

Obstetric Point of Care EchocardiographyRoss P. Harrington, M.D.¹, Kimberly Babiash, M.D., MBA^{1,2}¹University of Kansas School of Medicine-Wichita, Wichita, KS

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<https://doi.org/10.17161/kjm.voll5.18439>**INTRODUCTION**

Due to advancements in diagnostics, surgeries, and fertility treatments, the obstetric population is getting older and sicker,^{1,3} which requires the practice of obstetric anesthesia to evolve to provide exceptional care for this at-risk population. Early detection and optimization of disease processes in obstetric patients decreases morbidity and mortality.⁴ Point of care ultrasound is a tool that can be used quickly and efficiently to gain knowledge of a patient's current physiologic status. It provides knowledge to the entire obstetric team on which to base decisions. Anesthesiologists play a key role in evaluating, diagnosing, and managing these patients to optimize and improve outcomes.⁵

We present a case where bedside echocardiography allowed early diagnosis and subsequently altered management to improve patient outcomes significantly in an obstetric patient with new onset and undiagnosed cardiomyopathy. In addition, caution is recommended when employing the algorithmic use of labetalol for the treatment of the pregnancy-induced hypertension given the concern for the use of beta blockers in acute heart failure settings.

CASE REPORT

Written, informed consent was obtained from the patient prior to the preparation of this report. A 42-year-old woman, gravida 6, para 2 at 32 weeks 6 days gestational age, was referred to labor and delivery due to chronic hypertension with superimposed pre-eclampsia with severe features. She had a past medical history significant for morbid obesity and chronic hypertension. Significant familial history included her father's death at age 42 due to ischemic cardiomyopathy.

The patient was admitted and started on magnesium and labetalol protocol for pre-eclampsia, and induction of labor was initiated with oxytocin. She received one dose of 20 mg intravenous labetalol, but developed bradycardia three hours later with a heart rate of 29 bpm. The anesthesiologist was contacted to assist with bradycardia. A bedside transthoracic echocardiogram (TTE) showed global hypokinesis with likely ejection fraction (EF) < 20% seen in the parasternal short axis view (PSAX). Electrocardiogram showed bigeminy and inferior wall ischemia. The anesthesiologist recommended immediate cessation of induction for further cardiac optimization.

Desiring a multidisciplinary approach, the anesthesiologist ordered telemetry, intensive care unit (ICU) nursing staff, formal echocardiogram, chest x-ray, labs including magnesium level, and cardiology consult. The anesthesiologist emphasized the urgency of evaluation and importance of optimization to reduce the possibility of mortality. Test results showed pulmonary edema on chest x-ray indicating volume

overload and venous congestion in the lungs secondary to decreased cardiac function. The TTE showed EF < 20% with diffuse hypokinesis, pulmonary artery pressure 60 mmHg, and a dilated inferior vena cava. There were no significant valvular abnormalities. It was decided to halt magnesium, begin diuresis, maintain blood pressure control, and plan for cesarean section the following morning.

A repeat bedside TTE prior to cesarean section showed improved EF to 35% as seen in PSAX following diuresis and appropriate after-load reduction that did not combine beta blockade in the mechanism of action. The carefully devised anesthetic plan avoided general anesthetic by utilizing a low dose combined spinal-epidural that was raised slowly with the epidural catheter. Hemodynamics were maintained using an arterial line for monitoring and an epinephrine infusion with boluses for blood pressure and inotropic support. The cesarean section was successful without complication, and the patient went to ICU post-operatively. Her ICU course consisted of blood pressure control and management of multiple episodes of ventricular tachycardia. On post operative day two, she had a left heart catheterization which revealed a non-ischemic cardiomyopathy and ejection fraction of 20%. She was discharged on post-operative day four with medical management including a life vest and follow-up to cardiology.

DISCUSSION

Obstetric patients are presenting with more multi-medical problems, including heart disease and obesity, resulting in increasingly complex care requirements. Often, obstetric patients present acutely with incomplete workups and/or are unaware of significant medical comorbidities, mistaking symptoms for "normal" changes in pregnancy. Therefore, optimal care plans have the potential to be delayed or overlooked at the time of delivery.^{1,2} Most concerning is that cardiac conditions are a large portion of these comorbidities and are a leading cause of morbidity and mortality in obstetrics.⁶

Having a multi-disciplinary approach to managing obstetric patients has shown to improve outcomes.⁶ Fortunately, anesthesiologists are members of the obstetrics care team and are most suited to evaluate, diagnose, and help treat these conditions. The Rapid Obstetric Screening Echocardiography protocol can be utilized to tailor appropriate blood pressure management strategies to optimize the patient's condition.⁷ This protocol can be used to evaluate ejection fraction, volume status, valvular abnormalities, and other basic cardiac pathological conditions which are important factors in managing complex physiologic changes occurring peripartum. Point of care ultrasound allows these evaluations to happen quickly, so management can be tailored to the patient's current physiologic status. Since delayed diagnosis was a contributing cause in approximately half of all maternal deaths,⁴ the importance of bedside ultrasound is invaluable in the initial evaluation so expedited treatment plans can be made.

Maternal morbidity and mortality are increasing due to a variety of factors.¹ Obstetric anesthesiologists are an invaluable member of the obstetric team due to a skill set which can identify and guide treatment using technical skills, such as echocardiography, and communication between other members of the obstetric team. This places obstetric anesthesiologists in an optimal position to improve maternal morbidity and mortality, as seen in this case report.

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