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Stress Induced Cardiomyopathy Requiring Ventricular Assist Device Support in an 8-Year-Old Girl with Acute Leukemia

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Stress-induced cardiomyopathy (SIC) is a reversible transient cardiomyopathy, which was first described in 1990 in Japanese, termed "Takotsubo cardiomyopathy (TC)".[1] TC has been acknowledged as a unique form of reversible cardiomyopathy, characterized by left ventricular (LV) dysfunction with a variety of wall-motion abnormalities beyond a single coronary artery.[1] While it generally occurs in adults, TC in children is less common and serious cardiogenic shock and mortality are more rare.[2]

We report a rare case of SIC requiring a temporary left ventricular assist device (LVAD) during a neutropenic fever treatment after chemotherapy for acute leukemia in an 8-year-old girl. She had dyspnea and hypotension with progressive cardiomegaly and pulmonary edema during antibiotic therapy (Fig. 1). Serial echocardiography revealed progressive LV dysfunction; a LV ejection fraction (EF) 55% on hospital day (HD)16, and EF 35% on HD19. The ST-T changes on electrocardiogram were not remarkable. Creatine kinase, creatine kinase-myocardial band, and troponin I were slightly elevated 105 IU/L (reference<270 IU/L), 7.1 ng/ml (reference<6.6 ng/ml) and 0.13 ng/ml (reference<0.028 ng/ml). On HD21, EF was 19% with global hypokinesia and she had severe lactic acidosis (15 mmol/L) (Fig. 1). Temporary extracorporeal LVAD was eventually applied on HD21. Inflow cannula was inserted into the LV through the right upper pulmonary vein and left atrium with full median sternotomy (Fig. 1D). Outflow cannula was inserted into the ascending aorta. As her lung con-

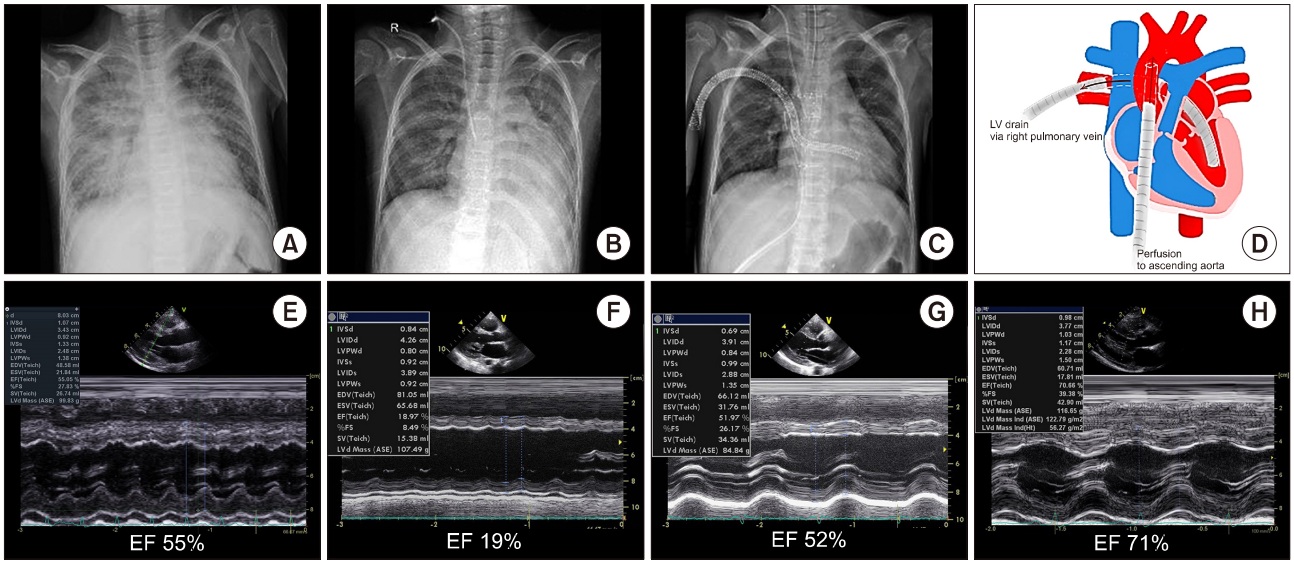

FIG. 1. Serial chest radiographs and echocardiograms. Chest radiographs on HD13 (A), HD20 (B) showed cardiomegaly and pulmonary congestion progressed, LVAD was applied on HD21 (C, D). Echocardiograms showed a rapid recovery of ventricular function after LVAD insertion; HD16 (E), pre LVAD insertion (F), 7 days after LVAD insertion (G), and post LVAD removal (H).

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Article History:
Received July 11, 2019
Revised August 6, 2019
Accepted August 15, 2019

https://doi.org/10.4068/cmj.2019.55.3.179

dition was good, we did not connect an oxygenator and mechanical circulatory support assisted LV only with centrifugal pump. As the anticoagulation therapy, heparin continuous infusion was performed with a target aPTT range of 60 to 85. After 5 days of LVAD insertion, LV function recovered to EF 52%, LVAD was discontinued successfully on HD27. After recovery, an MRI and coronary CT showed good function of ventricles without gadolinium enhancement and coronary abnormalities. Echocardiography has shown normal ranges of ventricular function for 2 years since LVAD weaning.

In this case, she had no ST-T change and there was an insignificant increase of cardiac enzyme, which is different from acute coronary syndrome or acute myocarditis.[3] From these findings and rapidly recovered ventricular function, we could diagnose her as SIC. SIC generally has a good prognosis, but it can manifest as cardiogenic shock in children. Therefore, active management, such as mechanical circulatory support, should be considered before multiorgan failure progresses.

CONFLICT OF INTEREST STATEMENT

None declared.

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