



Severe Dengue with Cardiac Tamponade: A Case Report and Challenges in Management

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Abstract

Dengue fever is one of the major public health problems in India. Severe form of dengue has very high mortality if not detected and treated early. Poly-serositis is an important feature of severe dengue, commonly manifested as effusion in pleura, pericardium and ascites. Cardiac tamponade is a rare life-threatening association with dengue with very few case reports in entire medical literature. In his article we have described a case of dengue shock presented with cardiac tamponade. She required emergency pericardiocentesis under cover of platelet transfusion, following which her hemodynamics improved gradually. Understanding the nature of shock was crucial in the successful management of the case.

Keywords: Severe Dengue; Cardiac Tamponade, Bedside Ultrasound

Introduction

Dengue is an arboviral infection with a wide variety of clinical spectrum. WHO factsheet 2018 reported estimated global burden of dengue infection 390 million per year [1] though actual number of cases grossly under reported. The disease is endemic in more than 100 countries with south East Asia being most notoriously affected. India belongs to one of the endemic countries and bears almost one fifth of all cases [2] of dengue in south east Asian region. Dengue viruses are RNA viruses belonging to the family *Flaviviridae*. There are four serotypes of dengue viruses (DEN 1 - 4). Infection from one serotype does not confer long-term protection against infection by other serotypes. *Aedes* mosquito acts as vector and humans remain carrier of virus once infected and transmits the infection through vector to non-infected persons. Incubation period is 4 to 10 days [1] after the mosquito bites. Severe dengue is characterized by capillary leakage [3] and hemorrhage, that have very high mortality if not treated in timely fashion. Pericardial effusion may occur as part of poly-serositis in dengue. Rarely pericardial effusion can lead to tamponade which causes obstructive shock. In contrast, in most cases of dengue shock is hypovolemic in nature due to plasma leakage or bleeding. Bedside ultrasonography is an important tool to differentiate two distinctive pathologies which have entirely divergent approach in management. This case report describes a case of dengue fever presented with cardiac tamponade diagnosed with bedside echocardiography and managed with emergency pericardiocentesis.

A 36 year old female, no known co morbidities, was admitted with history of high-grade fever with headache and myalgia for 5 days, and breathlessness for one day. On admission, she was found to be hypotensive with cool extremities, tachypneic with oxygen saturation maintaining above 97% with 5 lit oxygen via face mask, conscious but restless and agitated. She was in high anion gap metabolic acidosis with high lactate (pH: 7.28, PaCO₂: 16.5 mm of Hg, PaO₂: 148.2 mm of Hg, HCO₃⁻: 7.8 mmol/L, lactate 9.64 mmol/L). Chest X-ray was unremarkable except mild right pleural effusion (Figure 1). Bedside echocardiography suggested to have plethoric and non-collapsible inferior vena cava, pericardial effusion with collapsing right atrial chamber (Figure 2), global left ventricular hypokinesia with estimated left ventricular ejection fraction of 20 - 25%. ECG was low voltage. Her blood investigations revealed to have hemoglobin 14.4 gm/dl, white cell count 8.08 x 10⁹ per liter, Platelet 30 x 10⁹ per liter, Bilirubin 6.33 μmol/L, aspartate aminotransferase 21590 IU/L, alanine aminotransferase 3481 IU/L, serum albumin 25 gm/L, prothrombin time 25.5 sec (INR: 2.34) electrolyte normal, BUN 4.29 mmol/L, creatinine 97.2 μmol/L, ferritin 16500 μg/L, CRP 13.7 mg/L, procalcitonin: 0.22 μg/L, lactate dehydrogenase 4374 unit/L, NT pro BNP: 9407 ng/L, Malaria smear and rapid diagnostic tests (*P. vivax* and *falciparum*) were negative.



Figure 1: Chest X-ray on admission: mild blunting of right costophrenic angle.

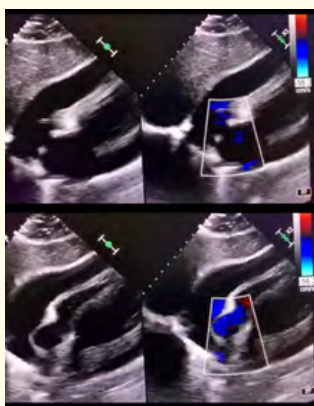


Figure 2: Subcostal view of echo-cardiography showing pericardial effusion with diastolic collapse of right ventricle.

She was initially started with intravenous fluid balanced crystalloid solution (Plasmalyte and ringer's lactate) and noradrenaline support (dose titrated to effect to maintain mean arterial BP 60 - 65 mmHg.). Pericardiocentesis was done bed side under ultrasound guidance after transfusing one single donor platelet and 350 ml of pericardial fluid was aspirated and a sheath (6F) was kept in pericardial space. The cause was identified promptly as pericardial tamponade, and septic shock was ruled out, so initial IV antibiotic (ceftriaxone 1 gm) was discontinued. Patient responded appropriately with treatment. She was oliguric and severe metabolic acidosis, hence sustained low-efficiency dialysis (SLED) was initiated. She was put on ventilator in view of severe hemodynamic instability and progressive breathlessness. Her subsequent investigations found to have Dengue IgM (ELISA) positive and NS1 Ag (ELISA) positive. BACTEC™ blood culture and urine culture were sterile. Analysis of pericardial fluid found it to be transudative in

nature and negative for bacterial and fungal etiology. Her hemodynamics gradually improved after pericardiocentesis, vasopressors weaned off. Repeat 2D Echo after 2 days revealed to have minimal further collection and hence sheath was removed. She was gradually weaned off from ventilator. Her kidney function also recovered over time. Her subsequent course in the hospital was uneventful.

Discussion

Dengue has three stages of clinical illness. 1) febrile phase characterised by dehydration 2) Critical phase lasting for 24 - 48 hrs characterised by plasma leakage or major haemorrhage leading to organ impairment, 3) recovery phase with gradual reabsorption of extravascular fluid. It is usually a self-limiting disease. Approximately 75% of all cases being asymptomatic and less than 5% of patients developing severe dengue [3]. Severe Dengue was described by WHO [4] as dengue fever with evidence of severe plasma leakage or severe haemorrhage or severe organ involvement. It replaces earlier clinical classification of dengue fever [5] with dengue haemorrhagic fever and dengue shock syndrome. currently severe dengue is the leading cause of hospitalisation and death from dengue. Factors associated with mortality in severe dengue [6] were studied and found to be female sex, neurological signs, ascites, pleural effusion, hypoalbuminemia, haemoconcentration, level of rise in alanine transaminase and aspartate transaminase, coagulopathy and infection with dengue serotype 2. Dengue shock syndrome has case fatality rate 50 times more [7] compared to dengue patients without shock. Plasma leakage in severe dengue is a unique pathology characterised by extravasation of fluid from leaky capillaries, resulting in ascites, pleural effusion, pericardial effusion and hypoproteinaemia. Excessive capillary leakage may lead to hypovolemia and dengue shock. There are various types of cardiac manifestation of dengue [8-10]. It can be sinus bradycardia (commonest), AV block, transient ventricular arrhythmia, myocarditis with systolic and diastolic dysfunction, pericardial effusion, elevation of cardiac biomarkers, and in severest form, cardiogenic shock and heart failure. Although pericardial effusion in dengue fever [8-11] has commonly been described in literature, dengue fever presenting with cardiac tamponade is an extremely rare entity and only few case reports [12-14] have been published so far.

In current case a 36-year-old previously healthy lady was admitted with dengue fever with shock. The case had several facets in management. It was severe dengue fever with 1) pericardial tamponade causing hemodynamic instability 2) acute kidney injury with oliguria and metabolic acidosis, 3) ischemic/dengue hepatitis 4) Thrombocytopenia with coagulopathy. Aetiology of shock in present case was predominantly "obstructive" in nature due to

cardiac tamponade whereas, most cases of dengue shock are characteristically hypovolemic in nature. Identification of pericardial tamponade was the crux in the management which is a rare entity. Subsequent dilemma in decision of management was consideration of pericardial tapping in the face of coagulopathy and thrombocytopenia but decision was taken in favour, as the condition was rapidly worsening and was being life threatening. The intervention actually proved to be lifesaving in this case. Bed side echocardiography was an important instrumental tool in diagnosis and placement of pericardial catheter which reminds us the importance of it in current generation ICU management. Pericardial tamponade in dengue fever is a rare association, only a few case reports published in medical literature so far. Kumar, *et al.* [12] reported the first case report in 2010 where a 59 year old woman with dengue fever developed cardiac tamponade requiring surgical drainage, but the patient had concomitant lupus nephritis. Bendwal, *et al.* [13] reported another case with dengue fever with pericardial tamponade that required urgent pericardiocentesis. In both the above reports, dengue serotype was not done. Fernandes, *et al.* [14] in 2017 published a report of cardiac tamponade in a 16 day post-partum female patient after infection with dengue virus serotype 2. In our report we were not able to detect particular serotype as it was unavailable in our set-up. Our case report adds to the existing literature as publication of such reports on this rare clinical presentation of dengue fever will make it more familiar to entire medical fraternity.

Conclusion

Dengue fever may present with life-threatening pericardial tamponade. Timely diagnosis of this condition is instrumental in successful treatment of this condition.

Conflict of Interest

None.

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