

Cardiomyopathy, Peripartum

Risk

- Exact incidence unknown
- Incidence in USA: About 1:3000 to 1:4000 live births
- Incidence higher in African-Americans compared to Caucasians
- Highest incidence in Haiti and parts of Africa

Perioperative Risks

- CHF
- Arrhythmias; atrial and ventricular
- Pulm and systemic thromboembolism

Worry About

- Increased myocardial oxygen demand with progression of pregnancy may exceed myocardial oxygen supply resulting in myocardial ischemia.
- Autotransfusion associated with uterine contractions during labor and involuted uterus after delivery may significantly increase preload resulting in pulm edema.
- Anticoagulation may contraindicate neuraxial anesthesia.
- Inadequate pain control during labor will increase sympathetic drive resulting in increased afterload and worsening of cardiac function.

Overview

- A type of DCM.
- All of the following must be present for a diagnosis: cardiac failure in the last mo of pregnancy or within 5 mo postpartum, no identifiable cause of cardiac failure, absence of heart disease prior to the last mo of pregnancy, ECHO evidence of LV systolic dysfunction.
- Symptoms and signs of heart failure will often develop insidiously and must be discriminated from normal physiologic changes of pregnancy.
- Pt complaints include dyspnea, orthopnea, cough, hemoptysis, malaise, chest or abdominal pain.
- Physical findings include peripheral edema, jugular venous distension, crackles on chest auscultation, a third heart sound, and a new onset regurgitant murmur.
- CXR will reveal cardiomegaly and pulm edema, while ECG may show arrhythmias with nonspecific ST and T wave changes. Dilated hypokinetic ventricles are seen on ECHO.

Etiology

- Exact etiology is unknown.
- Possible etiologies include viral or autoimmune myocarditis, abnormal cytokines, and selenium deficiency.

- Abnormal cleavage product of prolactin inducing apoptosis has also been implicated.
- African-American ethnicity, advanced maternal age, multiple gestation, and hypertensive diseases of pregnancy are contributing factors.

Usual Treatment

- Treatment is mainly supportive and aims to restore normal hemodynamic indices, avoiding further worsening of cardiac function and complications of heart failure.
- Sodium and fluid intake restriction is essential if the pt presents with signs of pulm edema. Diuretics are administered to decrease preload.
- Vasodilators (nitrates or hydralazine) may be useful in reducing afterload if the pt's systolic blood pressure is in an acceptable range.
- In pts with low cardiac output state despite initial therapy, inotropic agents (dobutamine or levosimendan) are indicated.
- Beta-blockers are indicated once pt is clinically stable.
- Anticoagulation is recommended in parturients with LVEF <35%.
- Pts are best managed by a multidisciplinary team.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Airway edema	Pregnancy	Airway exam	
RESP	Pulm edema	Dyspnea Cough	Tachypnea Rales/rhonchi	CXR
CV	LV dysfunction CHF Myocardial ischemia Arrhythmias	Fatigue, orthopnea PND Chest pain Palpitations	Narrow pulse pressure Cardiomegaly JVD, peripheral edema S ₃ , S ₄ , murmur	ECG, BNP CXR, ECHO Troponin
GI	Hepatic congestion	Abdominal pain	Tender hepatomegaly	LFTs, PT, albumin
OB	Decreased placental perfusion		FHR—absent variability	NST, BPP Doppler velocimetry
HEME	Anemia	Fatigue	Pallor	CBC

Key References: Sliwa K, Hilfiker-Kleiner D, Petrie M, et al.: Current state of knowledge on aetiology, diagnosis, management, and therapy of peripartum cardiomyopathy: a position statement from the Heart Failure Association of the European Society of Cardiology Working Group on peripartum cardiomyopathy, *Eur J Heart Fail* 12(8):767–778, 2010; Dennis AT: Heart failure in pregnant women: is it peripartum cardiomyopathy? *Anesth Analg* 120:638–643, 2015.

Perioperative Implications

Antepartum management

- Pharmacologic management of congestive heart failure following established guidelines
- ACE inhibitors should be avoided during pregnancy.
- Supplemental oxygen to maintain oxygen saturations $\geq 95\%$.

Monitoring

- ECG with ST-segment analysis
- Intra-arterial blood pressure monitoring is indicated
- Consider a CVP or PA cath if patient is in acute heart failure or pulm edema
- TEE is useful for assessing ventricular and valvular function if general anesthesia is used for delivery

Airway

- Airway edema can make management potentially difficult.
- Cautious instrumentation of airway because oral and pharyngeal mucosal surfaces are friable.
- Be prepared for an emergent airway.

Preinduction/Induction

- Combined spinal epidural or epidural analgesia/anesthesia with slow titration of low concentrations

of local anesthetic has the advantages of decreasing preload and afterload provided normal blood pressure is maintained.

- The neuraxial block also provides excellent pain control and attenuates the sympathetic response to pain and its effects on the heart.
- If general anesthesia is indicated, the goal is to maintain a low to normal heart rate and avoid hypotension or hypertension.
- An opioid-based induction of anesthesia will avoid the myocardial depression and hypotension associated with large doses of propofol or thiopental.
- Etomidate has also been used for induction of anesthesia.
- Neonatal resuscitation will be required if high-dose opioid is used for maternal induction of anesthesia.
- Avoid aortocaval compression.

Maintenance

- The same principles during induction apply; avoid tachycardia, hypotension, hypertension and depression of myocardial contractility

- Low concentration of inhalational agent <0.75 MAC
- TIVA using remifentanyl and propofol has also been reported.
- Cautious use of oxytocin after delivery because of its potential CV adverse effects.

Extubation

- Extubate awake; risk of pulm aspiration of gastric contents.

Postoperative Period

- Consider close hemodynamic monitoring in the critical care unit.
- Medical management of heart failure should continue and addition of ACE inhibitors or ARBs to reduce afterload should be considered.

Anticipated Problems/Concerns

- Acute pulm edema.
- Tachyarrhythmias.
- Pulm and systemic embolism.
- Hemorrhage.