Peripartum Cardiomyopathy: Assessment and Treatment

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Definition

- 1937: First described
- 1971: Demakis peripartum CM
  - Development of HF in last month of pregnancy or within 5 months of delivery
  - Absence of a determinable etiology of HF
  - Absence of structural heart disease prior
- 1997 NHLBI workshop
  - LVEF <45%, fractional shortening <30%
Pregnancy-Associated Cardiomyopathy Data Collection (n=123)

Survey Forms Mailed To 15,000 Physicians

Respondents 409 Physicians

Diagnosis of PACM 233 Patients

USC Patients 14 Patients

Self-Referred Cases 33 Patients

Medical Records Reviewed 76 Patients

Time of Diagnosis of PPCM in 123 Patients

Elkayam, U. J Am Coll Cardiol 2011;58:659-670
Continuum

- PPCM
- Pregnancy associated CM
- ESC: “an idiopathic CM presenting with HF secondary to LV systolic dysfunction towards the end of pregnancy or in the months following delivery.
- Most in 3\textsuperscript{rd} trimester, some in 2\textsuperscript{nd}
- Diagnosis of exclusion
Change in the Incidence of PPCM Over Time

Elkayam, U. J Am Coll Cardiol 2011;58:659-670
Associated Conditions

- Age, mean 27-33 years
- Race: higher in AA
- HTN, not a cause, check BNP
- Multifetal pregnancies
- Parity
Clinical Presentation

- **Symptoms:** dyspnea, orthopnea, cough, chest pain, abdominal pain
- **Exam:** Tachycardia, tachypnea, BP up or down, inc JVD, displaced apical impulse, RV heave, MR, TR, S3, rales, edema
- **EKG:** sinus tach with nonsp st-t changes, LVH, LAE
- **CXR:** pulmonary venous congestion, cardiomegaly, pleural effusion
- **Echo:** varying degrees of LV dilation and dysfunction, RV and biatrial dilation, MR, TR, pulmonary pressures
Clinical Presentation

- Signs and symptoms of normal pregnancy
- BNP no change in pregnancy and postpartum period
- PPCM: BNP levels markedly elevated
Prognosis:
Pattern of Recovery of LV Function in 40 Patients With PPCM

Elkayam, U. J Am Coll Cardiol 2011;58:659-670
Prognosis:
Trend in LVEF According to Final Outcome

55 women
LV recovery in 45%

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Predictors of LV Recovery

- LV diastolic dimension (<5.5 to 6.0 cm)
- Systolic function at time of diagnosis (LVEF >30%, fractional shortening >20%)
- Lack of troponin elevation
- Lower level of plasma BNP
- Absence of LV thrombus
- Breast-feeding
- Diagnosis after the delivery
- Non-African American ethnicity
Complications

- Thromboembolism
  - Coronary emboli
  - Biventricular thrombi
  - Pulmonary embolism
  - Peripheral embolization
  - Thrombotic cerebral infarct
- Severe HF
- Cardiogenic shock
- Cardiopulmonary arrest due to HF/arrhythmias
- Death
Timing of Mortality After Diagnosis in Patients With PPCM

From 1991-1997, 171 cases

Elkayam, U. J Am Coll Cardiol 2011;58:659-670
PERIPARTUM CARDIOMYOPATHY
SUBSEQUENT PREGNANCY
PPCM

44 Patients
60 Pregnancies

Group A
Normalized LVEF
N=42

Group B
Persistent LV Dysfunction
N=18

(Elkayam et al NEJM 2001;344:1567)
Incidence of Maternal Complications Associated With Subsequent Pregnancy in Women With PPCM

Elkayam, U. J Am Coll Cardiol 2011;58:659-670
Pregnancy Classes

- **Category A:** Controlled studies fail to demonstrate a risk to the fetus in the first trimester, and the possibility of fetal harm appears remote.

- **Category B:** Either animal-reproduction studies have not demonstrated a fetal risk but there are no controlled studies in pregnant women.

- **Category C:** Adverse effects on the fetus and there are no controlled studies in women, or studies in women and animals are not available. Drugs should be given only if the potential benefit justifies the potential risk to the fetus.

- **Category D:** Evidence of human fetal risk, but the benefits from use in pregnant women may be acceptable despite the risk.

- **Category X:** The drug is contraindicated in women who are or may become pregnant.
Treatment

- Loop Diuretics
  - Caution in pregnancy to avoid hypotension and decreased uterine perfusion
  - Furosemide (cat C) excreted into breast milk
    - No reports of AE in infants

- Intravenous vasoactive medications
  - Decompensated HF
  - NTG preferred (cat B)
  - Nitroprusside (cat C) thiocyanate toxicity
  - Inotropic agents: limited data, cat B and C
    - Advanced HF, low BP, high filling pressures
Treatment

- **ACEI/ARB (cat C)**
  - Contraindicated in pregnancy
    - Dev of fetal kidneys, oligohydramnios, IUGR, prematurity, bone malformation, limb contractures, PDA, RDS, hypotension, anuria, neonatal death
  - During pregnancy, combine nitrates and hydralazine

- **Beta Blockers**
  - B1 selective preferred because nonselective beta-blockade facilitates uterine activity
  - Secreted into breast milk

- **Spironolactone (cat C)**
  - Antiandrogenic effect
Treatment

- **Digoxin (cat C)**
  - No fetal harm
  - Excreted into breast milk

- **Anticoagulants**
  - Time of diagnosis till EF recovers
  - Important up to 6-8 weeks postpartum
  - Unfractionated heparin and low-molecular weight heparin are safe, not cross placenta
  - High prevalence of urgent delivery, unfractionated heparin preferred due to shorter half life
  - Warfain and heparin not secreted into breast milk

- **Newer therapies**
  - Immune globin, pentoxifylline, bromocriptine
PPCM and Pentoxifylline

Combined Endpoint of Poor Outcome
(Death, Class III-IV @ last FU, Failure to increase EF >10%)

- Standard Therapy: 52%
- Pentoxifylline: 27%

Treatment with pentoxifylline – the only independent predictor of outcome, on logistic regression analysis
Sliwa et al, Eur J heart fail 2002;4:305
PPCM and Pentoxifylline

6 Month Mortality

Sliwa et al, Eur J heart fail 2002;4:305
Treatment

- Discontinuation of treatment?
- ICD and external defibrillators
- Cardiac assist devices
- Cardiac transplantation
- Labor and Delivery
- ?Termination of pregnancy
- Birth Control
Conclusions

- Associations with PPCM include advanced maternal age, African American race, maternal hypertension, and multiple gestation.
- Diagnosis of peripartum cardiomyopathy may be delayed.
- Normalization of LV function occurs in >50% of women with PPCM, within 2-6 months of diagnosis.
- Predictors of LV recovery include LV diastolic dimension of <5.5 to 6 cm, LV ejection fraction >30%-35%, lack of troponin elevation, lower level of plasma BNP.
- Subsequent pregnancy may lead to a significant and persistent depression of LVEF, to CHF and even to death.
- PPCM treatment should be consistent with current guidelines for the treatment of heart failure in adults. Drug therapy may need to be altered during pregnancy or lactation to avoid detrimental effects to the fetus.