



THE CARDIAC IMPACT OF DENGUE: A FOCUS ON MYOCARDITIS

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ABSTRACT Dengue is an endemic viral fever that may be asymptomatic or cause non-specific flu-like illness [1]. Severe manifestations of dengue include dengue hemorrhagic fever and dengue shock syndrome [1]. Atypical manifestations like central nervous system, cardiovascular, and liver involvement have been increasingly reported which constitutes expanded dengue syndrome [2]. Dengue myocarditis is considered an uncommon complication of dengue fever [3]. Here we present a case report of 22 years 22-year-old male infected with dengue fever who experienced chest pain and breathing difficulty and further workup was suggestive of dengue myocarditis. Physicians should have a high index of suspicion for cardiac complications in dengue patients and should manage accordingly to avoid preventable morbidity and mortality[2].

KEYWORDS : Dengue, Expanded dengue syndrome, Myocarditis.**INTRODUCTION**

Dengue is an arboviral disease caused by flavivirus^[4]. It is transmitted by the bite of a female arthropod particularly *Aedes albopictus* or *Aedes aegypti* mosquitoes^[3]. The mosquito has been infected by one of the four dengue virus serotypes^[3]. The fifth serotype of the virus has been described recently^[3]. Dengue infection is endemic in South and Southeast Asia, Central and Latin America, and Africa^[4]. 100 -400 million new infections can occur per year of which more than 80 percent are mild or asymptomatic as per the World Health Organization^[3]. Dengue fever has three phases, an initial phase with fever and dehydration, a critical phase manifesting as shock from plasma leakage or hemorrhage or organ damage, and a recovery phase with resolution of plasma leakage^[4]. World Health Organization categorizes dengue into severe and non-severe dengue^[5]. Cardiac involvement in dengue was first described by Obeyesekere and Hermon from Sri Lanka in 1972^[1]. Cardiac manifestations of dengue include myocarditis, pericarditis, rhythm disturbances, first and second-degree atrioventricular block, and rarely third-degree heart block^[5]. Myocarditis refers to inflammation of the myocardium and when associated with cardiac dysfunction it can lead to inflammatory cardiomyopathy that may be reversible or not^[1].

CASE REPORT

22 year 22-year-old young male with no known comorbidities presented with the chief complaints of fever associated with myalgia, arthralgia, and retro-orbital pain for the past 3 days. History of retrosternal chest pain on and off for the past 3 days. The patient was evaluated in an outside hospital where Troponin I, Troponin T, and myoglobin levels were elevated. Dengue NS1 antigen was positive. The patient was admitted to Apollo Hospital for further management.

On admission, the patient was conscious and oriented. His pulse rate-108/minute, blood pressure-100/70mmhg, respiratory rate-20/minute, saturation-98% under room air and temperature-100.3Fahrenheit. The patient was started on IV fluids. Electrocardiography showed ST depression in leads V2-V5. 2D Echocardiogram showed ejection fraction-62% and no regional wall motion abnormality. Ultrasound abdomen showed bilateral mild pleural effusion and no ascites or gall bladder wall edema. The cardiologist advised daily electrocardiography monitoring.

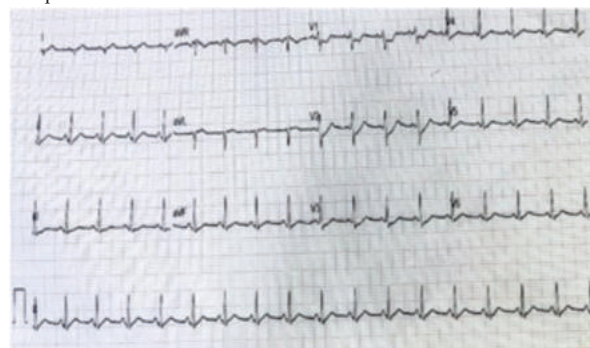
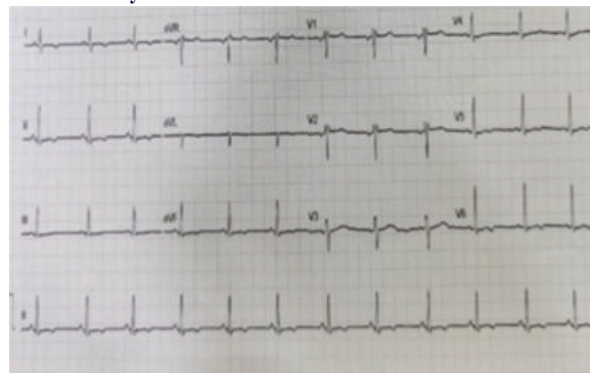
DAY 4: The patient developed chest pain, persistent tachycardia, and shortness of breath on the same day. Hypoxia was managed with oxygen support [1-2 liters] through nasal prongs.

Electrocardiography showed the same changes as on admission. Troponin I level was 25 ng/ml. The repeat troponin I level after 4 hours was 24.01 ng/ml. NTPROBNP level was elevated [3008 pg/ml]. Repeat detailed echocardiogram showed ejection fraction of 50% and mild hypokinesia of left ventricular basal and mid inferior wall with trace pericardial effusion. The patient was diagnosed with dengue myocarditis. Intravenous fluids were stopped to prevent fluid overload. Tachycardia was managed with T.Ivabradine. The patient was

observed in the intensive care unit. Repeat Dengue NS-1 antigen and dengue polymerase chain reaction were positive.

DAY 5: The patient started developing a dry cough the next day. He was evaluated with COVID and H1N1 Polymerase chain reaction which were negative. The patient was started on doxycycline 100 mg twice daily. Scrub IgM was negative, and the antibiotic was stopped. Blood cultures were sterile. The patient had fluctuating platelet counts during the hospital stay.

The patient's tachycardia and hypoxia improved gradually. He was weaned off from oxygen support on day 7. Repeat Troponin I and NTPROBNP levels on day 7 were 0.88 ng/ml and 1990 pg/ml. The patient was shifted to the ward on day 8. The patient's platelet count improved and he was discharged on day 11. The patient was advised to follow up as an outpatient after 2 weeks with a repeat echocardiogram. The patient was educated about the need to avoid strenuous activities.

**ECG 1 On Day Of Admission: ST DEPRESSION IN V1-V5 LEADS****ECG 2 On Day Of Discharge: ECG 2: NEW ONSET RIGHT**

BUNDLE BRANCH BLOCK WITH T WAVE INVERSIONS IN LEAD 1, LEAD 2, aVF, V5 and V6

DISCUSSION

The manifestations of cardiac complication in dengue fever vary considerably^[7]. At one end patients may be asymptomatic or may present with mild cardiac symptoms like transient bradycardia or transient atrioventricular block or ventricular arrhythmias^[7]. On the other end patients can develop pulmonary edema or cardiogenic shock^[7]. Only DEN2 and DEN 3 serotypes were found to be the culprit virus in dengue patients with cardiac complications^[7]. Myocardial involvement in dengue patients can be due to direct viral invasion of cardiac muscles or cytokine mediated immunological storm or both^[7].

Epidemiological data from India suggest that one in 206 dengue infected patients develop cardiac symptoms attributed to myocarditis^[3]. The clinical manifestations of dengue myocarditis can range from silent forms to symptoms of dyspnea, chest pain, cardiogenic shock, heart failure or pulmonary edema^[3]. Mild cases usually resolve spontaneously, whereas myocarditis can also lead to dilated cardiomyopathy which can present as cardiac failure or sudden cardiac death^[3]. Echocardiography usually reveals the structural and functional abnormalities of heart^[3]. In addition cardiac biomarkers like Troponin and NTPROBNP levels are often elevated in myocarditis^[3]. Cardiac magnetic resonance imaging has become a useful non-invasive method because they are not only capable of detecting structural abnormalities but they can also provide information regarding inflammation and myocardial edema^[3]. However endomyocardial biopsy remains the gold standard test for the definitive diagnosis of myocarditis^[3].

Early diagnosis of myocardial involvement, avoiding fluid overload and inotropic support remains the cornerstone in the management of myocarditis in dengue patients^[4].

Inappropriate usage of fluids in dengue myocarditis patient can precipitate volume overload^[1]. Persistence of dysfunction after the illness and cardiomyopathy may necessitate treatment with beta blockers, angiotensin converting enzyme inhibitors or angiotensin receptor blockers, diuretics and antiarrhythmics^[1]. Specific interventions like implantable cardioverter defibrillator and cardiac transplantation may also be required^[1].

Declaration

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