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Mechanical Circulatory Support In Peripartum Cardiomyopathy For Cesarian Delivery And Bridge To Transplant

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UCONN SCHOOL OF MEDICINE

Introduction

- Peripartum cardiomyopathy (PPCM) is a rare and potentially life-threatening complication of pregnancy.
- It is defined as an idiopathic cardiomyopathy that begins in the last month of pregnancy or within the first 5 months post-partum occurring in patients without preexisting heart disease.
- Echocardiographic criteria for diagnosis include an EF < 45% and end-diastolic dimension of >2.7 cm/m^2.
- We present a case of presumed peripartum cardiomyopathy that went undiagnosed until a subsequent pregnancy requiring mechanical circulatory support for medically refractory heart failure, delivery of the fetus, and bridge to transplant.

Methods

We performed a retrospective review of one case and performed brief literature review on the topic. The patient gave consent to be written up. As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements as per Hartford Healthcare policy.

Risk Factors

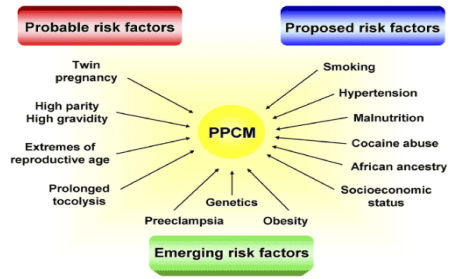


Image from Albakri, A., 2018

Case Report

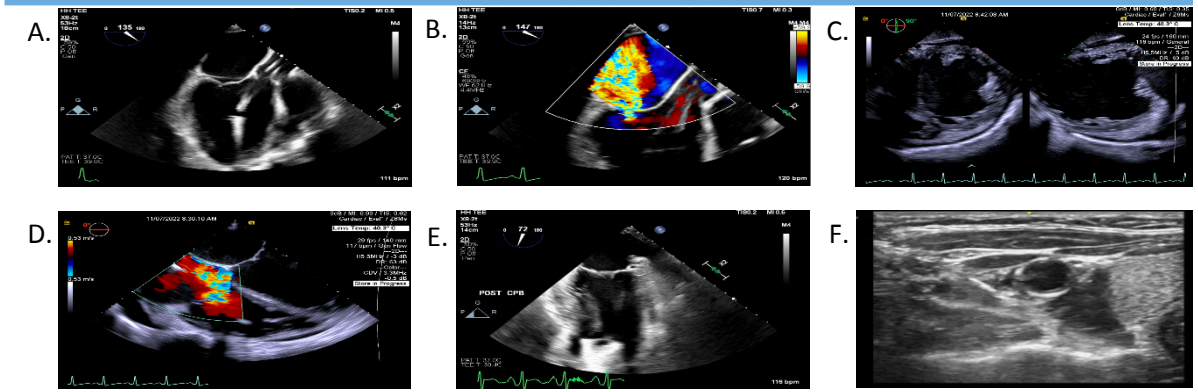
This case outlines an atypical, late presentation of severe, treatment resistant cardiomyopathy and complex management by a multidisciplinary team. A 26-year-old Hispanic female with a history of multiple emergency department and clinic visits for dyspnea, chest pain, abdominal pain and palpitations presented to the emergency department with new onset lower extremity edema along with worsening dyspnea and chest pain. She had a significant past medical history of seizure disorder, asthma, anxiety and gestational hypertension. Her surgical history was significant for two cesarian sections. At the time of presentation, she was 24 weeks pregnant, and her symptoms had been mild, but present for months. This cluster of symptoms and risk factors were suggestive of PPCM.

Transthoracic echocardiogram showed eccentric hypertrophy with a left ventricular internal diameter in diastole (LVIDd) of 7.8cm (4.1 cm/m^2). LV ejection fraction was 20-25%. There was severe mitral and tricuspid regurgitation. Moderate pericardial effusion was noted without evidence of tamponade.

The patient was transferred to the cardiac intensive care unit, a pulmonary artery catheter was placed and she was started on inotropic therapy and diuretics. Despite increasing medical therapy, the patient continued to decline and had frequent runs of ventricular tachycardia (VT). The decision was made to place an Impella 5.5 (Abiomed, Danvers, MA) for mechanical support during cesarian delivery. A stellate ganglion block was performed prior to Impella insertion for VT suppression. Following Impella placement, the patient was optimized for 10 days prior to delivery. A successful cesarian section was performed under general anesthesia.

Of note, throughout her initial hospitalization, several discussions occurred with the patient regarding cardiac transplantation in the future. However, the patient was not initially interested in transplant and there was concern that there were socioeconomic barriers that could impede successful transplantation. Despite this, the patient and multidisciplinary team elected to proceed with placement of a Heartmate 3 (Abbott Medical, North Chicago, IL) left ventricular assist device as a bridge to transplantation. Unfortunately, since placement of her VAD, she has had a chronic driveline infection.

Imaging



Figures A-F:
Figure A: Midesophageal long axis view demonstrating proper impella positioning into the left ventricular apex
Figure B: Midesophageal long axis view demonstrating severe mitral regurgitation
Figure C: Biplane image of transgastic short and long axis demonstrating a severely dilated left ventricle
Figure D: Midesophageal four chamber RV focused image revealing severe tricuspid regurgitation
Figure E: Midesophageal commisural view showing placement of the LVAD inflow cannula directed towards the mitral valve
Figure F: Ultrasound demonstrating anatomy required for stellate ganglion block
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Discussion

PPCM is a rare disease occurring in an estimate of <0.1% of pregnancies. The etiology of PPCM is not well understood. Several proposed triggers include; oxidative stress, autoimmunity, inflammatory conditions, and myocarditis. The majority of PPCM cases present within 5 months of delivery. Patients typically have a late diagnosis with NYHA functional class IV symptoms (unable to do physical activity without discomfort, and symptoms also felt at rest) which predisposes them to higher rates of morbidity and death.

Here we describe a rare case demonstrating the use of mechanical circulatory support for PPCM during pregnancy to facilitate a successful cesarean delivery. This approach is not well described in the literature and to our knowledge there are very few case reports regarding this. delivery. However, Takeshi et al. did demonstrate successful use of intra-aortic balloon pump placement and ECMO cannulation prior to emergent cesarean delivery. Similarly, the patient had two prior uneventful pregnancies, and she presented with severe PPCM during her third with an LVEF of 10%.

PPCM is a serious condition and may lead to significant morbidity for both the mother and fetus if urgent delivery is required. Traditionally, mechanical circulatory support is initiated after delivery, however there may be a role for its use prior to delivery. It is possible that early initiation may optimize patients with severe PPCM prior to delivery and improve outcomes for both the mother and fetus.

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