interview with him.

7. Case Description

This is a male patient, 75 years old, with a pathological history of arterial hypertension, permanent atrial fibrillation, heart failure with preserved ejection fraction (HFEP) with ejection fraction (Teichholz) 51.3% (VR 52-72). She was using enalapril 5 mg 12/12 hours, AAS 100 mg once a day, carvedilol 12.5mg 12/12 hours, simvastatin 40 mg once a day and furosemide 40 mg once a day, rivaroxaban 20 mg once a day . He denied travel outside the state of São Paulo. Initially, care was given at the city's Emergency Care Unit (UPA), which complained of lack of appetite, daily fever, headache, myalgia, arthralgia and worsening of the general condition for about 5 days; due to this, the hypothesis of dengue was raised, NS1 (Non Structural) was collected and symptomatic treatment and intravenous hydration were started. About 20 days later, the patient presented bilateral lower limb edema, paroxysmal nocturnal dyspnea, orthopnea and dyspnea on minimal exertion, unable to perform daily activities that were previously well tolerated and asymptomatic. On admission to the tertiary hospital, he was in good general condition, blood pressure 100x60 mmHg, heart rate 70 bpm, capillary refill time less than 3 seconds, respiratory rate 18 bpm, temperature 36°C, Glasgow 15, cardiac auscultation normal, arrhythmic heart sounds, without murmurs, pulmonary auscultation with thick bibasal rales, flaccid abdomen and painless on palpation, no petechiae on the body or rashes, presenting with heart failure profile B. He remained hospitalized in a cardiology ward, where a chest X-ray (figure 1) was performed, which showed pleural effusion more prominent in the costophrenic sinus on the right, laboratory tests (table 1), transthoracic echocardiogram (figure 2) and magnetic resonance imaging of the heart (figure 3).

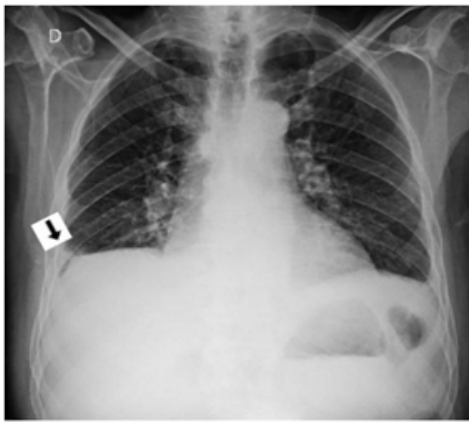


Figure 1: Chest X-ray demonstrating more prominent pleural effusion on the right (arrowhead).

Hematimetric characteristics	Day 01	Day 03	Reference values
Hemoglobin	14	13,1	12,40 a 16,80 g/dL
Hematocrit	42,2	40,7	38,30 a 51,30 %
Platelets	103,00	107,00	150,00 a 400,00 103/uL
Leukocytes	5,71	5,1	4,00 a 10,00 103/uL

CHART 1: Hematimetric characteristics obtained from the patient's blood count.

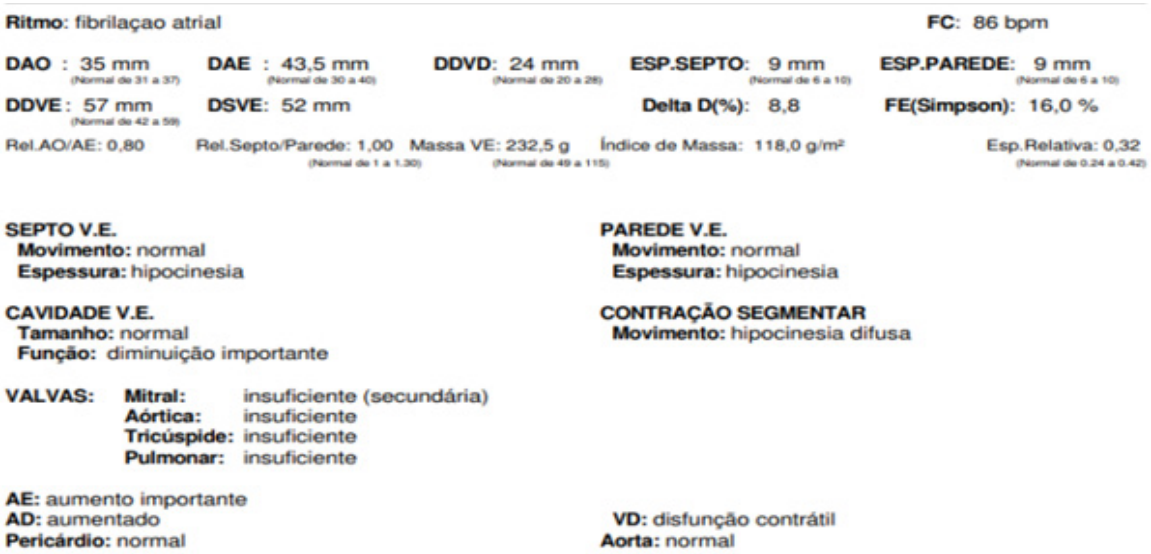


Figure 2: Transthoracic echocardiogram demonstrating a significant reduction in ejection fraction (16%) associated with diffuse left ventricular hypo-

kinesia, in addition to atrial fibrillation rhythm.
Source: patient chart.

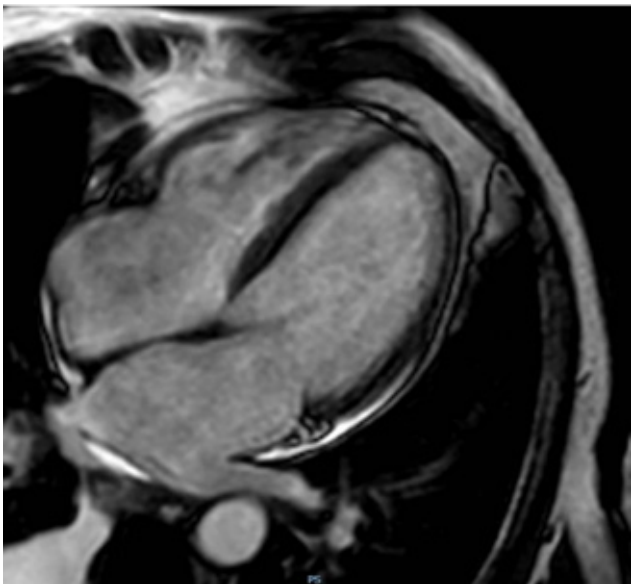
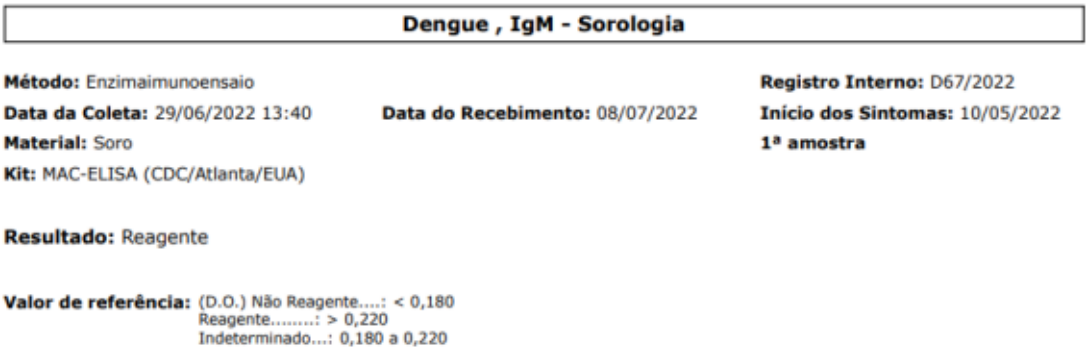


Figure 3: Magnetic resonance imaging of the heart showing the presence of delayed mesocardial myocardial enhancement in the middle and basal anteroseptal and inferoseptal segments, compatible with myocarditis.
Source: Patient record.



Dengue , IgM - Sorologia

Método: Enzimaimunoensaio
Data da Coleta: 29/06/2022 13:40
Material: Soro
Kit: MAC-ELISA (CDC/Atlanta/EUA)

Data do Recebimento: 08/07/2022

Registro Interno: D67/2022
Início dos Sintomas: 10/05/2022
1ª amostra

Resultado: Reagente

Valor de referência: (D.O.) Não Reagente.....: < 0,180
Reagente.....: > 0,220
Indeterminado...: 0,180 a 0,220

Figure 4: ELISA serological test for dengue performed by Instituto Adolfo Lutz confirming diagnosis of dengue in the acute phase.
Source: Adolfo Lutz Institute (patient chart).

The patient remained hospitalized for 9 days in the ward, receiving optimized drug treatment for chronic heart failure. . He remained stable throughout the period, with preserved diuresis and with progressive improvement of dyspnea and edema of the lower limbs, managing to perform self-care and activities previously carried out in an oligosymptomatic way, and due to this he was discharged from the hospital with outpatient return. After 21 days of hospitalization, the patient returned to the clinical outpatient clinic of the specialty with new decompensation of heart failure after interrupting drug treatment, on this occasion NT-proBNP was requested with a result of 21,819 (VR: less than 125 pg/mL - To exclude heart failure heart rate in outpatients with mild symptoms). The patient was referred to the anticoagulation outpatient clinic to replace rivaroxaban with warfarin, however he no longer attended the consultations, losing all specialized medical follow-up.

8. Discussion

Cardiac manifestations in dengue can vary greatly, from silent disease to severe myocarditis, resulting in death or permanent sequelae such as chronic heart failure. Dengue among arboviruses is the one with the highest percentage of described cardiovascular manifestations, with prospective studies reporting that 48% of patients with the severe form develop myocarditis. A necropsy study of four fatal cases of dengue showed findings of myocarditis with the presence of edema, hemorrhage, mononuclear infiltrate and presence of antigen and viral replication [7]. Another study carried out in 2017 in Rio de Janeiro with 117 fatal cases of dengue revealed a high prevalence of myocarditis. The results suggested that the heart is the target of dengue virus infection with an intense inflammatory process probably induced by the patient's immune response [8].

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With a still uncertain pathophysiology, myocarditis is characterized by the presence of an inflammatory infiltrate in the myocardium, capable of leading to necrosis or degeneration of cardiomyocytes. It has a low incidence due to little diagnosis, since the gold standard for diagnosing myocarditis is endomyocardial biopsy, which should be indicated in the investigation of recent onset insufficiency, in the presence of ventricular blocks and arrhythmias, without improvement with conventional treatment. Currently, the specific treatment for this disease is restricted to immunosuppression in eosinophilic myocarditis, giant cell myocarditis and those associated with autoimmune diseases, a classification that will be given by biopsy. In other cases, clinical support should be given, especially with the classic treatment of heart failure [3].

Therefore, although the association between tropical diseases and myocarditis is based on case series and few studies with a well-defined diagnosis of myocarditis, the diagnostic investigation of common diseases in the region in cases of myocarditis in endemic areas is justified, since the its complications such as chronic heart failure imply high morbidity and mortality, and high costs for the public health system. Patients with HF have high rates of reintegration, and, in general, about 30% of patients needed to be hospitalized for compensation and need to be readmitted in the first year of follow-up [8].

9. Conclusion

Myocarditis can be caused by a wide variety of infectious agents, including viruses, protozoa, bacteria, chlamydiae, rickettsiae, fungi, and spirochetes. Among all these myocarditis triggers, viral infection is the most prevalent, especially those most prevalent in our environment, and currently the dengue virus has been one of them. Myocarditis can manifest itself in different ways, ranging from mild and oligosymptomatic to severe, associated with ventricular arrhythmias, hemodynamic instability and cardiogenic shock. It should be considered as a HF decompensation factor in previously stable patients without other clearly identified precipitating factors.

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