

Acute Myocarditis Caused by Chikungunya Virus Assessed by Cardiac Magnetic Resonance Imaging

Eduardo Cavalcanti Lapa Santos,^{1,2} Eduardo Andrada Figueiredo,¹ Renata Ávila Cintra,¹ Michel Pompeu Barros de Oliveira Sá,¹ George Augusto da Fonseca Carvalho Antunes Lima²

Hospital Dom Hélder Câmara (HDH),¹ Cabo de Santo Agostinho, PE; Universidade Federal de Pernambuco (UFPE),² Recife, PE – Brazil

Introduction

Chikungunya infection usually has a benign course characterized by fever, polyarthritis and rashes. Occasionally, cardiac manifestations such as myocarditis can develop. We report the case of an elderly patient with established myocarditis following Chikungunya infection.

Case Presentation

A 80-year-old female patient with a history of systemic arterial hypertension, heart failure (HF) with preserved left ventricular ejection fraction (EF), mild aortic stenosis, and paroxysmal atrial fibrillation (AF) presented dyspnea and palpitations approximately 4 months after an acute febrile syndrome caused by the Chikungunya virus. On physical examination: blood pressure of 132x80 mmHg, heart rate of 86 bpm, systolic murmur in the aortic area with carotid radiation, absence of pulmonary rales, minimal jugular vein distension at a 30-degree angle, no edema and weighing 83.3 kg. Electrocardiogram (ECG) demonstrated regular sinus rhythm and right bundle branch block (already present in a previous ECG). On cardiovascular complaints (4 months after the acute event), an echocardiogram was requested, which did not show any change compared to the previous year's examination. Due to the possibility of myocarditis caused by the Chikungunya virus, gadolinium cardiac magnetic resonance imaging (CMR) was performed, which showed normal cardiac chambers, preserved biventricular systolic function (right ventricular EF = 59%; left ventricular EF = 68%), absence of myocardial edema, absence of pericardial effusion and changes in pericardial thickness, presence of mesoepicardial fibrosis in the lower segment of the medial region of the left ventricle, compatible with previous inflammatory cardiomyopathy (Figure 1). The patient was treated with oral diuretics and beta-blockers, with progressive improvement of symptoms.

Keywords

Myocarditis; Chikungunya Virus; Autoimmune Diseases/Diagnostic Imaging; Magnetic Resonance Imaging; Echocardiography.

Mailing Address: Eduardo Cavalcanti Lapa Santos, MD, MSc • Hospital Dom Helder Câmara – HDH BR 101 Sul, Km 28. Postal Code 54510000, Cabo de Santo Agostinho, Pernambuco – Brazil
Email: eduardolapa@gmail.com
Manuscript received October 18, 2017; revised October 22, 2017; accepted October 22, 2017

DOI: 10.5935/2318-8219.20180006

Discussion

Chikungunya fever is caused by the CHIKV virus, an arbovirus of the A group.^{1,2} In some regions, as in Brazil, the virus is spread through bites from *Aedes* mosquitoes, and the species *Aedes aegypti* was identified as the most common vector, although the virus has recently been associated with many other species.³ Human infection is considered benign in most cases,⁴ with fever, headache, myalgia, and occasional evanescent rash.⁴⁻⁶ Symmetric and acute bilateral polyarthritis may be observed.⁴⁻⁶ CHIKV virus infection may occur with more severe complications that can affect the nervous system, the liver and the heart, leading to high mortality rates.⁴

The mechanism of cardiac involvement in Chikungunya fever is not fully understood.¹ CHIKV may invade the myocardium and directly damage cardiomyocytes or give rise to hypersensitivity or autoimmune reaction.² The clinical features of myocarditis are often vague and nonspecific, and may be confused with other diseases.² The clinical picture has a wide spectrum, including dizziness, fainting, deep pain, sweating, precordial pain, among others.² The signs may be minimal and associated with arrhythmias or small abnormalities on electrocardiography.²

Diagnosis of myocardial involvement by CHIKV can be done through imaging tests such as echocardiogram and CMR.^{1,6} The latter allows an adequate myocardial characterization of the lesion, identifying both acute and subacute inflammatory lesions (myocardial edema), and also the cicatricial lesions of the chronic phase. The late enhancement technique allows the identification of necrosis/fibrosis regions with a multifocal distribution pattern characteristic of myocarditis, without correlation with the coronary territory, affecting the epicardium and/or the mesocardium and preserving the subendocardium in general.⁷ In the case reported, no evidence of myocardial edema was observed, since the patient was already in the chronic phase of the disease at the moment of the test, which revealed late enhancement with characteristics compatible with a previous inflammatory process. It is important for the diagnosis to rule out any other recent cardiotropic infection.⁴

Etiological diagnosis of CHIKV myocarditis can be done through the IgM-capture ELISA, antigen detection or virus isolation, varying with the availability of the methods.⁴ The frequency of myocardial lesions in this scenario is not known, especially because many cases of myocarditis remain undiagnosed,¹ but even among adults the reported occurrence is uncommon.⁴ Serial electrocardiographic evaluations seem to be the best guide for the prognosis.² With the worldwide resurgence of arboviruses, new clinical patterns may arise.⁵ Physicians should be aware of the possible cardiac involvement in the Chikungunya infection^{1,2,5} to address this potentially lethal complication in infectious disease outbreaks.⁵

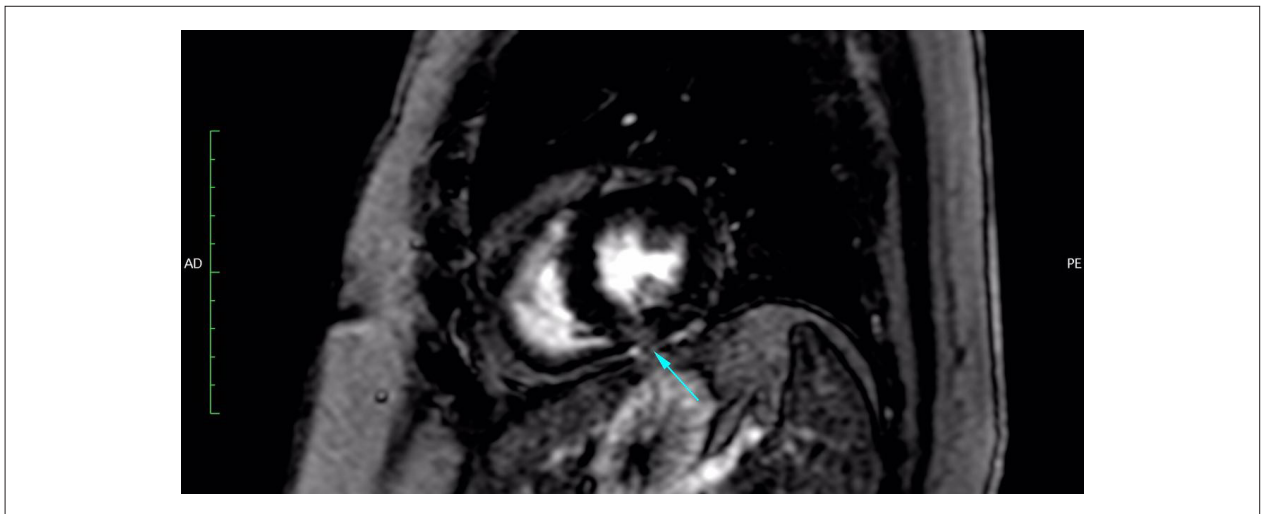


Figure 1 – Short-axis: left ventricular late gadolinium enhancement on cardiac magnetic resonance imaging. Note epicardial delayed enhancement (arrow).

Authors' contribution

Research creation and design: Santos ECL; Data acquisition: Lima GAFCA; Data analysis and interpretation: Ávila R; Manuscript drafting: Lima GAFCA; Critical review of the manuscript for important intellectual content: Santos ECL, Figueiredo EA, Sá MPBO; Translation: Santos ECL, Lima GAFCA.

Potential Conflicts of Interests

There are no relevant conflicts of interests.

Funding Sources

This study had no external funding sources.

Academic Association

This study is not associated with any graduate programs.

References

1. Obeyesekere I, Hermon Y. Arbovirus heart disease: myocarditis and cardiomyopathy following dengue and chikungunya fever--a follow-up study. *Am Heart J.* 1973;85(2):186-94. PMID: 4688831
2. Obeyesekere I, Hermon Y. Myocarditis and cardiomyopathy after arbovirus infections (dengue and chikungunya fever). *Brit Heart J.* 1972;34(8):821-7. Doi: <http://dx.doi.org/10.1136/hrt.34.8.821>
3. da Cruz Ferreira DA, Degener CM, de Almeida Marques-Toledo C, Bendati MM, Fetzler LO, Teixeira CP, Eiras AE. Meteorological variables and mosquito monitoring are good predictors for infestation trends of *Aedes aegypti*, the vector of dengue, chikungunya and Zika. *Parasit Vectors.* 2017;10(1):78. doi:10.1186/s3071-017-2025-8
4. Menon PR, C K, Sankar J, Gopinathan KM, Mohan G. A child with serious Chikungunya virus (CHIKV) infection requiring intensive care, after an outbreak. *Indian J Pediatr.* 2010;77(11):326-8. doi:10.1007/s12098-010-0174-2
5. Mirabel M, Vignaux O, Lebon P, Legmann P, Weber S, Meune C. Acute myocarditis due to Chikungunya virus assessed by contrast-enhanced MRI. *Int J Cardiol.* 2007;121(1):e7-8 doi:10.1016/j.ijcard.2007.04.153
6. Simon F, Paule P, Oliver M. Chikungunya virus-induced myopericarditis: toward an increase of dilated cardiomyopathy in countries with epidemics? *Am J Trop Med Hyg.* 2008; 78(2):212-3. doi: <https://doi.org/10.4269/ajtmh.2008.78.212>
7. Montera MW, Mesquita ET, Colafranceschi AS, Oliveira Jr AC Jr, Rabischoffsky A, Ianni BM, et al. I Brazilian guidelines on myocarditis and pericarditis. *Arq Bras Cardiol.* 2013;100(4 Suppl 1):1-36. doi: 10.5935/abc.2013S004