

An Unusual Presentation of Dengue Myocarditis: A Case Report

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Abstract

Dengue fever (DF) is a common mosquito-borne viral illness, with various cardiovascular implications, including electrocardiographic abnormalities, due to profound myocardial involvement (myocarditis) by the dengue virus. Here, we are describing an untraditional presentation of DF, in which a young male encountered with cardiac rhythm abnormalities without fever, thrombocytopenia, or capillary leakage. The patient had symptomatic hypotension, and his electrocardiogram (ECG) demonstrated alternative patterns of ventricular bigeminy and trigeminy. Serum electrolytes, total leukocyte counts, and renal function tests were normal, but cardiac biomarkers were elevated in this patient. Two-dimensional echocardiography demonstrated global left ventricular wall hypokinesia with an ejection fraction of 53%, but the coronary angiography indicated no vascular thrombus or occlusion. Subsequent evaluation found that the dengue IgM antibody by enzyme-linked immunosorbent assay was positive in this patient. He was managed conservatively for this and had a splendid recovery in the form of normal ECG at the time of discharge and echocardiography on follow-up. The case delineates a rare and challenging presentation of cardiac involvement in DF.

Keywords: Cardiac manifestations, dengue fever, dengue myocarditis, electrocardiography, ventricular bigeminy, ventricular trigeminy

INTRODUCTION

Dengue fever (DF) is a relatively common mosquito-borne febrile illness, which is caused by single positive-stranded RNA virus called dengue virus. The virus has four serotypes, i.e., DENV1, DENV2, DENV3, and DENV4 and belongs to genus *Flavivirus*.^[1] Typically, DF presents as an acute febrile illness with capillary leak, leading to hypotension and major organ system involvement.^[2] The latter complication affects relatively less individuals and among various organ systems, the cardiovascular system is more profoundly affected due to direct myocarditis and capillary leak-related hypotension. Various cardiac manifestations include rhythm abnormalities, myocardial dysfunction, or depression leading to systolic or diastolic deviance, asymptomatic cardiac biomarker elevation, and frank heart failure.^[3] In rhythm aberrancies, commonly encountered patterns are sinus tachycardia, second degree and complete atrio-ventricular block, paroxysmal supraventricular tachycardia, and acute atrial fibrillation, and myocarditis has been particularized for all these changes.^[1]

CASE PRESENTATION

A previously healthy 28-year-old non-smoker, non-alcoholic male was referred to our emergency department in shock with a history of restlessness and dizziness for past 1 day. The symptoms started gradually and were more on standing and walking, with no associated syncopal episodes or palpitations. Fever complaint was absent and the patient had no history of diarrhea or vomiting. He was addiction-free and never suffered from any chronic illness. On examination, the patient had normal built, respiratory pattern and consciousness level. Blood pressure was documented to be 78/46 mmHg with a regular and low volume pulse and normal capillary oxygen saturation. Systemic examination, including respiratory, nervous, and cardiovascular systems, revealed no abnormality.

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The 12-lead electrocardiography (ECG) in this patient demonstrated multiple ventricular premature complexes with normal sinus beats in-between, forming an alternative ventricular bigeminy and trigeminy pattern [Figure 1]. There were no ST-segment changes, but a qualitative troponin T-test was found to be positive in this patient. His chest X-ray had no abnormality, so intravenous fluids were started promptly to correct his blood pressure and the patient was shifted to the intensive care unit subsequently. Two-dimensional echocardiography was performed after the initial stabilization and demonstrated mild global left ventricular hypokinesia with wall motion score index of 1.5 and ejection fraction (EF) of 53%. All these findings raised the possibility of acute myocardial infarction and the patient underwent percutaneous coronary intervention, but the modality demonstrated no vessel pathology or thrombosis in any part.

Meanwhile, the laboratory tests depicted a hemoglobin level of 15.8 g/dL (normal 13–16), hematocrit of 48.5% (normal 40–50%), white blood count of $5.5 \times 10^9/\text{L}$ (normal 4–11), and a platelet count of $156 \times 10^9/\text{L}$ (normal 150–450). Serum electrolytes including magnesium and calcium, liver function test, renal function test, and coagulation profile were within the normal range, but creatine phosphokinase-MB (CPK-MB) had a value of 56 IU/L (normal <25). Despite raised cardiac biomarker, his ECG demonstrated normal sinus rhythm from day 3 onwards [Figure 2] and the patient was maintaining a normal blood pressure following this conservative management. He was then shifted to the general ward, where ultrasound of the

abdomen demonstrated mild free fluid inside the peritoneal cavity with mild hepatosplenomegaly. Autoimmune evaluation, including anti-nuclear antibody, anti-double-stranded deoxyribonucleic acid, and rheumatoid factor levels, was found to be inconclusive, and his thyroid function tests were also in the reference range. Local endemicity and mild hepatosplenomegaly endorsed the evaluation of tropical fever illnesses, and dengue IgM by an enzyme-linked immunosorbent assay was found to be positive in this patient. Other infective etiologies such as malaria, scrub typhus, leptospirosis, and enteric fever were also ruled out by appropriate tests, and his blood culture was sterile after 48 h of the incubation period. In view of cardiac rhythm abnormality, hypotension, left ventricular wall motion abnormality, low EF, and a positive dengue serology, the diagnosis of dengue myocarditis was made. The ongoing conservative management was continued for the next 3 days, following which the patient became completely asymptomatic and was discharged. On repeat echocardiography after 1 months' duration, his left ventricular hypokinetic abnormality reversed and EF improved to 59%.

DISCUSSION

Dengue myocarditis is a complication beyond the usual disease spectrum of DF and can affect up to 27% of the total cases.^[4] The occurrence of this pathology is linked to the direct toxic effect of the virus and immune-related myocardial injury.^[5] Further, according to the recent literature, the involvement is more common in the male population and transient in nature.^[5] Arrhythmias

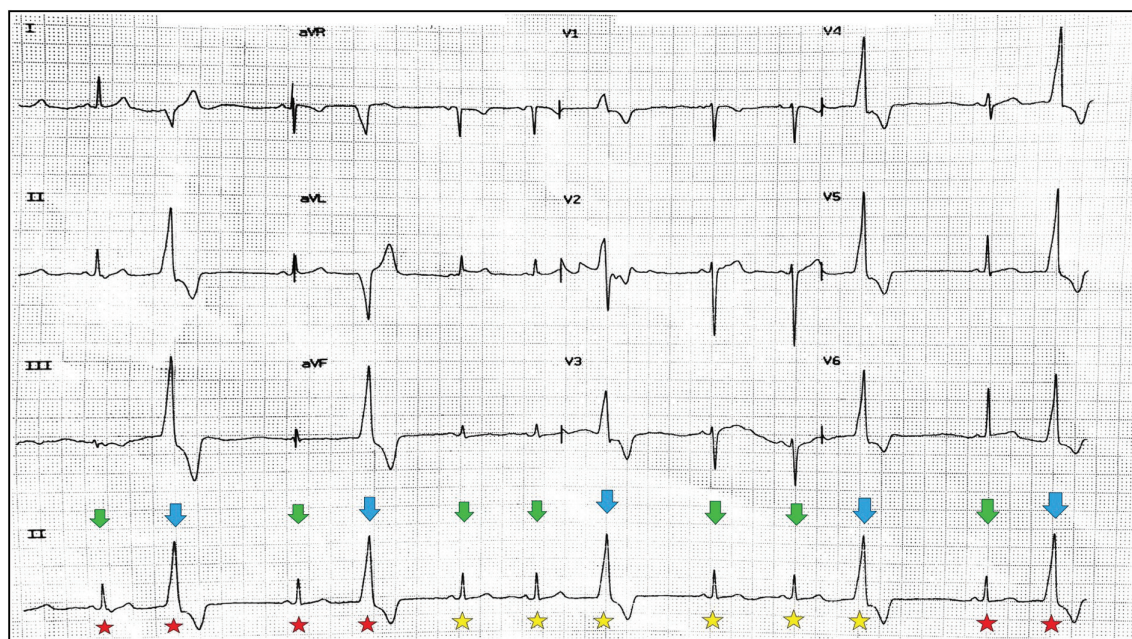


Figure 1: An initial 12-lead electrocardiogram demonstrating multiple ventricular premature complexes (blue arrow) with normal sinus beats (green arrow) in-between, forming an alternative ventricular bigeminy (red star-marked complexes) and trigeminy (yellow star-marked complexes) pattern in lead II

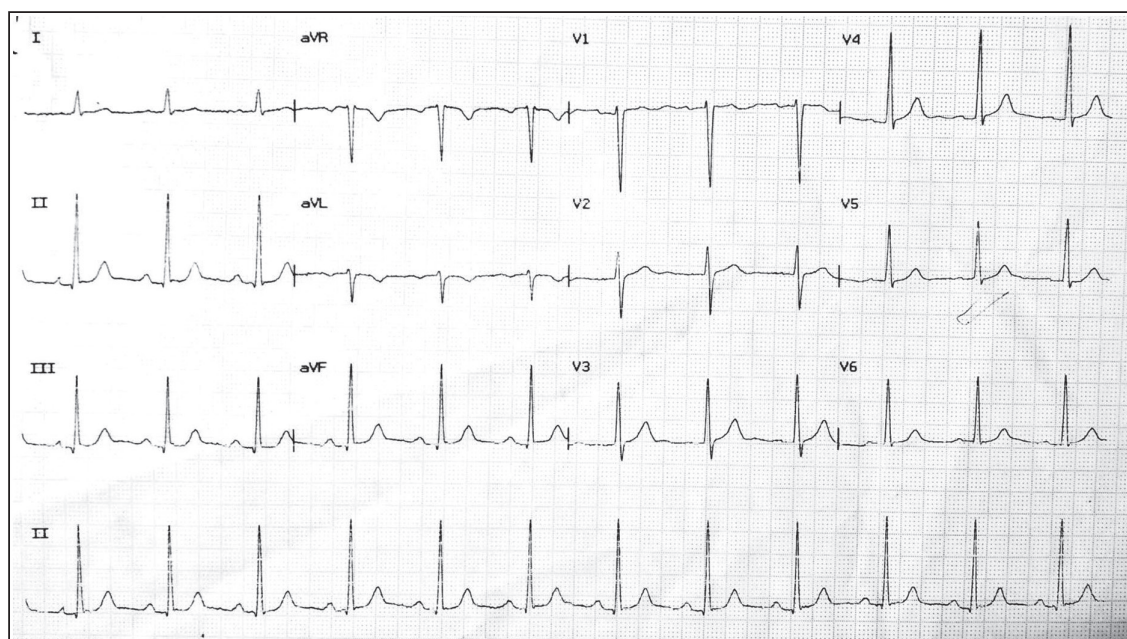


Figure 2: Subsequent electrocardiogram of the patient demonstrating normal sinus rhythm

and left ventricular dysfunction are the two major clinical manifestations of the dengue myocarditis and the electrocardiographic abnormalities are said to be in the range of 34–75%.^[6] The changes include sinus tachycardia and bradycardia, first- and-second degree A-V block, complete heart block, atrial fibrillation, ST-segment changes, and ventricular tachycardia rarely.^[5]

The diagnosis of DF is usually straightforward in the presence of fever, thrombocytopenia, petechiae, ecchymosis, and evidence of capillary leak, but can be laborious in some instances like in our patient. The mere presence of myocarditis can misguide the clinician, leading to unanticipated delay in the objective diagnosis. Existence of chest pain, pleurisy, palpitations, pulse abnormalities, pulmonary edema, and shock can indicate cardiac involvement.^[6] But according to a research, the actual myocardial involvement and clinical evidence of myocarditis can be different.^[5] ECG was the most frequently involved modality in dengue myocarditis, and troponin-T was more superior than CPK-MB in diagnosing the cardiac injury and predicting the mortality. However, ECG changes also do not correlate with the severity of DF and occur more in second dengue virus infection.^[1,7]

The management of DF is supportive and so is for associated myocarditis.^[6] Myocarditis is clinically silent in most of the cases and treatment is unnecessary in asymptomatic patients. Even routine echocardiography is indicated only in the presence of ECG abnormalities.^[6] Hypotension is the most common treatment requiring complication in the context of DF, which can be due to capillary leak or myocarditis. In these scenarios, the presence of rhythm aberrancies

indicates underlying myocarditis. Fluid therapy along with judicious use of inotropic support is the mainstay in the management, and diuretics can be used whenever required.^[8] Injectable steroids and immunoglobulins lack clinical evidence, but calcium correction is a must in optimizing the cardiac status.^[6]

The prognosis of dengue myocarditis is good, when identified and treated timely. The cardiac involvement occurs at the same time when there is vascular leakage in the natural course of the disease and is more prominent in severe DF.^[9] Thus, it is recommended to evaluate severe DF with echocardiography, particularly myocardial tissue Doppler imaging and cardiac biomarkers.^[9] Additionally, dengue vaccine, named Dengvaxia (CYD-TDV), has been introduced in 2015 and is recommended for individuals of 9–45 years of age in endemic zone.^[10] The vaccine is given in three doses (0, 6, and 12 months) and indicated in the endemic area, where the incidence of DF is high.

CONCLUSION

Myocarditis in DF is not an uncommon entity, and the diagnosis of this infirmity can be challenging. Our patient presented with uncommon ECG findings with shock, which describes the variable presentation of dengue myocarditis. Different electrocardiographic patterns have been encountered but none is specific. Still, the ECG abnormalities hold a crucial significance in the clinical identification of these patients. Commonly, the cardiac involvement in DF is transient and requires supportive measures in most cases, but missing the subtle sign can be devastating.

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Conflicts of interest

There are no conflicts of interest.

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