Management of Urgent Pre-Term Cesarean Delivery in a Parturient with Prior Lung Resection, Severe Progressive Peripartum Cardiomyopathy and Pulmonary Hypertension

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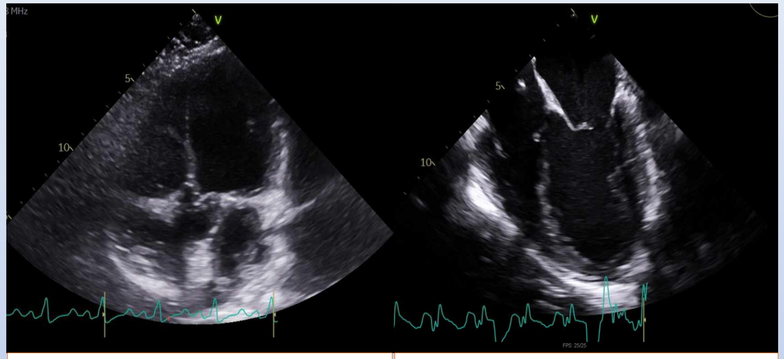
INTRODUCTION

Peripartum cardiomyopathy (PPCM), diagnosed when heart failure develops appears towards the end of pregnancy with no other identifiable cause, is a significant anesthetic challenge in Cesarean deliveries [1]. PPCM is frequently associated with and can worsen underlying pulmonary hypertension, which itself elevates the risk of a major peripartum adverse cardiac event [2].

Multiple potential factors contribute to the development of PPCM, including angiogenic imbalance, inflammatory cytokine mobilization, genetic predisposition. Physiologic increases in cardiac output and blood volume during pregnancy may exaggerate remodeling and worsening of PPCM [3].

CASE PRESENTATION

- A 42-year-old Hispanic G3P1011 presented at 34 weeks with worsening dyspnea. Past medical history was significant for metastatic osteosarcoma treated with left arm amputation, left lobectomy, and radiotherapy, as well as pulmonary embolism, left bundle branch block, and pulmonary hypertension. Obstetric history was significant for one prior C-section performed for pre-eclampsia and one first trimester spontaneous abortion several years prior.
- A transesophageal echocardiogram at 26 weeks EGA showed an ejection fraction of 40%. Imaging on presentation to our facility at 34 weeks EGA showed an EF of 19%, moderate tricuspid and mitral regurgitation, elevated filling pressures, and interval worsening of her pulmonary hypertension (WHO Group 2) with a pulmonary artery systolic pressure of 60 mmHg. There were elements of restrictive lung disease secondary to her history of chemoradiation, lobectomy, and PE.
- A CARPREG II score of 4 (2 points for Pulmonary hypertension, 2 points for baseline ventricular dysfunction <55%) indicated a 22% risk of primary cardiac event in the peripartum period.



TTE Outpatient at 34 weeks GA
Apical four chamber view
Dilated LV EF estimate 19%
Moderate MR moderate TR

TEE Intraoperative
Midesophageal four chamber view
Worse Dilation of LV EF estimate 17%
Continued moderate MR and TR

PERIPARTUM COURSE

- The patient was admitted CV-ICU preoperatively for placement of arterial and pulmonary artery catheters, heparin therapy, diuresis, and beta blocker therapy, A team was placed on standby for ECMO cannulation.
- The patient was placed on a milrinone infusion to support cardiac contractility without worsening her pulmonary HTN. Anesthesia was induced with etomidate, lidocaine, succinylcholine and norepinephrine. Video-assisted laryngoscopy was utilized to secure the airway; intubation was difficult due to airway edema. Severe hypertension following induction (194/130) responded well to nitroglycerin.
- A TEE conducted during the case revealed an EF of 17% with global hypokinesis. Delivery of a healthy infant was achieved with 800 mL EBL. Bilateral tubal ligation and closure were marked by persistent tachycardia and moderate hypertension.
- The patient was transported back to the CV-ICU where she was extubated several hours later. On postpartum day 8, both the patient and her baby were safely discharged home.
- The patient's EF increased to 40% at 4-month follow-up visit

DISCUSSION

A safe anesthetic plan for delivery when presented with severe PPCM requires several specific considerations. In this patient, adequate vascular access was an initial challenge given her history of upper extremity amputation. Invasive monitoring with Swan-Ganz catheterization and ECMO standby were part of a safe strategy given her preoperative pulmonary hypertension, likely due to prior radiation therapy and partial lung resection.

A multidisciplinary navigation team facilitated risk stratification and delivery. Preoperative anticoagulation was utilized to decrease the risk of intraoperative thromboembolism that can be associated with parturients who have decreased EF.

The choice for general anesthesia permitted optimization of oxygenation, ventilation and titration of vasopressor / inotrope therapy. The patient's pre-existing pulmonary hypertension and restrictive lung disease worsened the risk of rapidly developing hypoxia and hypercarbia, which was minimized by careful ventilator management.

Preload and afterload were maintained in a narrow range to prevent cardiovascular decompensation, while milrinone was utilized to maintain contractility. Adequate preoperative diuresis and conservative fluid management in both preoperative and intraoperative settings ensured that any autotransfusion after delivery would not cause circulatory overload.

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