Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Case Report

Dengue myocarditis masquerading as ST elevation myocardial infarction

Lt Col Balbir Singh ^a, Lt Col Nitin Bajaj ^{b,*},
Maj Gen Prashant Bharadwaj, vsm** ^c, Air Cmde D.S. Chadha ^d

^a Classified Specialist (Medicine) & Senior Resident (Cardiology), Military Hospital Cardiothoracic Centre, Pune 411040, India

^b Classified Specialist (Medicine & Cardiology), Command Hospital (Northern Command), Udhampur, India

^c Deputy Commandant, Army Hospital (Research and Referral), New Delhi, India

^d Consultant (Medicine and Cardiology), Command Hospital (Air Force), Bengaluru, India

ARTICLE INFO

Article history:

Received 18 February 2018

Accepted 12 July 2018

Available online 16 October 2018

Keywords:

Dengue fever

Myocarditis

ST elevation myocardial infarction

Spectrum of the cardiac involvement with dengue fever and its management is discussed.

Case report

A 22-year-old male patient, with no modifiable cardiac risk factors presented to a physician in a peripheral hospital with a history of fever of 2 days duration. Fever was continuous, high grade associated with chills, rigors, and myalgias. He also had a dull aching atypical precordial chest pain at the time of initial presentation. Clinical examination revealed tachycardia with temperature of 102°F. Systemic examination was unremarkable. His initial investigations revealed normal hematological and biochemical parameters, with a platelet count of 1.7 lac/mm.³ Peripheral blood smear and rapid diagnostic test for malaria was negative. His chest radiograph was normal. ECG showed ST elevation in II, III, aVF, and V3-V6 (Fig. 1). In view of chest pain and ECG features, a diagnosis of inferior wall STEMI was made at the peripheral hospital, and he was thrombolized with Inj Tenecteplase 35 mg IV bolus and supportive management with fluids and antipyretics. However, his condition worsened, and he developed increasing dyspnea and hypotension. ECG however did not show any evolution of myocardial infarction, but ST elevation persisted. Further evaluation revealed positive IgG and IgM antibody titers for dengue virus.

Introduction

Dengue fever is a common arboviral disease, which has a wide clinical spectrum ranging from a mild febrile illness to severe forms such as dengue hemorrhagic fever and dengue shock syndrome. Cardiac involvement in dengue fever is not uncommon and has been reported in literature since 1970 as nonspecific electrocardiographic (ECG) abnormalities, arrhythmias, raised cardiac biomarkers, myocarditis, and pericarditis.¹ In this report, we discuss a 22-year-old young male patient who presented with dengue fever and ECG changes mimicking a ST elevation myocardial infarction (STEMI).

* Corresponding author.

E-mail address: nitinbajaj.76@gmail.com (N. Bajaj).

<https://doi.org/10.1016/j.mjafi.2018.07.007>

0377-1237/© 2018, Armed Forces Medical Services (AFMS). All rights reserved.

Fig. 1 – 12-lead electrocardiogram of the patient showing ST elevation in lead II, III, aVF, V3 to V6. ECG: electrocardiographic

He was transferred to our center for further management. On admission at our hospital, he had a pulse rate of 130/min, blood pressure of 80/56 mm Hg, respiratory rate of 24 breaths per minute, with pallor, bipedal pitting edema, cold extremities, and no evidence of mucocutaneous bleed. Systemic examination revealed bilateral basal crepitations along with S3 gallop; abdomen and neurologic examination was normal. Laboratory investigations revealed hemoglobin 9.9 gm/dl, hematocrit 35%, platelet count 80000/mm³. Troponin I was 2705 pg/ml (normal <14 pg/ml), and brain natriuretic peptide was 258 pg/ml (normal <125 pg/ml). His biochemical parameters including the renal functions were normal. Chest radiograph revealed a normal sized heart with blunting of left costophrenic angle and bilateral hilar prominence with upper lobar venous diversion. ECG revealed persistent ST elevation in leads II, III, aVF, V3-V6, and QTc of 410 msec. Echocardiography revealed a markedly reduced left ventricular ejection

fraction (LVEF) of 25% with global hypokinesia (Fig. 2). Ultrasound of abdomen revealed mild ascites with a normal liver size. His peripheral blood smears were negative for toxic granules. In view of a background of dengue viral infection ECG changes and echo findings of global hypokinesia, a diagnosis of dengue fever with secondary myocarditis leading to heart failure was considered, and he was managed with central venous pressure (CVP) guided IV fluids, dobutamine infusion, and low-dose furosemide infusion. Heparin and antiplatelets were stopped. On Day 2, he was noted to have thrombocytopenia (platelet count 10,000/mm³) requiring one unit single donor platelet (SDP) transfusion. He started recovering from Day 4 onward with improvement in hemodynamic status, rising platelet count so inotropic support was tapered off, and he was started on angiotensin inhibitors, beta blockers, diuretics, and aldosterone antagonists. Patient showed gradual improvement with recovery from heart

Fig. 2 – M mode echocardiography image in parasternal long axis view at the level of mitral valve leaflets showing a reduced LV function of 25%. LV: left ventricular.

failure, normalization of ECG over next 2 weeks, and improvement of LVEF to 40%. A coronary angiogram done showed normal coronaries with no obstructive lesions proving the diagnosis of myocarditis (Fig. 3). On follow-up after 6 months, his LVEF had shown considerable improvement and was recorded to be 50% (Fig. 4).

Discussion

Cardiac manifestations in dengue fever have been widely reported in literature. However, the incidence and the type of cardiac involvement is varied as most of the patients have subclinical cardiac involvement and are asymptomatic. Different criteria have been used for diagnosis of cardiac involvement with dengue infection i.e. ECG abnormalities, echocardiographic abnormalities, and biomarker elevation.¹

The majority of cardiac manifestations are asymptomatic and can be seen as transient ECG or echocardiographic abnormalities. The most common ECG finding reported as a part of dengue fever is sinus bradycardia, and other lesser common findings include ventricular premature beats, Atrio Ventricular (AV) dissociation, and rarely ventricular tachycardia.² Echocardiographic abnormalities seen as a part of dengue fever are transient systolic and diastolic dysfunction, mild regurgitation of AV valves, right ventricular or left ventricular (LV) dilatation, and in some cases severe LV systolic dysfunction.¹ In most of these studies, LV systolic dysfunction is mild; however, some cases of severe LV dysfunction with cardiogenic shock have been reported. Wali et al. in an Indian study reported reversible transient LV dysfunction in seven out of 17 patients with complete recovery of LV function over 3 weeks.³

In few studies, rise of biomarkers has been noted in patients with dengue fever associated with myocarditis. A study from Sri Lanka investigated the association of biomarkers such as myoglobin, creatine kinase-muscle brain type, N-terminal pro-brain natriuretic peptide, heart-type fatty acid binding protein, and troponin T in patients with dengue infection. This study found that at least one of the biomarkers was raised in 25% of cases of dengue infection.⁴

There are very few case reports in literature of dengue fever mimicking myocardial infarction (MI) and leading to severe LV systolic dysfunction.^{5–7} In such patients, the ECG changes can be suggestive of affection of any of the vascular territory. ECG in these patients generally reveals global hypokinesia with severe LV systolic dysfunction. The outcome in these patients have been variable with some patients succumbing to the disease in spite of all supportive measures such as intraaortic balloon pump and extra corporeal membrane oxygenation.^{6,7}

Echocardiography is the mainstay of diagnosis of myocarditis as it is easily available in most of the hospitals. Cardiac magnetic resonance imaging (MRI) provides valuable additional information on diagnosis of myocarditis but is not freely available in many hospitals in our country. In a study by Miranda et al., myocarditis was confirmed in 4 out of 12 patients by cardiac MRI.⁸

The pathogenesis of myocarditis as studied by autopsies of patients who died due to dengue complications seems to be due to direct affection of the cardiomyocytes by the dengue virus and concomitant release of inflammatory cytokines.⁸

Our case had a very fulminant course with severe myocarditis leading to cardiogenic shock and ECG findings mimicking as acute MI. Patients with dengue fever especially with severe infections should be screened with ECG for cardiac affection. An ECG should be done for all patients having hypotension. Cardiogenic shock in these patients needs to be excluded from the much more common vasodilatory shock in dengue due to capillary leakage.

The clinical importance of this case report is to sensitize the readers to cardiac manifestations of a common medical illness of the Indian subcontinent. Myocarditis masquerading, as MI can have therapeutic implications as the standard therapeutic modalities (antiplatelets, anticoagulants, and fibrinolytics), used for the management of patients with MI can lead to severe bleeding complications in these patients more so in the presence of thrombocytopenia. Thus it is imperative to keep in mind the presence of myocarditis in this clinical setting and refrain from using fibrinolytic drugs without further confirmation of the diagnosis.

Fig. 3 – Coronary angiogram of the patient showing normal left (A) and right (B) coronary arteries.

Fig. 4 – Follow-up echocardiography image of the patient showing a much improved left ventricular ejection fraction (LVEF).

Conflicts of interest

The authors have none to declare.

REFERENCES

1. Satarasinghe RL, Arulnithy K, Amerasena NL, et al. Asymptomatic myocardial involvement in acute dengue virus infection in a cohort of adult Sri Lankans admitted to a tertiary referral centre. *Br J Cardiol.* 2007;14:171–173.
2. Sheetal S, Jacob E. A study on the cardiac manifestations of dengue. *J Assoc Phys India.* 2016;64:30–34.
3. Wali JP, Biswas A, Chandra S, et al. Cardiac involvement in dengue haemorrhagic fever. *Int J Cardiol.* 1998;64:31–36.
4. Wichmann D, Kularatne S, Ehrhardt S, et al. Cardiac involvement in dengue virus infections during the 2004/2005 dengue fever season in Sri Lanka. *Southeast Asian J Trop Med Publ Health.* 2009;40:727–730.
5. Patra S, Bhardwaj G, Manohar JS, Srinivasa KH, Kharge J, Manjunath CN. Acute myocardial infarction being the presentation of dengue myocarditis. *J Cardiovasc Dis Res.* 2013;4:159–161.
6. Ku YH, Yu WL. Fatal dengue myocarditis despite the use of extracorporeal membrane oxygenation. *Case Rep Infect Dis.* 2016;2016:5627217.
7. Miranda CH, Borges MC, Schmidt A, et al. A case presentation of a fatal dengue myocarditis showing evidence for dengue virus-induced lesion. *Eur Heart J.* 2013;2:127–130.
8. Miranda CH, Borges MC, Matsuno AK, et al. Evaluation of cardiac involvement during dengue viral infection. *Clin Infect Dis.* 2013;57(6):812–819.