Myocarditis Complicating Pregnancy in Dengue Hemorrhagic Fever- A Case Report

ABSTRACT

We report a case of dengue hemorrhagic fever (DHF) complicated by acute myocarditis and review the literature. A 28-year-old pregnant woman experienced DHF due to dengue virus serotype 3, complicated with acute myocarditis and acute pulmonary edema. Clinically this masqueraded as acute myocardial infarction, with an electrocardiographically depressed ST segment in precordial leads and elevated serum cardiac-specific troponin I level. Under supportive management, the patient recovered 6 days later. Clinical manifestations of cardiac complications varied considerably, from self-limiting tachy-brady arrhythmia to severe myocardial damage, leading to hypotension and pulmonary edema. Although rare, a fatal outcome was reported in some cases of dengue with cardiac complications. Physicians should have a high index of suspicion for cardiac complications in patients with dengue illness in order to avoid preventable morbidity and mortality.

Key words: Myocarditis; Dengue hemorrhagic fever; Pregnancy

Introduction

Dengue is one of the most important mosquito-borne viral diseases in the world. It has reemerged with increased geographical distribution of the mosquito vector\(^1\). Clinically, a non-specific afebrile illness, a mild-form dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) are commonly encountered in dengue epidemics. Many cardiac complications have been reported in dengue-affected patients, which include atrioventricular conduction disorders\(^2\) supraventricular arrhythmia\(^3\) and myocarditis\(^4,5\). We report a case of 28 year pregnant women presenting with myocarditis on account of development of DHF. A better understanding of cardiac complications will potentially improve the treatment of dengue illness by avoiding otherwise preventable morbidity and mortality in the affected patients.

Case Presentation

A 28-year-old woman with G2P1 at 36 weeks presented to the emergency department with complaints of 3-days fever, malaise, and bleeding gums. She did not have any systemic disease, nor did she have a family history of cardiovascular disease. Upon arrival, her temperature was 39.8 °C, pulse rate (PR) 119/min, respiratory rate (RR) 20/min, and blood pressure (BP) 130/80 mmHg; her body weight was 52 kg, and multiple petechiae were found on bilateral legs. Uterus size corresponded to gestation on abdominal examination. Laboratory data revealed that her peripheral white cell count was 10.7 × 10^9/l (normal range 3.9–10.6 × 10^9/l) with 61% polymorphonuclear cells, hemoglobin 10.5 g/dl (normal range 12–15 g/dl), hematocrit 42.4% (normal range 35–45%), platelet count 11.0 × 10^5/l (normal range 150–400 × 10^9/l), prothrombin time 10.2 s (control, 10.6 s), activated partial thromboplastin time...
(aPTT) 71.4 s (control, 30.2 s), aspartate aminotransferase (AST) 2016 U/l (normal value <40 U/l), alanine aminotransferase 947 U/l (normal value <40 U/l), and albumin 2.3 g/dl (normal range 3.0–4.5 g/dl). The chest X-ray was normal. There were no symptoms suggestive of heart failure on clinical examination. A provisional diagnosis of DHF was made based on the findings of fever, bleeding gums, and petechiae, thrombocytopenia (<100 × 10^9/l), and hypoalbuminemia. Intravenous fluid supplementation with 0.9% normal saline infused at a rate of 6 ml/h/kg was started. Twelve units of platelets RDPC (50 ml/per unit) were transfused for thrombocytopenia, and 3 units of fresh frozen plasma (125 ml/per unit) were infused daily for three successive days for coagulopathy.

Fetal well-being was daily monitored by USG and on the 3rd day it was found that, no fetal cardiac activity was recorded and was induced delivered vaginally.

Despite a high fever (ear temperature 39.3 °C), the normal saline infusion was reduced to a rate of 3 ml/h/kg 17 h after her arrival because of stable vital signs (BP 121/63 mmHg; PR 80/min; RR 17/min). Her condition remained uneventful until day 3 when her blood pressure dropped abruptly to 78/51 mmHg, along with PR of 119/min. After intravenous fluid challenge with 6ml/kg/hour of normal saline, her BP increased to 100/67 mmHg with PR of 88/min. An inotropic agent was not administered. Her urine output was not recorded. Because of relative hypotension and persistent fever (ear temperature 38 °C), cefazolin and gentamicin were parenterally administered after blood sampling for culture.

The patient experienced sudden onset of chest pain and shortness of breath 22 h after the emergence of hypotension. On examination, she was conscious but febrile (temperature 38.1 °C), with a PR of 98/min and a BP of 134/95 mmHg. Auscultation revealed coarse rales throughout her chest. A follow-up chest radiograph showed progressive cardiomegaly, perihilar haze, and congestion over bilateral lower lung fields, suggestive of pulmonary edema. The total volume of intravenous fluid supplement and transfused blood components was estimated to be 5000 ml thus far. Intravenous fluid was immediately discontinued in view of pulmonary edema. Laboratory data now revealed that her peripheral white cell count was 16.8 × 10^9/l, hemoglobin 11.0 g/dl, hematocrit 32.3%, platelet count 80 × 10^9/l, aPTT 39.6 s, and albumin 2.0 g/dl with elevated serum cardiac-specific troponin I of 7.23 ng/ml (normal value <0.4 ng/ml). An ECG at this time showed ST segment depression (>1 mm) in precordial leads V3–V6 for which a diagnosis of acute myocardial injury was made based on ECG findings and the high troponin I level. Despite suspicion of an acute myocardial infarction or viral myocarditis, a coronary angiogram for differential diagnosis and to determine the need for primary coronary angioplasty was postponed because of thrombocytopenia and coagulopathy with active bleeding. In addition to oxygen supplement, albumin 25% and furosemide (40 mg) was intravenously infused to correct her pulmonary edema. An echocardiogram performed the following day showed a suboptimal left ventricular function with an ejection fraction of 62% and end-diastolic volume of 79 ml. She continued receiving intravenous albumin plus furosemide for a further 2 days. Effervescence occurred on day 5 and her peripheral white cell count was 13.2 × 10^9/l, hematocrit 37.1%, and platelet count 144 × 10^9/l.

The patient's blood culture was negative for bacterial growth, and a serological test was positive for dengue virus (DEN)-specific IgM & IgG antibody. Clinically she felt much better and refused further coronary angiographic investigations. She was discharged from the hospital after 10 days with TLC 7.8 × 10^9/l, AST 61 U/l, and albumin 3.2 g/dl. However the patient was lost to follow up.

**Discussion**

Dengue is a worldwide public health problem and causes innumerable deaths. More than 40% of the world’s population lives in dengue endemic areas, and the WHO estimates that about 2.5 billion people in 100 countries are at risk of infection and that as many as 100 million people are infected by dengue viruses every year. In the majority of infected people, dengue is a self-limited disease that resolves in 5–7 days. However, approximately 500,000 people develop a severe form, leading to about 20,000 deaths annually. Consequently, approximately 0.5% of dengue patients develop a severe form and require a specialized treatment.6 There are few reports of adult patients with acute heart failure during dengue virus infection, and, in two of them, this complication was considered to be the cause of death.7,8

The presence of IgM and IgG antibodies on the 8th day of disease indicate that this patient might have experienced a secondary dengue infection and complications are more frequent during secondary
infection. Cardiac involvement in dengue and its pathogenesis has been seldom described and poorly investigated. In one study in Sri Lanka, 25% of dengue patients presented with one or more elevated markers of myocardial injury, such as increase in myoglobin, CK-MB, troponin T, N-terminal type B peptide, and/or heart-type fatty acid binding protein levels. In another report of 102 children with DHF, 10 patients had acute myocarditis requiring use of inotropic drugs and one child died. Studying 17 DHF/DSS patients with radionuclide ventriculography, Wali et al. showed that seven patients had ejection fraction less than 40%, 12 had global hypokinesia, and, after 3 weeks of follow up, all alterations had returned to normal. Weerakoon et al. performed autopsies on five patients who died due to dengue complications and showed histopathological evidence of myocarditis. Cardiac arrhythmias due to myocarditis, various arrhythmias have been described during dengue virus infection such as atrial fibrillation, ventricular tachycardia and even atrioventricular blocks. These arrhythmias are associated to syncope and even sudden death.

The mechanism of myocardial damage in dengue could be the release of inflammatory mediators and/or the direct action of the virus on cardiomyocytes, as seen in acute myocarditis caused by other viruses. Other pathogens occurring simultaneously or following dengue infection have been described. In our case, infection by other pathogens was ruled out clinically and with laboratorial and histopathological data. We did not objectively exclude coxsackie B and other virus infections, but the temporal association with a dengue-like disease and the positive serology for dengue confirm dengue virus as the more probable causative agent in this patient.

**Conclusion**

Dengue virus can produce atypical manifestations as acute myocarditis leading to cardiogenic shock and death by a possible direct virus action on cardiomyocytes. Physicians taking care of dengue patients must keep this possible complication into mind.

**References**