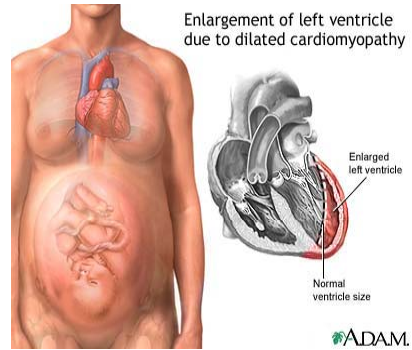


## **Periparum Cardiomyopathy**

**Ahmed El Hawary**  
**Suez Canal University**

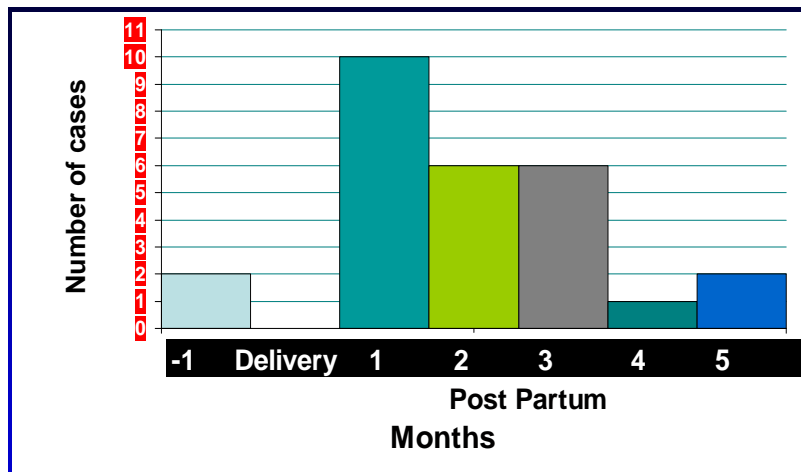


### **Definition of PPCM**

**PPCM is the development of HF:**

- 1. In the last month of pregnancy or within 5 months post-partum.**
- 2. With impaired systolic function.**
- 3. With no pre-existing cardiac disease or identifiable cause.**

### PPCM - Time of Onset



Demakis JG, Rahimtoola SH. Circulation 44:964;1971

### Incidence of PPCM

4% of all cardiomyopathies

1 : 3000-4000 preg.

### Type of myopathy

Dilated Cardiomyopathy

**Etiology unknown, but potential causes include:**

1. Myocarditis.
2. Abnormal immune response to pregnancy.
3. Increased myocyte apoptosis.
4. Genetic predisposition.
5. Proteolytic cleavage of prolactin during oxidative stress.

**Risk factors include:**

1. Advanced maternal age.
2. African descent.
3. High parity.
4. Twin pregnancy.
5. Use of tocolytics.
6. Poverty.

**Myocarditis ?**

**In one study**

Of women with PPCM, 45% showed evidence of “healing myocarditis”.

1. Presence of inflammatory cells.
2. Necrosis.
3. Fibrous remodeling.

**In another Study**

Myocarditis was found in 30% of patients with PPCM.

Sanderson et al. Br Heart J 1986; 56:285

O'Connell et al. J AM Coll Cardiol 1986; 8:52

## **Abnormal Immune Response?**

### **Maternal immunologic response to a fetal antigen?**

- Fetal cells may escape into the maternal circulation.
- May become lodged in cardiac tissue.
- May trigger immune response.

\*Nelson et al. J Am Med Womens Assoc 1998; 53:31

### **BUT**

In 39 women with PPCM in **Nigerian Study**:

No differences between subjects and controls in levels of:

Serum Immunoglobulins.

Circulating Immune Complexes.

Cardiac muscle antibodies.

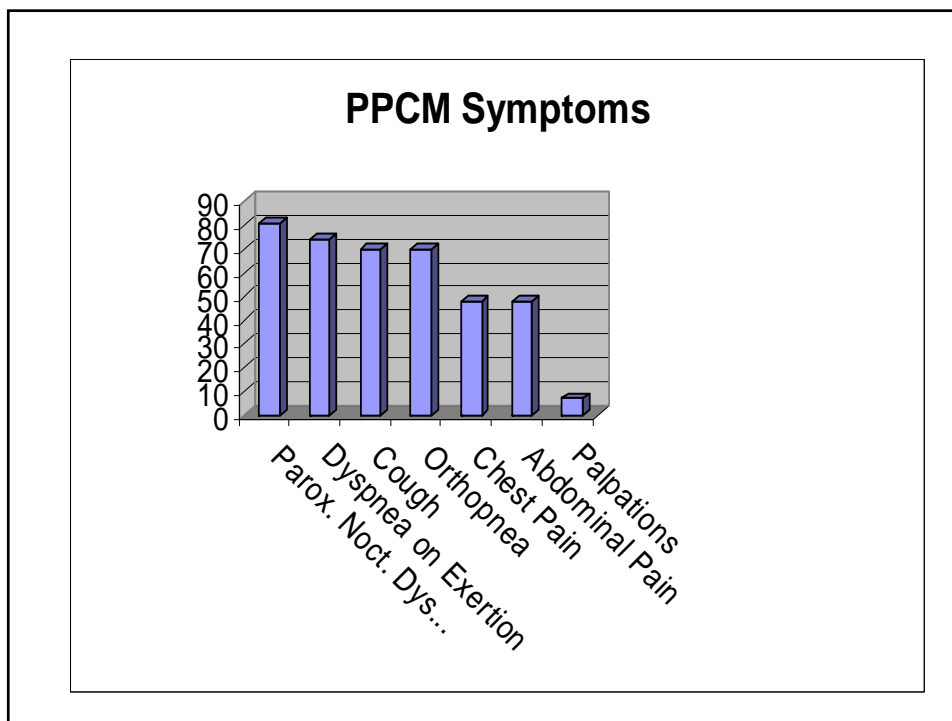
\*Cenac et al. Int J Cardiol 1990; 26:49

## **Genetics**

### **Several case reports published:**

1. In 1963, Pierce et al. reported that 3 of 17 PPCM patients had definitive FH of same condition.
2. In 1984 Voss et al. reported a patient who died from PPCM as did her mother and two of her sisters.
3. In 1993 Massad et al. reported 16 ys girl with PPCM; her sister later on received cardiac transplant for PPCM.

Pearl Am Heart J 1995;129:421-2



### Treatment

- Delivery
- Similar to other forms of CHF
  1. Diuretics
  2.  $\beta$ -blockers
  3. Digoxin
  4. Anticoagulants
  5. ACE-I (post partum)

**Must consider pregnancy class / breast-feeding harm potential !**

### **Pregnancy Drug Class Review**

***Category A:***

No risk to fetus in first or later trimesters.

***Category B:***

Safety based on animal studies; no studies in women.

***Category C:***

Studies in women and animals are not available.

Drugs given if potential benefits justify potential risk to fetus.

### **Pregnancy Drug Class Review**

***Category D:***

There is positive evidence of human fetal risk (unsafe),

In life-threatening illness the potential risk may be justified.

***Category X:***

Highly unsafe; risk outweighs any potential benefit.

Drugs are contraindicated in women who are or may become pregnant.

**Digoxin:** Class C.

**Lasix:** Class C.

Not recommended in PIH.

May decrease placental perfusion.

**Thiazide Diuretics:**

Not recommended in PIH.

Thrombocytopenia has been reported in breast feeding infants.

**Hydralazine:** Class C

Compatible with BF

**ACE Inhibitors:** Class D

Reserved for postpartum use  
compatible with BF

**Beta-Blockers:** Class C

Compatible with BF

Cause IUGR in some infants in utero.

**Heparin:** Class C

Not excreted in breast milk

**Warfarin:** Class D

Contraindicated in pregnancy

Safe in BF.

### Other Therapies

#### 1. Immune suppressive therapy

Prednisone

Azathioprine

#### 2. Immune modulatory therapy

IV Immune Globulin

Pentoxifylline

#### 3. Bromocriptine

#### 4. Cardiac Transplant

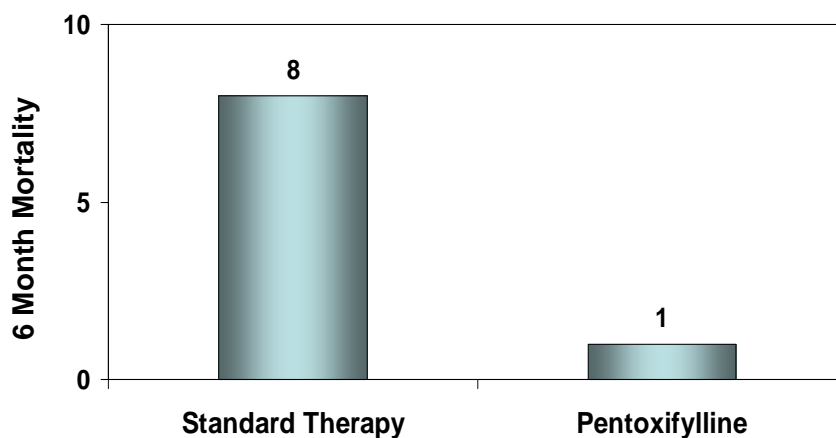
### IV Immune Globulin

One retrospective study of 17 patients with diagnosis of myocarditis and dilated cardiomyopathy :

- 6 PPCM
- 11 dilated cardiomyopathy
- All patients received >10 units IV Immune Globulin.
- All PPCM patients showed improvement in EF, compared to only 4/11 of dilated cardiomyopathy patients.

McNamara et al. Circulation 1997; 95:2476

### PPCM and Pentoxifylline



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

### **Prolactin**

- Prolactin level increased after delivery, where it induces lactation and promotes reshaping of the uterus.
- Prolactin exists in 2 biologically active forms with opposing effects.
  - **full-length 23 kDa prolactin:** promotes angiogenesis and protects endothelial cells.
  - **cleaved 16 kDa isoform** induces endothelial cell apoptosis and disrupts capillary structures.
- Recent data showed that oxidative stress promotes postpartum generation of 16 kDa prolactin, which is causally related to PPCM.
- In turn, prolactin blockade with **bromocriptine** was successful in preventing PPCM in mice and patients at high risk for the disease.

J Am Coll Cardiol 2007;50:2354 –5

### **Bromocriptine**

- In a case report study of 2 patients with acute PPCM, bromocriptine in addition to standard HF therapy was associated with recovery and prevention of CHF.
- This observation supports the notion that prolactin, specifically its 16 kDa isoform, seems to play a crucial role not only for the initiation but also for the progression of PPCM.

J Am Coll Cardiol 2007;50:2354 –5

### **Bromocriptine**

- In a preliminary study of **12 women with PPCM**, **6 women received bromocriptine** plus standard therapy, and **6 women standard therapy** alone.
- At **3 months** postpartum, all women in the bromocriptine group were alive and had preserved or improved LV function, whereas 3 women in the standard care group died and LV function had deteriorated in the remainder.
- The results of this small study coupled with animal and previous clinical data support conducting a larger trial of bromocriptine.

Cell 2007;128(3):589–600

### **Bromocriptine**

- Although this is potentially an exciting breakthrough in the pathophysiology of PPCM, the data are preliminary.
- So we must be careful as the use of bromocriptine in the postpartum period to suppresses lactation was associated with increased incidence of:
  - CV events
  - HTN
  - Thrombus formation.
- Therefore, it is reasonable to await the results of larger studies.

## **Cardiac Transplant**

It is estimated that transplant is performed in up to 1/3 of PPCM patients.

### *After transplant*

- Pts should be strongly advised against future pregnancies.
- There is Increased risk of HTN, pre-eclampsia, preterm labor, and graft failure due to recurrent disease.

Scott et al. Obstet Gynecol 1993; 82:324

## **Prognosis**

- Mortality estimates range from 25-50%.
- Most deaths occur within 3 months postpartum.
- Deaths usually caused by:
  1. Progressive pump failure
  2. Arrhythmias
  3. Thromboembolic events

## Prognosis

### Outcome in 123 Patients With PACM

Recovery	Persistent	Heart	Death
LVEF $\geq$ 50%	LV dysfunction	Transplantation	
59%	41%	4%	10%*

\* Including 2 pts who died post transplantation

## PPCM

### Risk of Subsequent Pregnancy

- Subsequent pregnancy may lead to a significant and persistent depression of LVEF, CHF, and death.
- Clinical and functional deterioration is more likely in patients with persistent LV dysfunction but can also occur in pts who normalize their LV function.

*Thanks For Your Kind Attention*