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Takotsubo Cardiomyopathy in Pediatric Scrub Typhus

Takotsubo Cardiomyopathy or stress cardiomyopathy is a heart failure syndrome characterized by transient left ventricular dysfunction with typical regional wall motion abnormalities [1]. The wall motion abnormalities are not confined to the vascular distribution of a single epicardial coronary artery; hence, non-ischemic mechanisms are considered responsible. Initially described in adult women with emotional stress as 'broken-heart syndrome', it was subsequently recognized in both males and females. Takotsubo cardiomyopathy has been reported rarely in children. We describe a case of Takotsubo cardiomyopathy associated with sepsis in a child.

A 10-year-old boy presented with complaints of high-grade fever since four days and fast breathing and poor oral intake since one day. On examination, he had tachycardia, hypotension, respiratory distress, generalized edema and hepatomegaly. High-flow oxygen, intravenous fluids and inotropes were started (noradrenaline followed by dobutamine). Laboratory investigations revealed a C-reactive protein of 101 mg/L. As clinical and laboratory features were suggestive of severe sepsis, intravenous antibiotics were started. Since hypotension persisted, 2D echocardiogram was done, which showed mid-ventricular regional wall motion abnormality (**Fig. 1a**), with normal contractility of cardiac apex (**Fig. 1b**) and mild mitral regurgitation. ECG showed mild ST elevation in lead V2. Troponin level was mildly elevated (16.4 ng/L), and B-type natriuretic peptide (BNP) markedly elevated (15725 pg/mL). In view of a diagnosis of Takotsubo cardiomyopathy, noradrenaline was tapered and diuretic drugs were prescribed. A repeat echocardiogram after three days showed normalization of left ventricular function and resolution of mitral regurgitation. Repeat ECG showed T wave inversion in V2. Work-up for persistence of fever spikes and thrombocytopenia revealed negative dengue serology, and positive result for OX K antigen on Weil Felix test. The child showed improvement on oral

Doxycycline and was discharged without any cardiac medications by ninth day of hospitalization.

Takotsubo cardiomyopathy is a reversible heart failure syndrome. It derives its name from the shape of the left ventricle in the typical apical-ballooning form, which resembles a Japanese octopus-trap. Four common morphological variants have been described [1]. In younger patients, a high proportion of non-apical anatomical variants are seen [2]. Our case was of the mid-ventricular type, with hypokinesia of the mid-ventricle and sparing of the apex.

Distinguishing Takotsubo syndrome from acute infective myocarditis can be challenging. However, involvement in Takotsubo cardiomyopathy shows typical regional pattern whereas in myocarditis it tends to be diffuse, and it shows a low or moderate troponin rise while there is frequently a significant rise in troponin in myocarditis [1]. The differential diagnosis includes sepsis-induced cardiomyopathy, but in the latter too, there is global involvement and enlargement of the ventricle, as opposed to regional affection in the former [3].

Regional wall motion abnormality of Takotsubo cardiomyopathy requires differentiation from acute coronary syndrome, a less common entity in children. Characteristically laboratory evaluation shows an extremely elevated BNP and mild troponin elevation. In contrast, in coronary ischemia, the degree of BNP elevation is typically lesser than in Takotsubo cardiomyopathy, troponin is significantly elevated and ECG and echocardiographic wall motion abnormalities are confined to the vascular distribution of epicardial coronary arteries [4]. ECG in Takotsubo cardiomyopathy may show non-specific ST changes, with later development of T wave inversion, as seen in our case, or even QTc prolongation [1]. Cardiac magnetic resonance during the acute phase may help differentiate Takotsubo cardiomyopathy from both, myocarditis as well as acute myocardial infarction [2].

Sepsis has been widely described in adults as a cause for Takotsubo cardiomyopathy, with a causative organism identifiable in culture in up to 50% of admissions [5]. Our search of English language scientific literature did not reveal any report of this disorder in pediatric sepsis following scrub typhus infection. There is a possibility that scrub typhus as a cause is

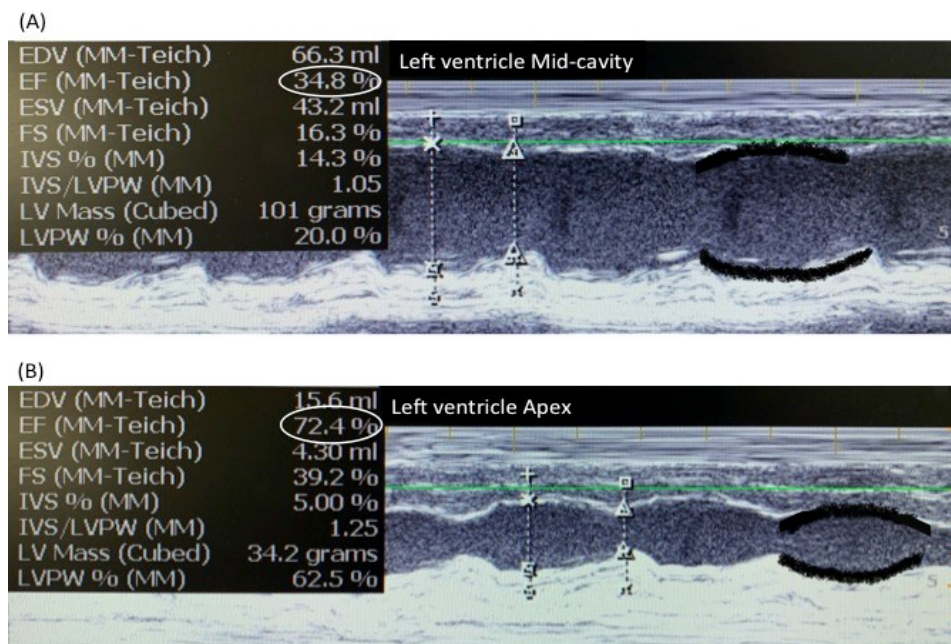


Fig. 1 M-mode Echocardiogram of Left ventricle (LV). (a) Poor contractility of LV Mid-cavity with Ejection fraction (EF) of 34%. The black lines marked along anterior and posterior LV walls show poor excursion with time, (b) Normal contractility of LV Apex with EF: 72%. The black lines highlight excellent approximation during systole.

either unrecognized or under-reported.

Management of this disorder is unique in that catecholamines are incriminated in the pathophysiology and hence, must be avoided. Beta-blockers and ACE inhibitors may be used. Mechanical support such as extracorporeal membrane oxygenation may be required. For inotropic support, Levosimendan is considered safe, and has been reported to be effective specifically in sepsis-associated Takotsubo cardiomyopathy [6].

The long-term prognosis is favorable, but it is now recognized that upto 50% can have acute complications with a mortality rate of 4-5 % [1].

To conclude, Takotsubo cardiomyopathy may be identified by the typical echocardiographic appearance and laboratory features, and entails specific management considerations. Recognition of the entity is of importance because of the unique management approach that it entails

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