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Electrocardiographic changes in patients with Chikungunya fever

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ABSTRACT

Chikungunya virus fever (CHIKV) is significantly affecting the Americas since 2014. Cardiovascular disorders such as arrhythmias, myocarditis, pericarditis, myocardial infarction have occurred in previously healthy cases. Although that, there is a lack of publications assessing it. We report a series of 14 cases of patients with CHIKV infection with suspicion of cardiovascular and electrocardiographical alterations (myocarditis) from an endemic area, Tolima, Colombia.

Keywords: Chikungunya; ECG; Myocarditis; Epidemiology; Colombia

INTRODUCTION

Chikungunya virus fever (CHIKV) is significantly affecting the Americas since 2014⁽¹⁾. CHIKV is not generally a life-threatening condition, but since 2005 severe clinical forms of the infection have been described⁽¹⁻²⁾. Cardiovascular disorders such as arrhythmias, myocarditis, pericarditis, myocardial infarction have occurred in previously healthy cases⁽²⁾. Although that, there is a lack of publications assessing cardiovascular, echocardiographical and electrocardiographical (ECG) changes in patients with Chikungunya, and most of them are case reports from the 2005-2007 epidemics on Reunion Island⁽³⁾. No previous studies or even case reports have described during current epidemics in the Americas (2014-2015). For this reason, we report a series of 14 cases of patients with CHIKV infection with suspicion of cardiovascular and electrocardiographical alterations (myocarditis).

METHODS

We assessed CHIKV infection (serological and virologically), clinical features and ECG findings in patients admitted to the Hospital Santa

Bárbara de Venadillo in Colombia during January-May 2015. During that period a total of 2353 cases of CHIKV were attended at this institution.

RESULTS

Of the patients included in this report (0.6%), nine were female, with a mean age 41 y-old (range 16-75, only four of them were >50 y-old). All the patients presented with fever and polyarthralgia with serological (IgM ELISA) and/or molecular confirmation (RT-PCR) of CHIKV infection and no dengue (using IgM ELISA). All patients presented chest pain, palpitations and fainting. Myocarditis was suspected in all of them. Rhythm disturbances occurred in 10 of them (71%) (Table 1), and included sinus tachycardia (3 of them), hemiblocks (2 of them), left ventricular hypertrophy (2 of them), ST segment depression (2 of them), among other alterations (Table 1).

Half of the patients had no previous history of cardiovascular diseases (among these one had hypertension and another diabetes mellitus type 2) (Table 1). No fatalities were recorded in this series and all patients recovered in two weeks from acute

infection and ECG alterations. Other infectious diseases, including respiratory infections such as influenza were ruled out.

DISCUSSION

As in other series, ECG alterations were seen in patients previously healthy and young ⁽²⁾. ST segment and T waves changes, disturbances in conduction and rhythm, have been reported as associated with dengue and Chikungunya myocarditis ⁽⁴⁾, as seen in our series. Although there was not a systematic evaluation of each of the 2339 cases to ensure an unbiased evaluation/screen for potential cardiac involvement, we found this first preliminary retrospective series of 14 cases which show significant cardiovascular manifestations and would lead to a prospective systematic ECG assessment in patients with CHIKV.

Cardiovascular system involvement in CHIKV has the potential to cause significant morbidity and even sometimes mortality. Although often transient; direct viral invasion, immune mechanisms, electrolyte imbalance, derangement of intracellular calcium ion storage, lactic acidosis, and ischemia due to

Table 1. Electrocardiographic changes in patients with Chikungunya fever in a series from Colombia

No	Age (y-old)	Sex	Previous history of CVD	Comorbidities	ECG findings
1	16	F	No	No	Shift in the QRS axis leftward, left anterior hemiblock
2	25	M	No	No	Normal
3	29	M	No	Previous abdominal surgery due to peritonitis	Left ventricular hypertrophy (LVH)
4	30	F	No	Previous C-section, preeclampsia	Inferior wall acute myocardial infarction, sinus tachycardia
5	46	F	No	Smoking	U waves
6	60	F	No	No	Normal
7	60	F	No	No	Normal
8	75	M	No	No	Shift in the QRS axis rightward, posterior hemiblock, LVH, early repolarization of inferior wall, U waves
9	21	F	Yes	Obesity	Sinus tachycardia
10	36	F	Yes	Obesity, concurrent breast cancer	Sinus tachycardia
11	36	M	Yes	Previous bariatric surgery	Normal
12	45	M	Yes	Previous abdominal surgery	Poor R wave progression at precordial leads, repolarization disturbances, ST segment depression at inferior wall (ischemia)
13	47	F	Yes	Diabetes mellitus type 2	Sinus bradycardia
14	52	F	Yes	Hypertension	ST segment depression at inferior wall (ischemia)

F=Female; M=Male. CHIKV=Chikungunya virus. CVD=Cardiovascular disease.

hypotension, all play a role in myocardial dysfunction, would be involved in patients with CHIKV, as has been reported in dengue⁽⁵⁾. In both arboviral infections, knowledge on cardiac manifestations, exact pathophysiology as well role of specific agents in the prevention and treatment of cardiac complications is still requiring study.

Although its limitations, as not echocardiographic assessment was done, this series, the first in the region, adds evidence of ECG alterations in patients with confirmed CHIKV infection. As CHIKV progress as a serious problem in the tropical Americas⁽¹⁾, its cardiac involvement is worrisome. As happens in dengue, probably in CHIKV asymptomatic myocarditis would be also occurring⁽⁵⁾. Even more, the overlap with other complications would be also seen. Then, a high index of suspicion is needed to identify cardiac involvement early. Echocardiography is the most useful investigation as has been suggested^(3,5). Finally, also is important to highlight that clinical features of atypical cases could be grouped mainly into three major categories: exacerbation of underlying medical conditions, deterioration of a previously unrecognized disorder, or exaggerated direct response to CHIKV⁽²⁾. All of them would have serious implications in cardiovascular complications and deserve further study and attention in the region of the Americas where current epidemics (2014-2015) carry more than a million of cases. This report should help prepare cardiologists and infectious diseases physicians in endemic regions but also to those in non-endemic regions attending patients returning from endemic areas, who care for such patients to know what to expect.

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