Journal of Infectious Diseases & Therapy
ISSN: 2332-0877

Ahmed et al., J Infect Dis Ther 2020, S4:002

Case Report Open Access

A 2-years old girl with dengue fever with cardiogenic shock due to acute myocarditis

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Received date: May 29, 2020; **Accepted date:** July 06, 2020; **Published date:** July 13, 2020

Abstract

A girl with dengue fever suddenly developed respiratory distress during afebrile phase followed by cardiogenic shock. Shock was initially unresponsive to ionotrope but later responded to intravenous immunoglobulin.

Keywords: Dengue fever; Cardiogenic shock

Case Presentation

A 2-year 3 months-old girl admitted at the hospital with a four-days history of high-grade fever followed by afebrile for 1 day associated with repeated episodes of vomiting with blood stained vomitus and one episode of passage of blood mixed with stool. Upon arrival, she was found afebeile, normotensive, euglycemic with regular pulse rhythm and multiple petechiaes were found on limbs. A speculative diagnosis of dengue haemorrhagic fever was made based on the findings of fever, petechiae, and thrombocytopenia. Her past medical history was unremarkable, except for history of hospitalization for dengue fever 1 year back. Treatment was started according to dengue management protocol and gradually her haematological parameters improved.

Since 3rd day of her afebrile period, she developed breathing difficulty along with sudden onset of signs of poor peripheral perfusion in the form of cold extremities, poor pulse volume, tachycardia, and peripheral cyanosis and unrecordable blood pressure. Cardiac auscultations were normal except for tachycardia. On auscultations of lung, bilateral fair air entry, vesicular breath sound, creps (+++).

To combat cardiogenic shock due to myocarditis, vesoactive medication was started and upto maximum doses of Dobutamine, Dopamine, and norepinephrine were given without any significant improvement. Due to persistent dyspnea and desaturation, the patient was put on mechanical ventilator. Echocardiography was done which revealed dilated left ventricle with severe biventricular dysfunction. Considering her condition as acute fulminant viral myocarditis, IVIG was administered in a total dose of 2gm/kg of body weight in two divided doses in consecutive 2 days. The patient responded dramatically to above management and gradually, her blood pressure become normalized, shock and dyspnea resolved and the patient was weaned from mechanical ventilator and was discharge from the hospital after full recovery.

Investigation	Reference range(1-9) (Children)	Patient's value
Dengue NS1		Positive
ICT for Dengue IgG & IgM		Positive
Hemoglobin (g/dL)	12 (mean Hb)	10.8
HCT		32
White cell count (x10^9/L)	04-11	6.87
Neutrophil (%)	40-80	80%
Lymphocyte (%)	20-40	14%
Monocyte (%)	02-10	4%
Platelet count (x109	150-400 x10^9	28.2 x10^9
C-Reactive protein (mg/dL)	<6	1.2
Troponin-I	15.6-26.2 pg/ml	61.9 pg/mL
BNP	<32.7pg/mL	1873 pg/mL
CK-MB	0–3 micrograms per liter (mcg/L)	60 mcg/L

Table 1: Investigation profile.

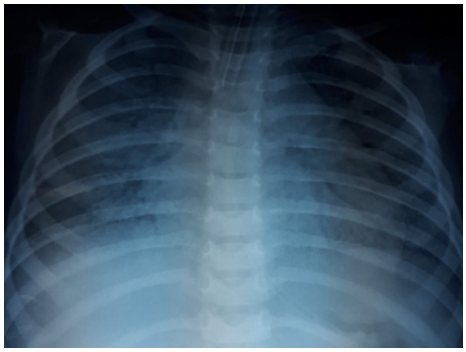

Figure 1: CXR AP view showing cardiomegaly (CTR was 0.79), perihilar haze, and congestion over bilateral lower lung fields, suggestive of pulmonary edema.

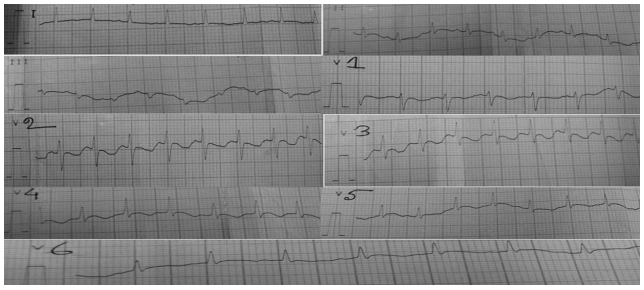

Figure 2: ECG showing ST-T changes suggestive of myocarditis in all chest and limb leads.

	25/7/19	27/7/19	31/7/19
EF	38	40%	58%
FS	18	19%	28%
LVIDs	28	26 mm	21
LVIDd	34	32 mm	31
MV E/A	1.3	1.46	1.6
TAPSE	9	10 mm	12 mm
PWd	5	04 mm	7mm
Pulmonary artery mean pressure	23	22 mm	
Interpretation	Dilated left ventricle with global hypokinesia	Severe biventricular dysfunction with mild pulmonary HTN	mildly Dilated left ventricle with global hypokinesia
	Severe biventricular dysfunction		Mild LV dysfunction
	mild pulmonary HTN		

FS= Fractional Shortening; EF =Ejection Fraction; LVIDd =LV internal diameter; diastolic LVIDs =left ventricular internal dimension in systole; TAPSE =Tricuspid Annular Plane Systolic Excursion; PWD =P Wave Dispersion

Table 2: Echocardiographic finding.

Discussion

At present, dengue fever is endemic in more than 100 countries in Western Pacific, Latin America, Southeast Asia, Eastern Mediterranean regions and Africa. It is estimated that although annually worldwide 96 million human beings have clinical manifestation of dengue fever, 390 million people suffer from dengue infections [10,11].Prevalence of myocarditis are 9%–15% among hospitalized patient with dengue fever (10-12). Myocardium can be injured by direct virus invasion, hypersensitivity or autoimmune reaction (7-11).

Various controversies exit regarding pathogenesis of dengue virus induced myocarditis. Like other viral myocarditis, both direct viral infection and altered immune response mediated injury might cause myocardial damage [13-17].

A spectrum of cardiac manifestation can be observed in dengue fever ranging from asymptomatic, chest pain, bradycardia, arrhythmia, transient atrioventricular nodal block, dyspnea due to acute left ventricular failure following severe myocardial cell injury with [16-18].

Biochemical markers of cardiac injury are as follow [19-26].

Marker	Time to raised plasma value	Peak	Duration of elevation
Aspartate aminotransferase	8 ± 12h	1 ± 2days	3 ± 6days
Lactate dehydrogenase	8 ± 12h	2 ± 3days	7 ± 10days

Creatine kinase	4 ± 6h	12 ± 36h	3 ± 4days
Hydroxy buterate dehydrogenase	8 ± 12h	2 ± 3days	7 ± 14days
Myoglobin	2 ± 3h	6 ± 12h	24 ± 48h
Heart fatty acid binding protein	2 ± 3h	8 ± 10h	18 ± 30h
Troponin T	4 ± 6h	12 ± 24h	7 ± 10days
Troponin I	4 ± 6h	12 ± 24h	6 ± 8days

Table 3: Biochemical marker of cardiac injury.

Treatment option of myocarditis is the optimal supportive care along with treatment of the underlying condition responsible for cardiac injury with evidence-based guidelines [27-29].

For myocarditis with inflammatory cardiomyopathy,

An etiologically driven treatment [27-28].

For acute fulminant myocarditis,

Pulse therapy with immunosuppressive medicine might be beneficial [27-29].

For viral myocarditis

Intravenous immunoglobulin has been proved to reduce inflammation [27-28].

Commonly, Intravenous immunoglobulin (IVIG) is used for immune mediated inflammatory diseases because of its ability to block the Fc receptors. A recent systematic review and meta-analysis, authors concluded that IVIG is benificial treatment of children with fulminant myocarditis [28].

The overall mortality rate of myocarditis among pediatric patients is 7.3%(30).The rate is higher for children younger than age 12 years as compared to older children [29].

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