

## Case Report

### Acute Pericarditis due to Dengue Fever: An Unusual Cardiac Manifestation

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#### Abstract

Dengue infection is a systemic arboviral infection with a clinically diverse spectrum of manifestations. Its clinical features range from asymptomatic subclinical infection to severe multi-organ involvements including death. Cardiac involvement is documented, but uncommon in dengue. Common cardiac manifestations are conduction abnormalities, myocarditis and pericardial effusion. Acute pericarditis in dengue fever (DF) is a rare incidence. We reported a case of DF which was complicated by acute pericarditis. An 18 years male patient suffered from dengue infection. After 7 days, he felt chest pain. Electrocardiogram (ECG) was interpreted as widespread elevation of ST segment in precordial and limb leads, but troponin-I level was normal. Chest radiograph illuminates cardiomegaly and left sided pleural effusion. Echocardiography also showed moderate pericardial effusion. The patient was treated by supportive management and he recovered. Acute pericarditis due to dengue is a rare condition, but it should be always kept in observance as a probable cause. Early diagnosis and rapid treatment are important for an effective outcome.

**Keywords: Dengue Pericarditis Cardiac.**

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#### Introduction

Dengue fever is an emerging global infectious disease. In the recent decades, this infection is rapidly increasing due to globalization and international travel, climate changes and rapid urbanization with substandard living, and geographic distribution. The dengue virus (DENV) is a single-stranded enveloped RNA virus, which is a member of the genus Flavi virus and the Flaviviridae family. It has four distinct serotypes (DENV1-4).<sup>1</sup> It is mainly transmitted by infected female *Aedes* mosquitoes, predominantly *Aedes aegypti* and *Aedes albopictus*. Infections may transmit through blood transfusion, organ transplantation and vertical transmission. The pathophysiology of this infection is plasma leakage occurred due to increase vascular permeability, which is manifested by pleural effusion, ascites, hypoproteinaemia and pericardial effusion.

In 1970, dengue fever was epidemic in only 9 countries but now more than 128 countries have declared an epidemic, particularly high prevalence in the South and South-east Asia region.<sup>2</sup> The prevalence of DENV infection is estimated 390 million globally in a year, where 96 million had clinical manifestations. There are increasing numbers of cases reported from Bangladesh. The first outbreak of DF occurred in Dhaka in 1964 and

was declared an epidemic in 2000; when 5,551 cases and 93 deaths were reported. Then, a major outbreak occurred in Dhaka, Bangladesh in 2019.<sup>3</sup> In this year, total of 101,354 cases of DENV infection and 164 deaths were reported in Bangladesh.<sup>4</sup>

Cardiac complications include atrioventricular conduction disorders, supraventricular arrhythmia, myocarditis and pericardial effusion may occur in the case of DENV infection. Pericarditis due to DENV infection is a very rare condition. In 2019, we found a dengue fever patient complicated by acute pericarditis. We reported this case for the better management of cardiac complications and for avoiding preventable mortality.

#### Case presentation

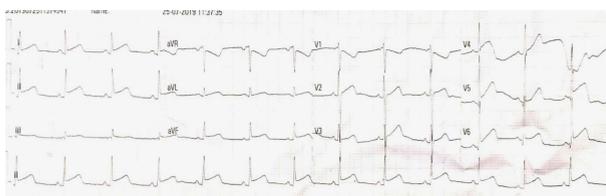
An 18 years male was admitted with the complaints of fever, bodyache and petechiae for 5 days in a tertiary level hospital. His highest recorded temperature was 105°F, blood pressure was 100/70 mmHg. There were petechiae in the multiple areas in the body. Laboratory findings disclosed that white cell count was  $3.59 \times 10^9/l$  (normal range  $3.70-9.70 \times 10^9/l$ ) with 60% polymorphonuclear cells, hemoglobin 13.7 g/dl (normal range 13.30-17.20 g/dl), ESR: 10 mm in 1<sup>st</sup> hour, hematocrit 40.0% (normal

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range 35-45%), platelet count  $62.0 \times 10^9/l$  (normal range  $150-400 \times 10^9/l$ ), prothrombin time 10.1 seconds (control 10.6 seconds), activated partial thromboplastin time (aPTT) 65.4 seconds (control 30.2 seconds), alanine aminotransferase 111 U/l (normal value  $<49$  U/l), and albumin 3.5 g/dl (normal range 3.0-4.5 g/dl). His NS<sub>1</sub> Ag was positive for DF. A tentative diagnosis of dengue haemorrhagic fever (DHF) was made based on the findings of fever, petechiae, thrombocytopenia ( $<100 \times 10^9/l$ ), and positive NS<sub>1</sub> serological test. He was treated accordingly but the temperature was not subsided. Besides on 7<sup>th</sup> day of admission he developed chest pain. Then he was referred to the National Institute of Cardiovascular Diseases and Hospital (NICVD), Dhaka, Bangladesh.



**Figure 1: ECG showing widespread ST segment elevations**

ECG showed widespread ST segment elevations, subtle PR segment deviation (Figure 1). Chest pain was retrosternal, sharp stabbing in nature, radiate to the neck and trapezius muscle, exacerbated by inspiration, deteriorates when supine position and subsides upon sitting upright and leaning forward. Clinical examination revealed tachycardia with the temperature of 101°F. His blood pressure was 105/70 mmHg and respiratory rate 16/minute, JVP was normal. No cyanosis, clubbing or lymphadenopathy was found. Heart sounds were muffled. Other systemic examinations were unremarkable.

In our hospital setting, laboratory findings showed peripheral white cell count was  $6.30 \times 10^9/l$  (normal range  $3.70-9.70 \times 10^9/l$ ) with 65% polymorphonuclear cells, hemoglobin 13.5 g/dl (normal range 13.30-17.20 g/dl), ESR: 10 mm in 1<sup>st</sup> hour, hematocrit 38.0% (normal range 35-45%), platelet count  $160.0 \times 10^9/l$  (normal range  $150-400 \times 10^9/l$ ).



**Figure 2: Chest X-ray showing cardiomegaly and left sided pleural effusion**

Chest radiograph (CXR) revealed cardiomegaly and left sided pleural effusion (Figure 2). Echocardiography showed the presence of moderate pericardial effusion (Figure 3). Cardiac troponin-I was 0.27 ng/ml (normal: upto 0.49). The pericardiocentesis was performed which produces about 300cc straw in coloured fluid. The results of the examination of pericardium fluid presented- color: straw, total protein: 3 g/dl, glucose: 85 mg/dl, WBC count: 200/cmm, polymorphs: 20%, lymphocyte: 80%, RBC: 0.000, Fluid for ADA: 20 U/L, AFB: No AFB was seen, GeneXpert MTB/RIF: *Mycobacterium tuberculosis* Complex not detected, No malignant cell was identified.



**Figure 3: 2D Echocardiography showing pericardial effusion**

The diagnosis was acute pericarditis due to dengue fever based on clinical manifestations and laboratory findings. The patient was treated accordingly. Gradually his fever subsided and chest pain was relieved. The patient was discharged 10 days after admission to the hospital with complete resolution of the symptoms.

## Discussion

The prevalence of DENV infection is readily increasing worldwide. The incidences of dengue have increased by 30-folds in the last five decades; also remarkably in our country.<sup>5</sup> Atypical manifestations of DENV infection are progressively being reported. Cardiac complications vary significantly in this infection. It is ranging from asymptomatic bradycardia to life-threatening myocarditis and pericardial effusion.<sup>6</sup> Patients may experience acute pulmonary edema and/or cardiogenic shock due to severe myocardial cell damage with left ventricular failure. The pathogenesis is not clear yet. Maybe the direct viral invasion, immune mechanisms, electrolyte imbalance, derangement of intracellular calcium ion storage, lactic acidosis, and ischemia due to hypotension are responsible.<sup>7</sup>

The incidence of cardiac complications in a patient with dengue infection varies pointedly. Wali et al, in a study, found that acute reversible cardiac arrest noted in DHF/DSS and causes hypotension or shock in these patients.<sup>8</sup> Goutam et al. reported that Cardiac manifestations of

Dengue were present in 11.4% of patients.<sup>9</sup> Agarwal et al. reported that only 1 out of 206 patients experienced cardiac symptoms in cardiovascular evaluation.<sup>10</sup> A study in Sri Lanka revealed that 62.5% of patients with DF had an abnormal ECG.<sup>11</sup> Another cohort study in Sri Lanka demonstrated that most of the cases with cardiac complications are clinically mild and self-limited.<sup>12</sup>

Pericardial involvement in dengue infections is not so common. Our case is really rare because only few cases have been reported till now. Nagaratnam et al. defined 3 cases of pericarditis with myocarditis.<sup>13</sup> Tayeb et al. reported 1 case ECG interpretation revealed acute pericarditis.<sup>14</sup> Bhatti et al. conveyed that acute pericarditis is an unfamiliar presentation of DF.<sup>15</sup> Goh reported a case of fulminant DSS with perimyocarditis that was complicated during clinical management.<sup>16</sup> Ramanathan et al. reported that dengue myopericarditis represents acute myocardial infarction.<sup>17</sup>

However, in the case of the majority of patients, the severity of dengue virus infections is mild; a small portion has developed severe complications, which may cause death if the patient does not manage properly. It is indeed to identify the complications, particularly cardiac conditions.

## Conclusion

Cardiac involvement is an important and neglected complication of dengue infection and a part of expanded dengue syndrome. A few patients undergo proper cardiac assessment for dengue infections, especially in endemic areas. So, the exact incidence of dengue pericarditis is uncertain. Acute pericarditis should be excluded in the patient who presented chest pain along with fever. The clinical assessments and proper management of the DF patients can prevent the fatality due to severe cardiac manifestations.

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