Peri-Partum Cardiomyopathy in the ICU

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Objectives

- Identify risk factors associated with peripartum cardiomyopathy
- Discuss discreet management of cardiomyopathy in obstetric patients
- Review the education patients need to know prior to leaving the ICU

Peripartum Cardiomyopathy Risk Factors

Maternal age ≥30 years	African ancestry	Hypertension
Anemia	Substance misuse	Asthma
Autoimmune disease	Preeclampsia or eclampsia • May have shared pathophysiology	Multiple gestation
Obesity	Thyroid dysfunction	Prolonged tocolysis

Peripartum Cardiomyopathy

Heart failure that may develop toward the end of pregnancy or months after delivery *without an identifiable cause*

Cardiac stress:

During lactation, blood vol. and CO remain elevated; may aggravate underlying heart failure

Fluid shifts/Retention

Postpartum diuresis may not occur properly in PPCM, leading to worsening fluid overload

Hormonal factors:

Prolactin, which rises during breastfeeding, has been implicated pathogenesis due to vasculotoxic fragments in some women predisposed to the condition[1]

***Bromocriptine**

-Inhibition of Pituitary Prolactin

-Positive assc. w/ LVEF and mortality

-Trials underway

Identifying Clinical Features

Pulmonary rales (left-sided congestion)

Elevated JVP (right-sided congestion)

Symptoms of congestion

- DOE
- Orthopnea
- PND
- Lower extremity edema

1. Arany Z, Feldman AM. To Breastfeed or Not to Breastfeed With Peripartum Cardiomyopathy. JACC Basic Transl Sci. 2019 Jun 24;4(3):301-303. doi: 10.1016/j.jacbts.2019.03.005. PMID: 31312754; PMCID: PMC6610157.

Peripartum Cardiomyopathy Differential Diagnosis

Benign dyspnea of pregnancy	Asthma	Pulmonary embolism	Amniotic fluid embolism	Preeclampsia
Normal CXR | Normal echocardiogram **Treatment:** No work up required	Indicated by PFTs and bronchodilator response | Wheezing **Treatment:** Bronchodilator therapy	Sudden onset |Tachycardia | Chest pain | Unremarkable pulmonary exam | DVT on LE imaging or PE on CT chest angiogram **Treatment**: Anticoagulation	**Anaphylactoid Syndrome of Pregnancy** Sudden onset | Circulatory collapse (usually after labor) | Bleeding (from DIC) | Hypotension | Tachypnea | Crackles on exam **Treatment:** Supportive care +/- ECMO	Hypertension | Proteinuria | Usually accompanied by neurologic symptoms (headache, dizziness) | Echocardiogram shows mildly decreased LVEF **Treatment:** Proceed with delivery | Supportive care

Peripartum Cardiomyopathy Evaluation

EKG: Sinus rhythm | Non-specific ST-segment or T-wave changes

Chest X-Ray: Pulmonary edema | Cardiomegaly

B-type natriuretic peptide (BNP): Elevated

Note: Not elevated in normal pregnancy

Echocardiography is the most useful diagnostic tool

<45% LVEF (diagnostic requirement)

In some cases:

RV dilation

Pulmonary hypertension

Atrial enlargement

AV regurgitation

*Caution in an early septic patient – elevated CO may mask PPCM

Peripartum Cardiomyopathy Management

Early consultation with a cardiologist/ MFM

Sodium restriction

Symptomatic pulmonary or peripheral edema present

- Loop diuretic

If hemodynamics permit

- Selective ß1 receptor blocker:
- **Metoprolol preferred to avoid uterine stimulation via β2 pathway**
- **Hydralazine** plus **isosorbide dinitrate**

- **Avoid** ACE inhibitors and angiotensin receptor blockers (ARBs) **during pregnancy**
  - Some of these medications may be used postpartum depending on lactation safety profile

Digoxin may be used in pregnancy

Cardioversion and defibrillation may be used in emergent settings

(safe in pregnancy)

Peripartum Cardiomyopathy Pregnancy Specific Considerations

Avoid over-diuresis to maintain perfusion of the placenta

*Close monitoring throughout pregnancy and through 6-months post-partum with echocardiograms (clinical scenario may dictate alternate/ more frequent regimen)

- Each trimester
- **Immediately after delivery**
- *4 weeks postpartum*

Timing of delivery (AHA recommendations)

- Stable: Per obstetric indications – Vaginal delivery preferred
- Unstable or maternal extremis: Prompt delivery

Breastfeeding

- **Unless severe LVEF, benefits may outweigh risks**
- **If undiagnosed:** SOB, Cough, Palpitations, Dizziness, Syncope, reduced milk production, edema, fatigue
- **Breastfeeding itself does not necessarily worsen cardiac outcomes** if the mother's condition is stable and well managed[1]

1. Noll, A., Kawamoto, K.R., Dassanayake, M.T. *et al.* Breastfeeding in patients with peripartum cardiomyopathy: clinical outcomes and physician counseling. *Int Breastfeed J* 19, 73 (2024). https://doi.org/10.1186/s13006-024-00673-6

Peripartum Cardiomyopathy

Most women (50-80%) will make a full recovery **(LVEF >50%)** within first 6 months.

- LVEF prior to next pregnancy is the strongest predictor of outcome
- If LVEF <50%
  - 50% risk of acute heart failure w/ worsening disease and increased mortality
  - Pregnancy contraindicated without recovery to normal LVEF thus "repeat pregnancy is contraindicated in women with PCCM"
  - Ensure contraception counseling prior to discharge

Women with normal function prior to subsequent pregnancy are still at increased risk **(20%)** of worsening cardiac function

An LVEF ≥30% usually means a full recovery of left ventricular function is likely

LVEF <30% suggests a slow or incomplete recovery with respect to achieving full ventricular function.

Black ancestry is associated with reduced likelihood of recovery

Mortality has improved from 30-50% in 1970's to 1.3-16% in 2000's.

Pearls

- There are known risk factors
- BNP is not elevated in normal pregnancy
- Diagnostic criteria is a LVEF <45% (beware of transient increases in sepsis)
- Beware of over diuresis
- Breast feeding is not contraindicated but **may be very symptomatic in undiagnosed patients**
- Council patients accordingly prior to leaving the ICU and again at discharge