

# Dengue fever complicated with ST elevation myocardial infarction with atypical features: A case report

SAGE Open Medical Case Reports  
Volume 12: 1–4  
© The Author(s) 2024  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/2050313X231225342  
journals.sagepub.com/home/sco



Ashutosh Kashyap<sup>1</sup> , Laxmi Raj Bhatta<sup>2</sup>, Bhuwan Bhatta<sup>3</sup>,  
Prakash Nepali<sup>4</sup>, Pratigya Gyawali<sup>1</sup>, Ashik Rajak<sup>5</sup>   
and Sarita Dhakal<sup>6</sup>

## Abstract

Dengue fever is an arboviral infection whose presentation ranges from a mild febrile illness to a multisystem complicated syndrome. We report a case of 58-year-old female presenting with fever, myalgia, arthralgia, and vomiting who was found to be infected with dengue and had electrocardiography changes revealing ST-segment elevation myocardial infarction, a rare manifestation in dengue. Dengue fever can affect the cardiovascular system leading to conduction abnormalities, hypotension, arrhythmias, myocarditis, cardiomyopathy, and occasionally myocardial infarction, which has been reported in only a few case reports prior to this. The differentiation between myocarditis and myocardial infarction is essential for which echocardiography and coronary angiography can be helpful. It is essential to keep an eye on the cardiovascular complications in a dengue patient as the presentation can be quite subtle with devastating consequences.

## Keywords

Dengue, STEMI, myocarditis, case report

Date received: 13 October 2023; accepted: 19 December 2023

## Introduction

Dengue is an arboviral infection, caused by four dengue virus serotypes and transmitted by mosquitoes of the genus *Aedes*. Dengue is endemic in over 100 countries with an estimated 30 folds increase in its incidence over past 50 years and is rapidly transforming into a global problem.<sup>1</sup> The disease has a wide clinical spectrum, ranging from a mild febrile illness to severe manifestations like dengue hemorrhagic fever and dengue shock syndrome, as seen in around 5% of the dengue patients.<sup>2</sup> In severe forms, the disease can manifest with severe bleeding and multi-system involvement in the form of hepatitis, neurological dysfunction or cardiovascular complications.<sup>3</sup> Dengue has been known to cause cardiovascular complications, reported in up to 12.5% patients with severe dengue, in the forms of conduction abnormalities, hypotension, arrhythmias, myocarditis, pericarditis or cardiomyopathy.<sup>3,4</sup> In this report, we describe a case of 58-year-old female patient with ST-elevation myocardial infarction (STEMI) complicating dengue fever who had presented to a tertiary care center in Nepal.

## Case presentation

A 58 years old female from Western Nepal presented during a dengue outbreak, with complaints of fever for 4 days, myalgia and arthralgia. The fever was intermittent in nature, documented maximum of 102°F, associated with chills and relieved with oral paracetamol. She had multiple episodes of

<sup>1</sup>Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University, Kathmandu, Nepal

<sup>2</sup>Department of Internal Medicine, Lalratna Hospital, Kailali, Nepal

<sup>3</sup>Department of Radiology, Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal

<sup>4</sup>Department of Internal Medicine, Chitwan Medical College and Teaching Hospital, Chitwan, Nepal

<sup>5</sup>Department of Internal Medicine, Kathmandu Medical College and Teaching Hospital, Kathmandu, Nepal

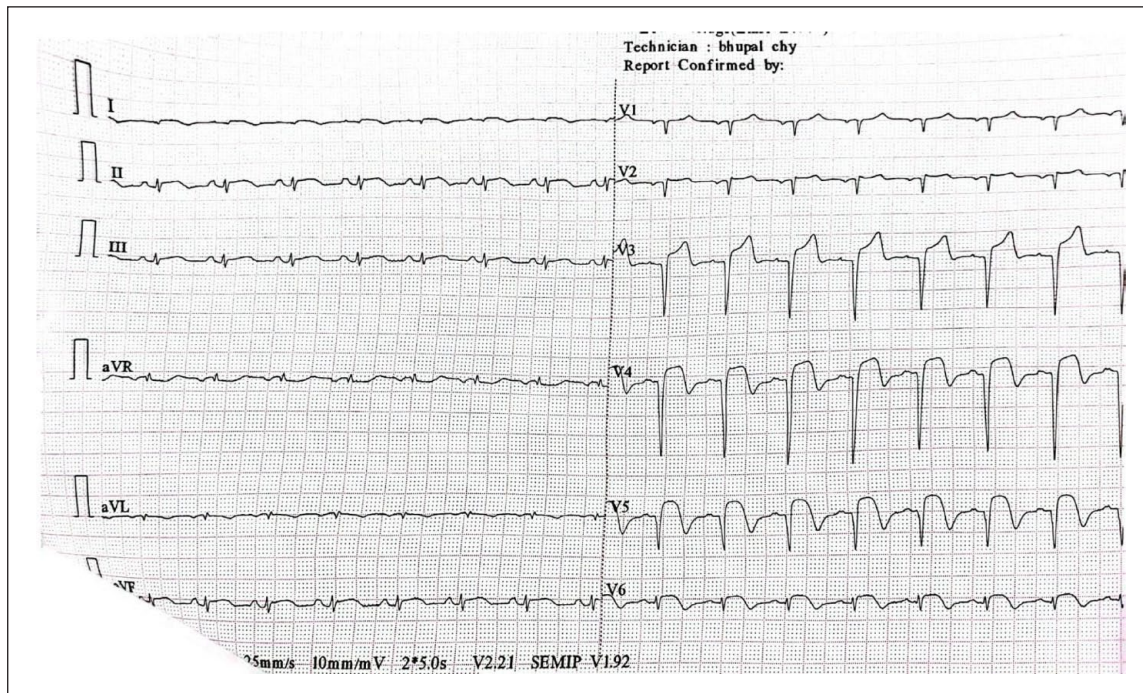
<sup>6</sup>Birat Medical College and Teaching Hospital, Biratnagar, Nepal

## Corresponding Author:

Ashutosh Kashyap, Maharajgunj Medical Campus, Institute of Medicine, Tribhuvan University, Kathmandu 44600, Nepal.

Email: ashutosh7kashyap@gmail.com





**Figure 1.** Electrocardiography of the patient.

nonbilious, non-projectile vomiting. She also had a history of throat discomfort but without any dysphagia. She gave history of reduced appetite, weakness, fatigue and light-headedness upon standing from a sitting position. There was no history of headache, alteration or loss of consciousness, abnormal body movements, rash, flu-like symptoms, cough, abdominal pain, chest pain, burning micturition, or abdominal distension. Bowel and bladder habits were normal. She has no known comorbidities. She is post-menopausal without a history of tobacco smoking, alcohol abuse, or any other substance use.

On examination, her vitals were within normal limits with blood pressure of 100/70 mmHg, pulse of 90 bpm, SpO<sub>2</sub> of 95% in room air, respiratory rate of 19 breaths/min, and temperature of 97°F. The findings of systemic examination were within normal limits. Blood investigations revealed total counts of 10,600/mm<sup>3</sup>, with 85% neutrophils and 12% lymphocytes. Liver function tests were abnormal, with aspartate aminotransferase of 251 U/L and alanine aminotransferase of 300 U/L. Serum sodium was 127 mmol/L and C-reactive protein was positive. She was found positive for dengue NS1 antigen.

Though there were no chest complaints, we performed a routine ECG (Figure 1) to look for any cardiac involvement. The ECG presented ST-segment elevation in leads V3, V4, V5, V6, II, aVF; T-wave inversion in leads I, aVL, V4, V5, V6; and abnormal Q waves in leads I, aVL, V1 to V6. Troponin I also came back positive. On echocardiography, left ventricular ejection fraction of 60% was noted with anterior wall hypokinesia. With these reports, the diagnosis of STEMI with dengue fever was made. Primary management

with loading doses of aspirin, clopidogrel, and atorvastatin was done, and percutaneous coronary intervention (PCI) was planned. PCI was done immediately, and 80%–90% stenosis with clot was present in proximal left anterior descending artery (LAD). Stenting with drug eluting stent was done in LAD, and the patient was monitored in cardiac care unit. There were no complications post-procedure, and she was discharged after 8 days of admission on aspirin, atorvastatin, clopidogrel, metoprolol, and spironolactone. Her health was improving on subsequent follow-ups without manifestation of any complications.

## Discussion

Cardiac involvement in dengue has been known for a long time, in various forms such as conduction abnormalities, hypotension, arrhythmias, myocarditis, pericarditis, heart failure, or cardiomyopathy. However, there is limited literature regarding myocardial infarction complicating dengue fever, mostly in the form of case reports. Wijayabandara et al.<sup>4</sup> had presented two cases of dengue fever complicated with acute STEMI. Both of those cases were managed conservatively. A case of simultaneous multivessel STEMI was reported by Lin et al.<sup>5</sup> from Taiwan, wherein coronary angiography had revealed subtotal occlusions in both LAD and left circumflex arteries, for which thrombus aspiration and stenting was done for both vessels. Rupture of preexisting unstable plaques in the background of widespread inflammation in severe dengue, which favors a procoagulant environment, is likely to increase the risk of thrombotic complications such as myocardial infarction.<sup>5,6</sup>

Myocarditis is a more common cardiac complication of severe dengue fever, and there have been instances in reported literature where myocarditis has presented masquerading as acute STEMI.<sup>7,8</sup> A case report by Dandeniya et al.<sup>8</sup> presented a patient in whom coronary artery spasms subsequent to myocarditis mimicked acute STEMI. In their case, transient nature of presentation, relief with sublingual glyceryl trinitrate, and lack of any global or focal wall motion abnormalities helped exclude the diagnosis of myocardial infarction.<sup>8</sup> Another case reported by Lee et al.<sup>7</sup> presented a fulminant dengue myocarditis with electrocardiogram mimicking acute myocardial infarction; however, normal coronary angiogram with good antegrade flow helped them rule out the diagnosis. Another case of dengue myocarditis mimicking acute myocardial infarction, both in clinical features and investigation findings was reported by Patra et al.<sup>9</sup> Although myocarditis is a more common complication of dengue, typical ECG changes and regional wall abnormalities on echocardiography favor the diagnosis of ischemia, as seen in our patient.<sup>4</sup>

Widespread endothelial dysfunction, alterations in vascular permeability, localized cardiac injuries in the form of myocardial necrosis and inflammation have been cited as the possible pathophysiological mechanisms behind the cardiac manifestations of dengue.<sup>3</sup> Various cytokines, tumor necrosis factor, and free oxygen radicals may be involved in the pathogenesis of myocarditis, which could further culminate into idiopathic dilated cardiomyopathy.<sup>10</sup>

The balance between procoagulant and anticoagulant mechanisms is toppled in case of severe dengue leading to an increase in the risk of thrombotic complications, as seen in our case.<sup>6</sup> Widespread endothelial damage leads to loss of non-thrombogenic protective properties of the endothelium. Dengue has also been found to promote secondary activation of procoagulant homeostatic mechanisms along with shifting the overall balance toward a more procoagulant environment, especially in severe cases.<sup>11</sup> This is a likely mechanism behind development of ischemia and infarction in our patient. Since cardiac dysfunction influences the outcome of disease, timely diagnosis and optimum management is of paramount importance as the results could be fatal in severe cases.<sup>7</sup>

Investigations, such as electrocardiography (ECG), cardiac biochemical markers, echocardiography, coronary angiography, and cardiac MRI, can be helpful in making the diagnosis. Echocardiography and coronary angiography can be helpful in differentiating myocarditis from acute myocardial infarction.<sup>7</sup> It can be difficult to perform coronary angiography in dengue patients due to thrombocytopenia and the procedure associated risks itself as well.<sup>4,8</sup> Endomyocardial biopsy is considered as the gold standard investigation for diagnosis of acute myocarditis; however, the invasiveness of the procedure is often a major hindrance in performing this. In these situations, the availability of cardiac MRI can prove quite helpful.<sup>8</sup> The presence of ST segment elevation in anterior chest leads with reciprocal changes in inferior leads, the

evolution of Q waves, along with presence of regional wall abnormalities on echocardiography favor the diagnosis of acute myocardial infarction over myocarditis.<sup>4</sup>

## Conclusion

Patients with dengue fever can present with a myriad of cardiac complications and early diagnosis along with optimum management becomes essential as the disease can easily take a fulminant course. It is important to differentiate acute myocardial infarction in dengue patients from dengue myocarditis and individualized management approach should be formulated due to lack of enough evidence supporting any management approach in this subgroup of patients.

## Acknowledgements

None.

## Author contributions

A.K., L.B., and B.B. conceptualized and carried out literature review for this report. A.K., P.N., and P.G. involved in manuscript writing. A.R. and S.D. involved in editing the draft. A.K., L.B., B.B., P.N., P.G., A.R., and S.D. re-edited the draft and reshaped the manuscript to its current form. All authors approved the final version of the manuscript.

## Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

## Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

## Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

## Provenance and peer review

Not commissioned, externally peer-reviewed.

## ORCID iDs

Ashutosh Kashyap  <https://orcid.org/0009-0000-0005-7718>

Ashik Rajak  <https://orcid.org/0000-0002-2219-3427>

## References

1. Guzman MG and Harris E. Dengue. *Lancet* 2015; 385(9966): 453–465.
2. Khetarpal N and Khanna I. Dengue fever: causes, complications, and vaccine strategies. *J Immunol Res* 2016; 2016: 1–14.

3. Araiza-Garaygordobil D, García-Martínez CE, Burgos LM, et al. Dengue and the heart. *Cardiovasc J Afr* 2021; 32(5): 46–53.
4. Wijayabandara M, Wijesundara D, Gamakaranage C, et al. Dengue fever complicated with acute ST elevation myocardial infarction—A therapeutic conundrum: our experience from two cases. *Asian J Med Sci* 2021; 12(1): 118–123.
5. Lin SC, Huang CH, Lin CY, et al. Dengue virus infection complicated with simultaneous multivessel ST elevation myocardial infarction. *J Microbiol Immunol Infect* 2016; 49(4): 619–620.
6. Wills BA, Oragui EE, Stephens AC, et al. Coagulation abnormalities in dengue hemorrhagic Fever: serial investigations in 167 Vietnamese children with Dengue shock syndrome. *Clin Infect Dis Off Publ Infect Dis Soc Am* 2002; 35(3): 277–285.
7. Lee CH, Teo C and Low AF. Fulminant dengue myocarditis masquerading as acute myocardial infarction. *Int J Cardiol* 2009; 136(3): e69–e71.
8. Dandeniya CL, Gawarammana IB and Weerakoon G. Coronary artery spasms mimicking acute ST-elevation myocardial infarction in dengue haemorrhagic fever. *Case Rep Infect Dis* 2020; 2020: 1–3.
9. Patra S, Bhardwaj G, Manohar JS, et al. Acute myocardial infarction being the presentation of dengue myocarditis. *J Cardiovasc Dis Res* 2013; 4(2): 159–161.
10. Wali JP, Biswas A, Chandra S, et al. Cardiac involvement in Dengue Haemorrhagic Fever. *Int J Cardiol* 1998; 64(1): 31–36.
11. Mairuhu ATA, Mac Gillavry MR, Setiati TE, et al. Is clinical outcome of dengue-virus infections influenced by coagulation and fibrinolysis? A critical review of the evidence. *Lancet Infect Dis* 2003; 3(1): 33–41.