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Case report

Successful treatment of peripartum cardiomyopathy with mechanical assist devices and cardiac transplantation

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ABSTRACT

In the severe form of peripartum cardiomyopathy short and long-term continuous flow ventricular assist devices offer a safe bridge to transplant where cardiac transplantation seems to be the only hope and treatment end point for most of these patients. In this report we described the outcome of a 33 years old patient on the 32nd gestational week with peripartum cardiomyopathy who was successfully treated with biventricular mechanical assist devices and cardiac transplantation.

Introduction

Peripartum cardiomyopathy is defined as a congestive heart failure resulting from left ventricular systolic dysfunction in the last month of pregnancy or within the first 5 months after delivery [1]. The diagnostic criteria were confirmed during the ''Peripartum Cardiomyopathy National Heart Lung and Blood Institute and Office of Rare Diseases Workshop'' in 2000 [2]. The true incidence of peripartum cardiomyopathy is uncertain, and the estimated range is between 1 per 100 to 1 per 15,000 deliveries. There also seems to be an increased incidence in Africa and African American patients [3].

There have been reports of the treatment of severe peripartum cardiomyopathy with cardiac transplantation [4] and with mechanical assist device support either as a bridge to transplantation or as a bridge to recovery [5–7]. Thus, when patients diagnosed with peripartum cardiomyopathy fail medical or surgical therapy (inotropic therapy, mitral valve surgery), mechanical assist device support either as a bridge to recovery or as a bridge to cardiac transplantation and primary cardiac transplantation are options. We demonstrate in this

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case report that transplantation after the bridge to transplant strategy can have successful survival outcome.

Case report

A 33-year-old patient on the 32nd gestational week was diagnosed with peripartum cardiomyopathy after she had a cardiac arrest and cardiopulmonary resuscitation. Transthoracic echocardiography showed global severe left ventricular dysfunction, ejection fraction (EF) of 25%, severe left ventricular dilatation with left ventricular end systolic diameter (LVEDD) 62 mm and severe functional mitral valve regurgitation with central jet (effective regurgitation orifice 0.50 cm^2, regurgitation volume 78 ml, vena contracta 8 mm). Coronary angiography showed normal coronary arteries (Figs. 1 and 2).

Heart failure therapy was initiated and the patient was scheduled for a mitral valve repair surgery. She underwent a mitral valve restrictive annuloplasty with an Edwards Physio II (Edwards, Lifesciences Corporation, Irvine, CA) annuloplasty ring N° 30 mm. Before the initiation of the cardiopulmonary by-pass a stillborn male baby was delivered through a cesarean section. Intraoperative transesophageal echocardiography after the procedure showed low EF and global hypokinesis of the left ventricle (LV) and despite the use of high doses of inotropic treatment, any trials to wean from the cardiopulmonary by-pass were unsuccessful. The decision to implant a temporary mechanical assist device was taken so a continuous-flow left ventricular assist device (LVAD) Levitronix CentriMag (Levitronix, Technologies LCC, Framingham, MA) was implanted. During the same session and after a consultation with the gynecologists, hysterectomy was performed as a preventive measure as a potential source of life threatening bleeding after the initiation of anticoagulation treatment due to LVAD implantation. On post-operative day (POD) 15 she underwent resynchronization therapy and despite maximal inotropic treatment follow-up echocardiography did not demonstrate any recovery of the LV function. On the POD 22 she underwent successful implantation of a long-term continuous-flow HeartMate II LVAD (Thoratec Corp., Pleasanton, CA). The following day due to hemodynamic instability and signs of right ventricular failure and severe tricuspid valve regurgitation, a right ventricular continuous-flow right ventricular assist device (RVAD) Levitronix CentriMag (Levitronix, Technologies LCC, Framingham, MA) was successfully implanted with a tricuspid valve annuloplasty with a Tricuspid Physio ring N° 32 mm (Edwards, Lifesciences Corporation, Irvine, CA). In the early postoperative phase ''open chest'' management and revisions were necessary due to bleeding and pericardial tamponade.

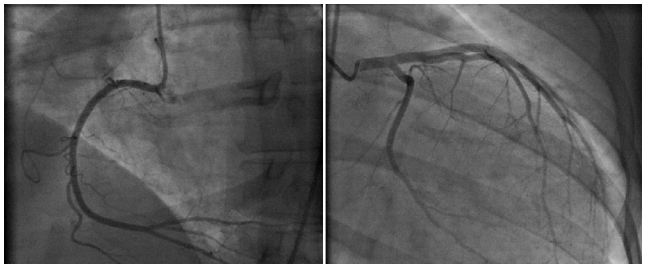

Fig. 1 – Normal coronary angiography of the right (left, LAO view) and left (right, RAO view) coronary arteries.

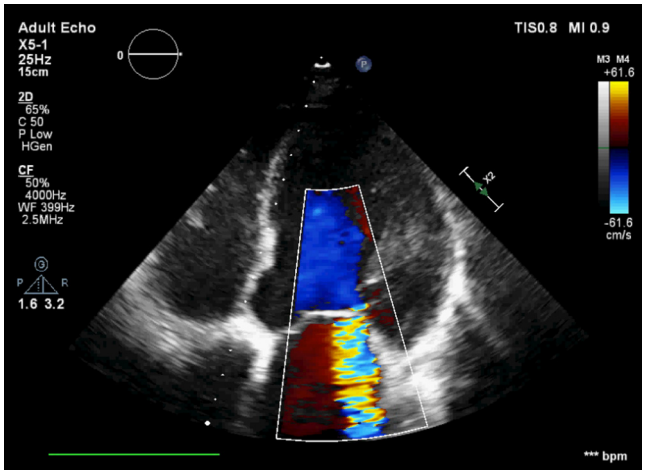

Fig. 2 – Transthoracic Doppler echocardiography showing severe mitral regurgitation.

After the biventricular VAD implantation hemodynamically was stable with preserved organ function, but she developed a culture positive *Klebsiella pneumoniae* infection. In this case transplantation remained the only option that allows the complete removal of all foreign material and gives the patient the best chance at long-term survival and eradicates the infection. As long as the patient had preserved organ function and otherwise met criteria for transplantation, heart transplantation was indicated and the patient was upgraded in the transplantation list. On POD 33 she underwent orthotopic heart transplantation. The next day after the heart transplantation due to right ventricular failure a right ventricular continuous-flow right ventricular assist device (RVAD) Levitronix CentriMag (Levitronix, Technologies LCC, Framingham, MA) was indicated and was successfully implanted. Also, again during the early postoperative phase ''open chest'' management and revisions were necessary due to bleeding and pericardial tamponade. After maximum inotropic support there was a recovery of the right ventricle so 8 days later on POD 41 the RVAD was explanted. The postoperative course was complicated with acute renal failure with dialysis, respiratory failure that needed tracheostomy and groin wound infection. Gradually, the patient recovered and rehabilitated and on the POD 82 after psychiatric and psychological consultations was discharge home. Two months after discharge the patient is still on rehabilitation and both the patient and the baby are doing well. An informed consent to publication was obtained from the patient.

Discussion

For those patients who fail oral medical treatment management and inotropic medical support (typically dobutamine) and continue to deteriorate, based on the patients symptoms and hemodynamic status, then mechanical assist device and (or) cardiac transplantation can be considered, depending on the severity of the heart failure. We have demonstrated that

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