

Peri-Partum Cardiomyopathy



Case Study

פרופ' טל בירון

מרכז רפואי מאיר
MEIR MEDICAL CENTER



42 yo
G4P3
39 w
C-HTN

IOL 2d
NVD
3100 gr
Apgar 9/10

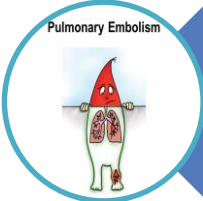
PD#1
Dizziness
Resp. Insuf.
Edema



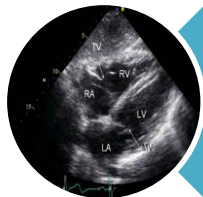
Bleeding, Anemia



Preeclampsia – severe features (Pulmonary edema)

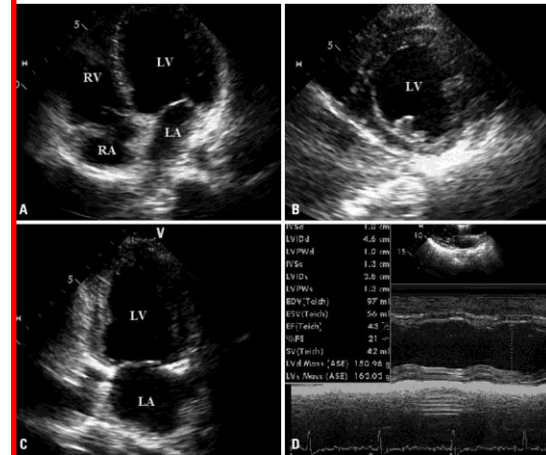
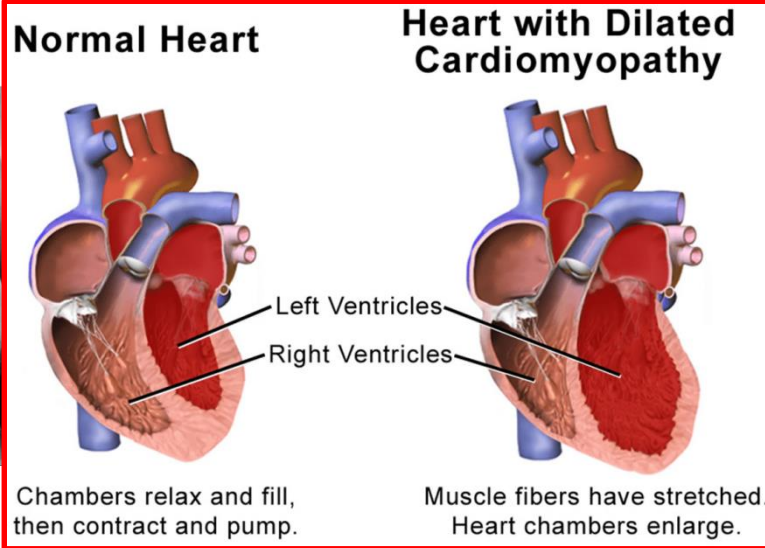
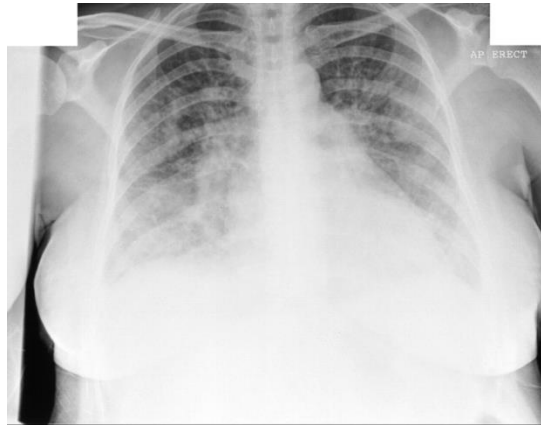


Pulmonary Emboli



PPCM

PERIPARTUM CARDIOMYOPATHY



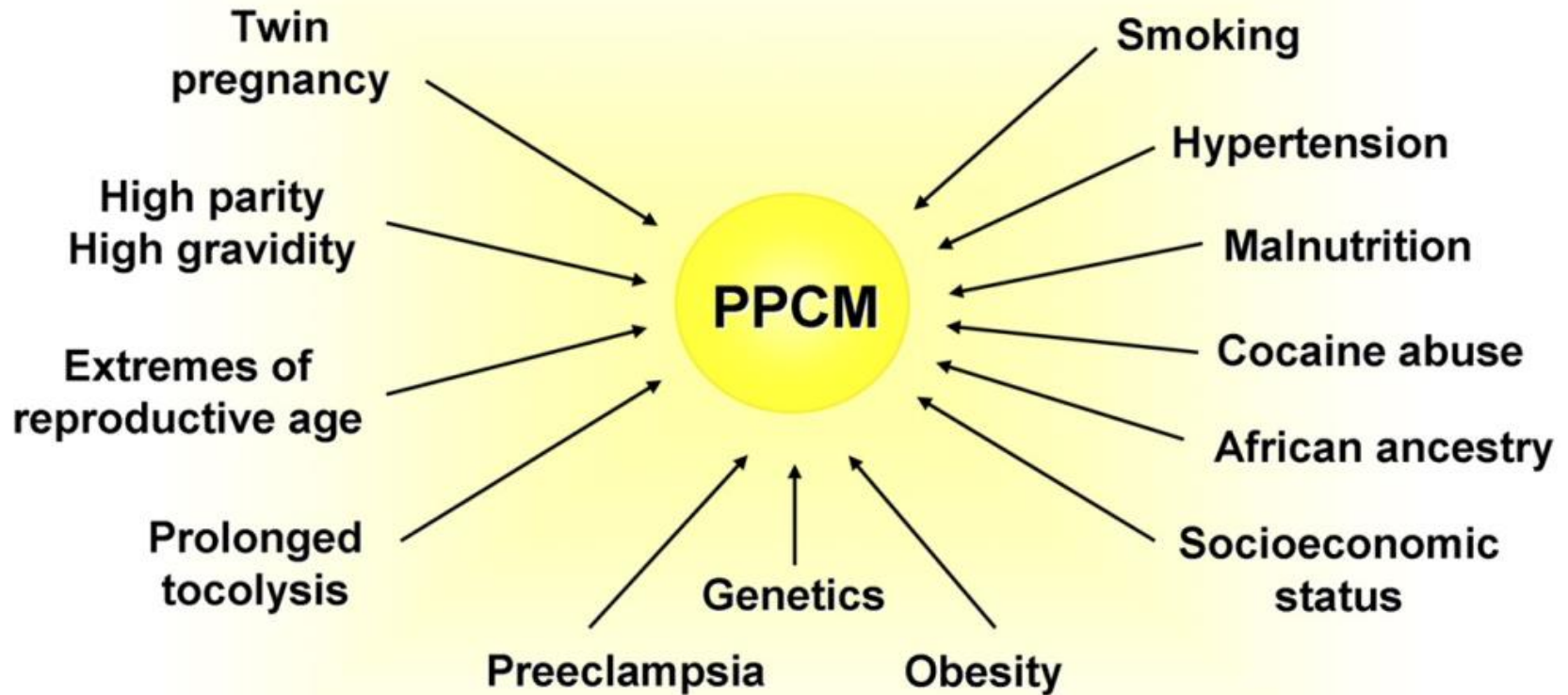
Clinical criteria for the diagnosis of peripartum cardiomyopathy

- Cardiac failure in the last month of pregnancy or within a few months postpartum
- Absence of another identifiable cause
- Absence of underlying structural heart disease
- LV systolic dysfunction by echocardiographic data:
 1. EF less than 45%
 2. M-mode fractional shortening less than 30% or both
 3. LV end-diastolic dimension greater than 2.7 cm/m²

EF 30%

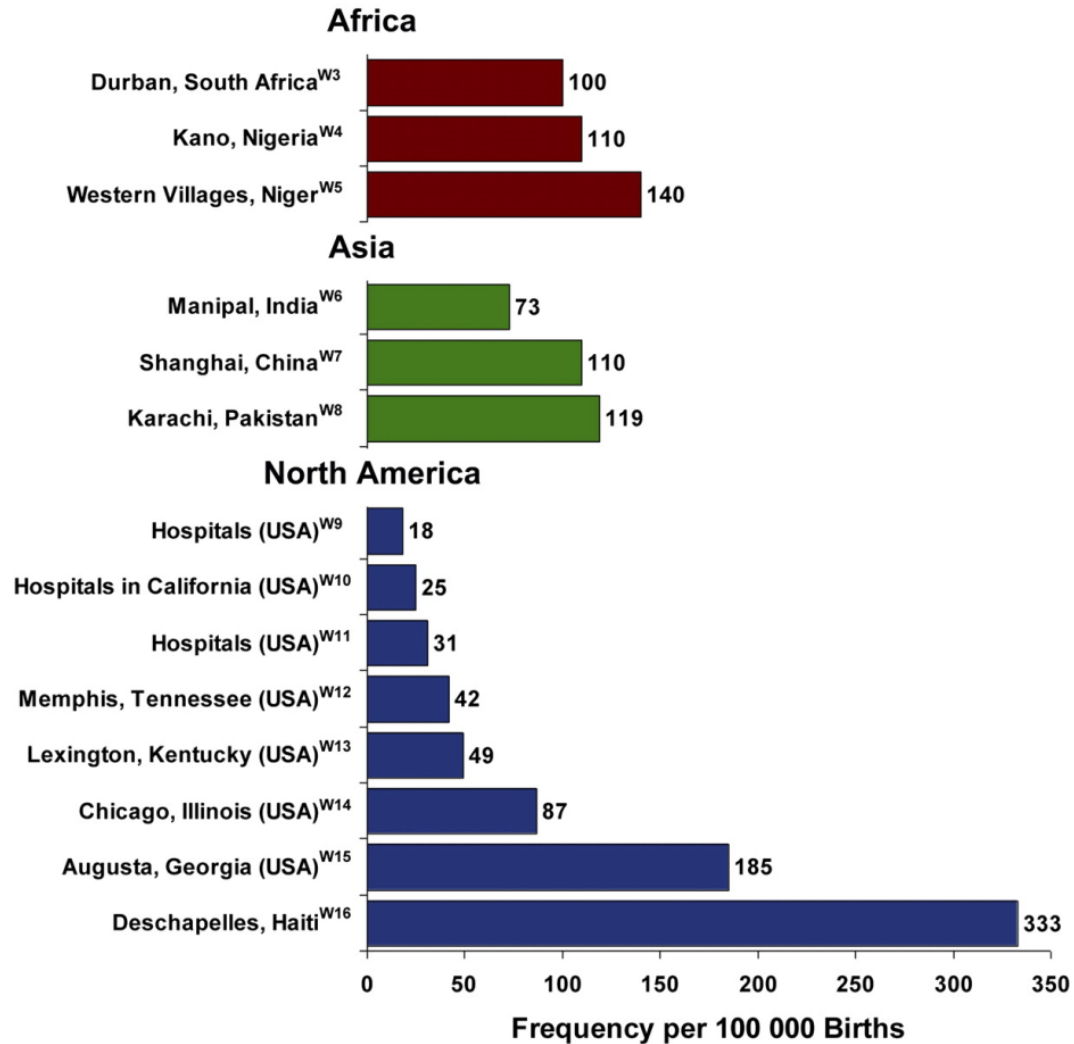
Probable risk factors

Proposed risk factors



Emerging risk factors

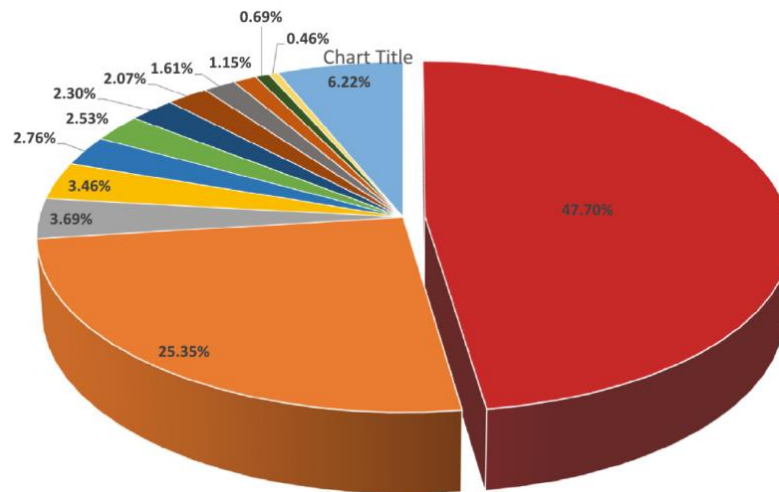
Incidence of PPCM



Etiologies, Predictors, and Economic Impact of 30-Day Readmissions Among Patients With Peripartum Cardiomyopathy

Mahek Shah, MD^{a,1}, Pradhun Ram, MD^{b,1,*}, Kevin Bryan Lo, MD^b, Soumya Patnaik, MD^c,
 Brijesh Patel, DO^a, Byomesh Tripathi, MD^c, Shantanu Patil, MD^d, Marvin Lu, MD^b,
 Ulrich P. Jorde, MD^f, and Vincent M. Figueredo, MD^g

6,977 admissions with PPCM (30d PP national database)

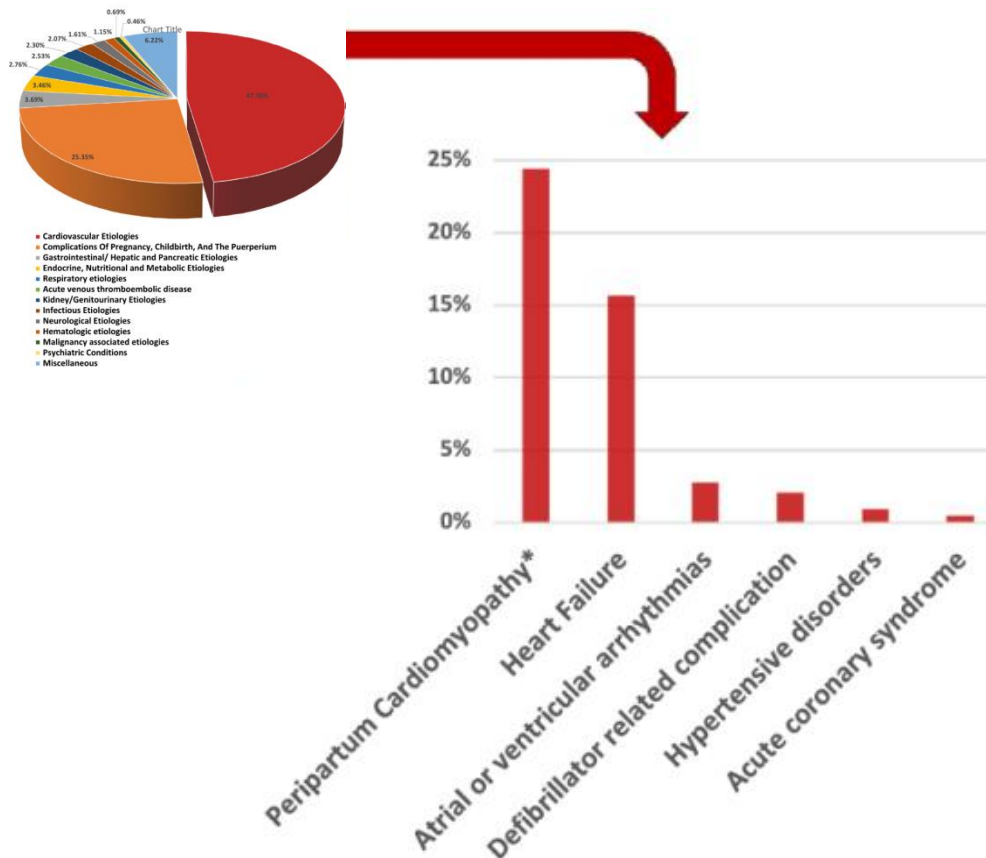


- Cardiovascular Etiologies
- Complications Of Pregnancy, Childbirth, And Gastrointestinal/ Hepatic and Pancreatic Etiology
- Gastrointestinal/ Hepatic and Pancreatic Etiology
- Endocrine, Nutritional and Metabolic Etiology
- Respiratory etiologies
- Acute venous thromboembolic disease
- Kidney/Genitourinary Etiologies
- Infectious Etiologies
- Neurological Etiologies
- Hematologic etiologies
- Malignancy associated etiologies
- Psychiatric Conditions
- Miscellaneous

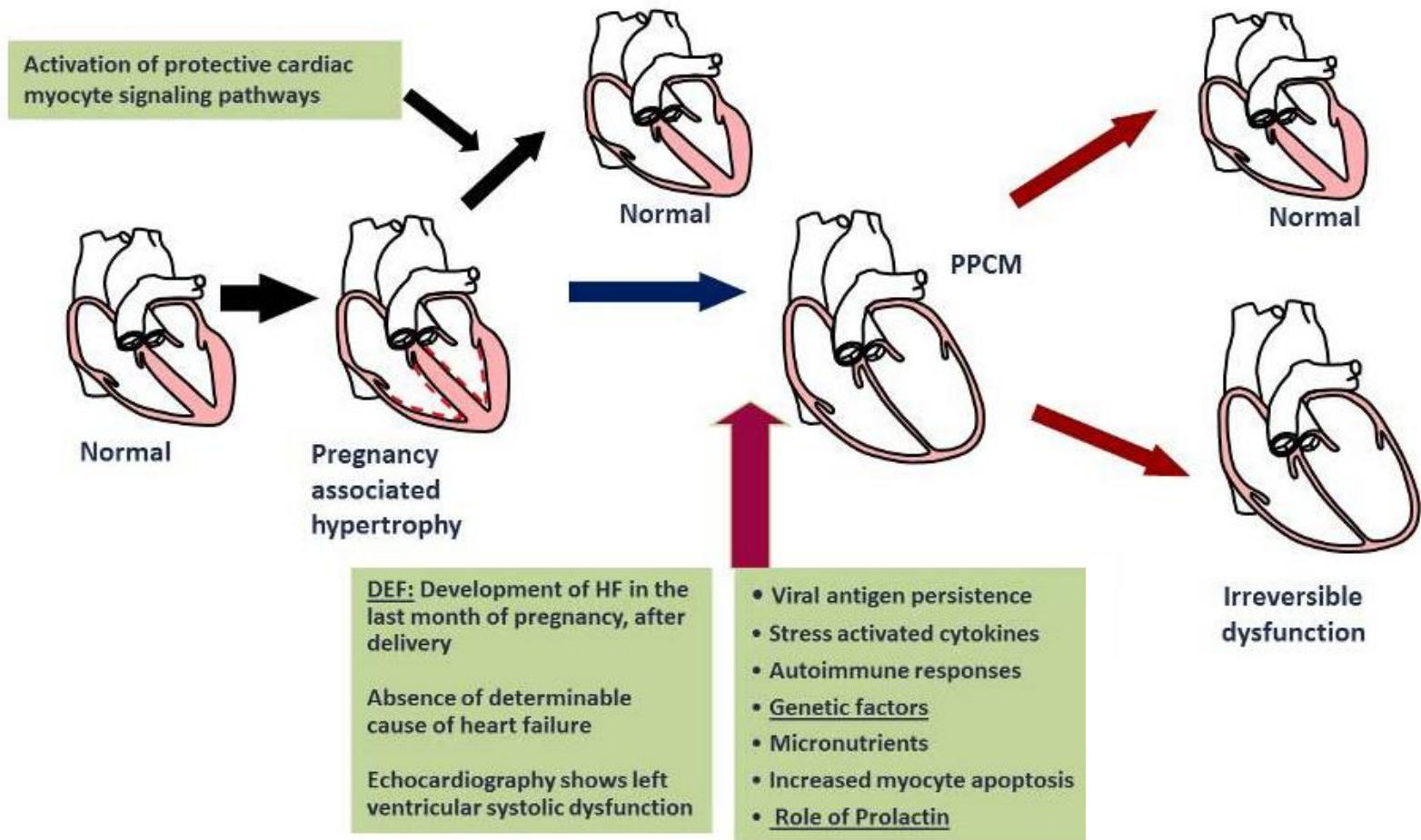
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6,977 admissions with PPCM (30d PP national database)



Pathogenesis of PPCM



Genetic theory

A novel human S10F-Hsp20 mutation induces lethal peripartum cardiomyopathy.

Author(s)

Liu,GS,Gardner,G,Adly,G,Jiang,M,Cai,WF,Lam,CK,Alogaili,F,Robbins,N,Rubinstein,J,Kranias,EG

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Decreased expression of programmed death 1 on peripheral blood lymphocytes disrupts immune homeostasis in peripartum cardiomyopathy

Guozhi Xia^a, Xin Sun^b, Xiaopu Zheng^{a,*}, Junkui Wang^c



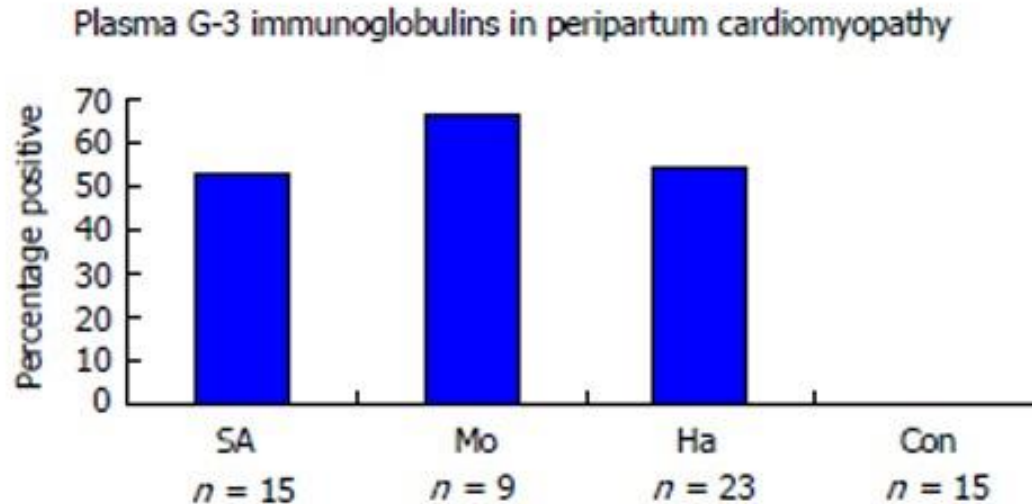
Circulation Journal
Official Journal of the Japanese Circulation Society
<http://www.j-circ.or.jp>

Peripartum Cardiomyopathy From a Genetic Perspective

Chizuko A. Kamiya, MD, PhD; Jun Yoshimatsu, MD, PhD; Tomoaki Ikeda, MD, PhD

REVIEW

Autoimmune theory



- **Multiple types of cardiac antigen antibodies**
- Cardiac myosin heavy chain antibodies in PPCM patients from two African nations.
None were found in control normal postpartum patients.

Vascular imbalance theory

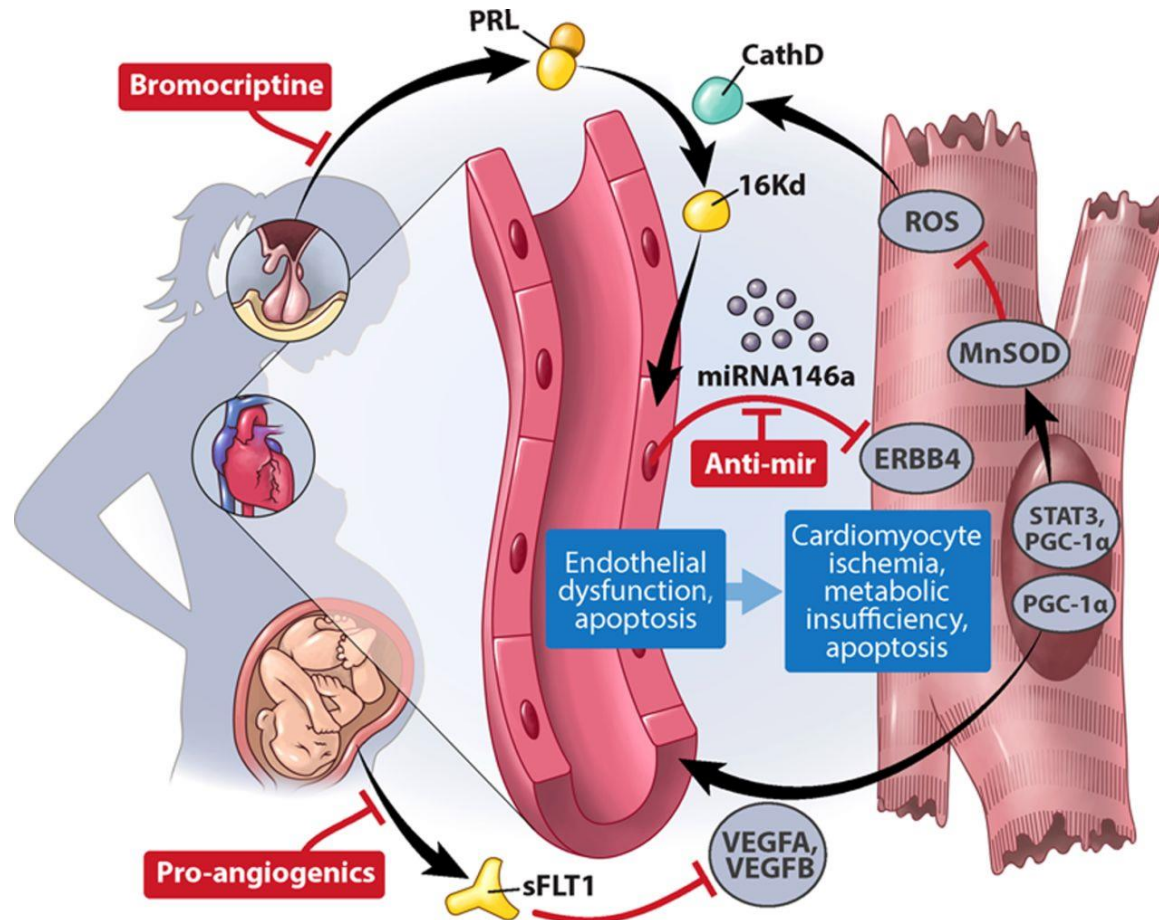


Fig. 1. Vasculo-hormonal hypothesis of the pathophysiology of PPCM. anti-mir, antibody to miRNA146a; CathD, cathepsinD; ERBB4, avian erythroblastic leukemia viral oncogene homolog 4; miRNA, microRNA; PRL, prolactin; ROS, reactive oxygen species; STAT3, signal transducer and activator of transcription 3. (From Arany Z, Elkayam U. Peripartum cardiomyopathy. *Circulation* 2016;133(14):1404; with permission.)



Bromocriptine

2.5 mg daily for 7 days
higher / longer treatment in
severe cases



Oral HF Drugs

Betablocker and ACE-inhibitor
after stabilisation,
MRA after ablation



Diuretics

Furosemide iv

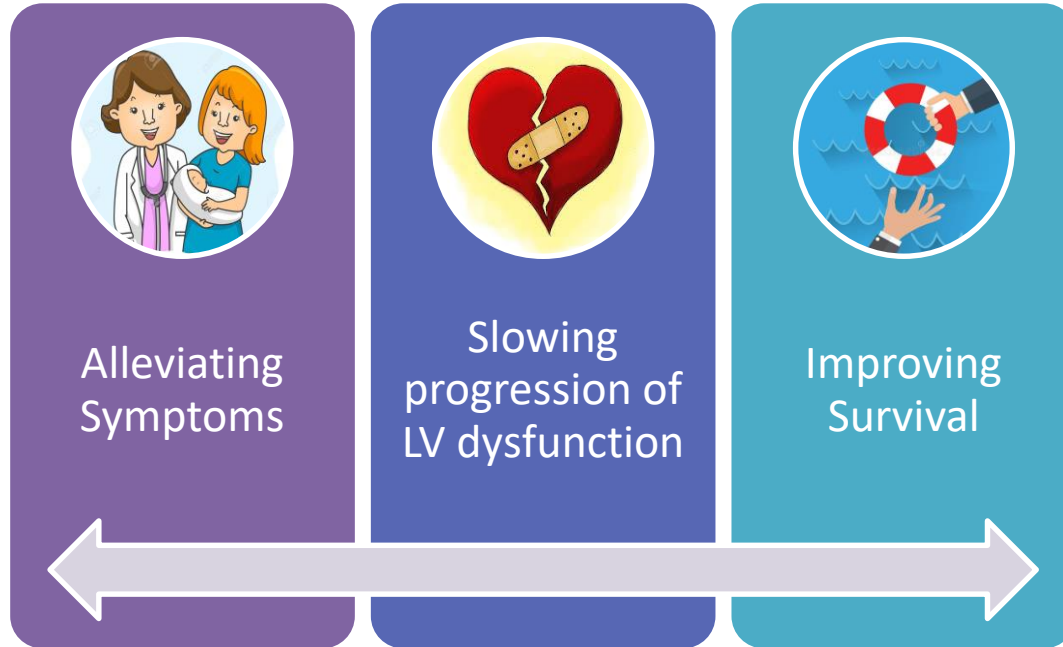
Relaxants

Vasodilators iv if SBP > 110 mmHg

Anticoagulation

Heparin immediately
in at least prophylactic dose

Management



Goals

- Treat hypertension
- Fluid restriction
- Dietary salt restriction
- Routine exercise postpartum if stable

Drugs for routine use

- Diuretics
- β -Blockers
- Vasodilators

Therapies in selected patients

- Aldosterone antagonists
- Digoxin
- Anticoagulation
- Implantable defibrillators
- Biventricular pacing
- Inotropes
- LVAD/cardiac transplantation

Table 2**Self-assessment tool in identifying women at risk for potential relapse**

Symptom/Sign	0 Points	1 Point	2 Points
Orthopnea	None	Need to elevate head only	Need to elevate body >45°
Dyspnea	None	When climbing ≥ 8 stairs	Walking level
Unexplained cough	None	Night time	Day and night
Pitting edema	None	Below knee	Above and below knee
Weight gain (9th mo)	≤ 907 g/wk	907–1814 g/wk	>1814 lbs/wk
Palpitations	None	When lying down	Any position day and night

Scoring and action: 0 to 2 low risk, observe. 3 to 4 mild risk, consider BNP/Hs-CRP → ECHO if abnormal. ≥ 5 high risk, BNP, Hs-CRP, ECHO.

From Fett JD. Personal commentary: monitoring subsequent pregnancy in recovered peripartum cardiomyopathy mothers. Crit Pathw Cardiol 2009;8(4):174; with permission.



43 yo...

Anti-hypertensives

B Blockers

EF=35%

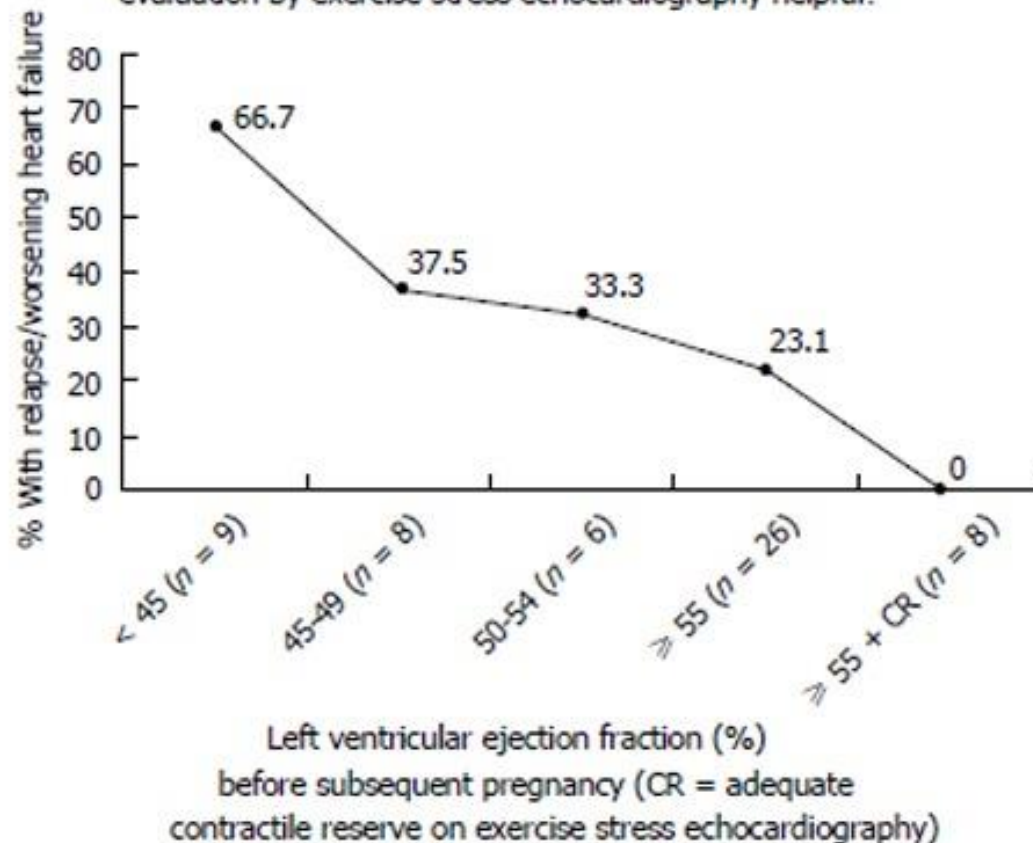
Pre-
gestational
consult

“Pregnancy is
NOT
recommended”



Risk for relapse of heart failure in a post PPCM pregnancy

Relapse or worsening of Heart Failure in 57 PPCM patients with subsequent pregnancy, 2005-2009: Is contractile reserve evaluation by exercise stress echocardiography helpful?



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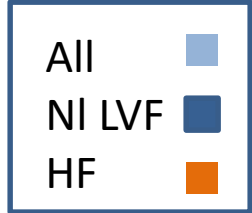
MATERNAL AND FETAL OUTCOMES OF SUBSEQUENT PREGNANCIES IN WOMEN WITH PERIPARTUM CARDIOMYOPATHY

URI ELKAYAM, M.D., PADMINI P. TUMMALA, M.D., KALPANA RAO, M.D., MOHAMMED W. AKHTER, M.D.,
ILYAS S. KARAALP, M.D., OMAR R. WANI, M.D., AFSHAN HAMEED, M.D., ISRAEL GVIAZDA, B.S.,
AND AVRAHAM SHOTAN, M.D.

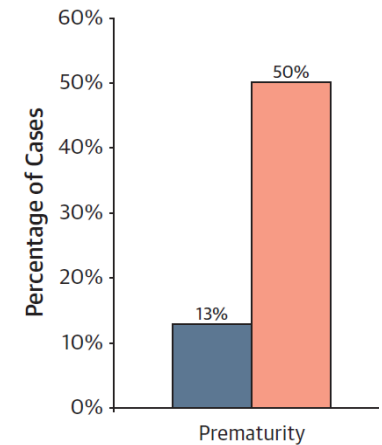
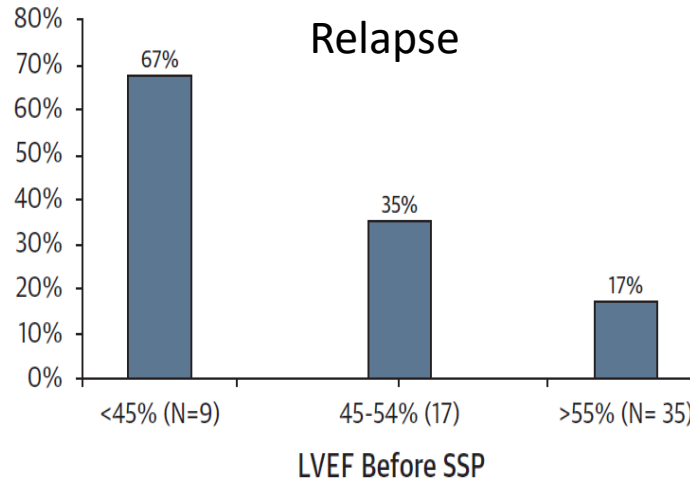
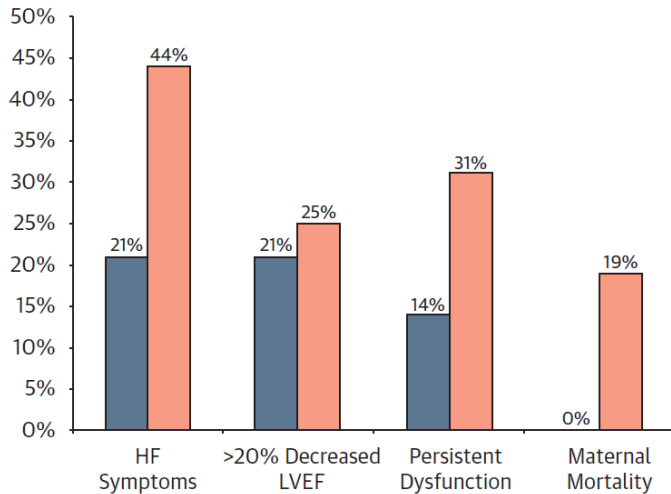
TABLE 1. INCIDENCE OF MATERNAL COMPLICATIONS DURING
THE FIRST SUBSEQUENT PREGNANCY IN WOMEN WHO HAD
HAD PERIPARTUM CARDIOMYOPATHY.*

GROUP	No. OF WOMEN	SYMPTOMS OF HEART FAILURE	>20% DECREASE IN LVEF	DECREASED LVEF AT FOLLOW-UP	DEATH
All women	44				
Group 1	28	6 (21)	6 (21)	4 (14)	0
Group 2	16	7 (44)	4 (25)	5 (31)	3 (19)†
Women who did not have abortions	35				
Group 1	23	6 (26)	4 (17)	2 (9)	0
Group 2	12	6 (50)	4 (33)	5 (42)	3 (25)‡

Risk of Subsequent Pregnancy in Women With a History of Peripartum Cardiomyopathy



Uri Elkayam, MD



Maternal Outcome

Fetal Outcome

Group	Maternal Outcome			Fetal Outcome		
	No Relapse	Relapse	Death	Live Birth	Abortions	Stillbirth
Group A	74.4%	23.3%	2.3%	93%	4.7%	2.3%
Group B	37.5%	54.2%	8.3%	83.3%	16.7%	0%

TABLE 3 Patients With Persistent Left Ventricular Dysfunction Before Subsequent Pregnancy

First Author (Ref. #)	Year	No. of Pregnancies	Deterioration of LV Function	Symptoms of Heart Failure	Persistently Decreased LVEF at Follow-Up	Death
Elkayam (10)	2001	12	4 (33)	6 (50)	5 (42)	3 (25)
Avila (12)	2002	9	NA	4 (44)	2 (22)	1 (11)
Sliwa (13)	2004	4	4 (100)	4 (100)	2 (50)	2 (50)
Chapa (14)	2005	4	0 (0)	0 (0)	4 (100)	0 (0)
Fett (15)	2006	16	8 (50)	8 (53)	7 (44)	1 (6)
Habli (16)	2008	10	9 (53)	NA	5 (29)	1 (6)
Hilfiker-Kleiner (18)	2007	12	5 (42)	NA	6 (50)	3 (25)
Fett (19)*	2010	26	10 (46)	NA	5 (80)	1 (0.4)*
Total		93	40/84 (48)	22/45 (49)	36/93 (39)	11/67 (16)

Values are n (%). *Most patients identified by an Internet support group of living patients with a history of peripartum cardiomyopathy; mortality rate was therefore not available.

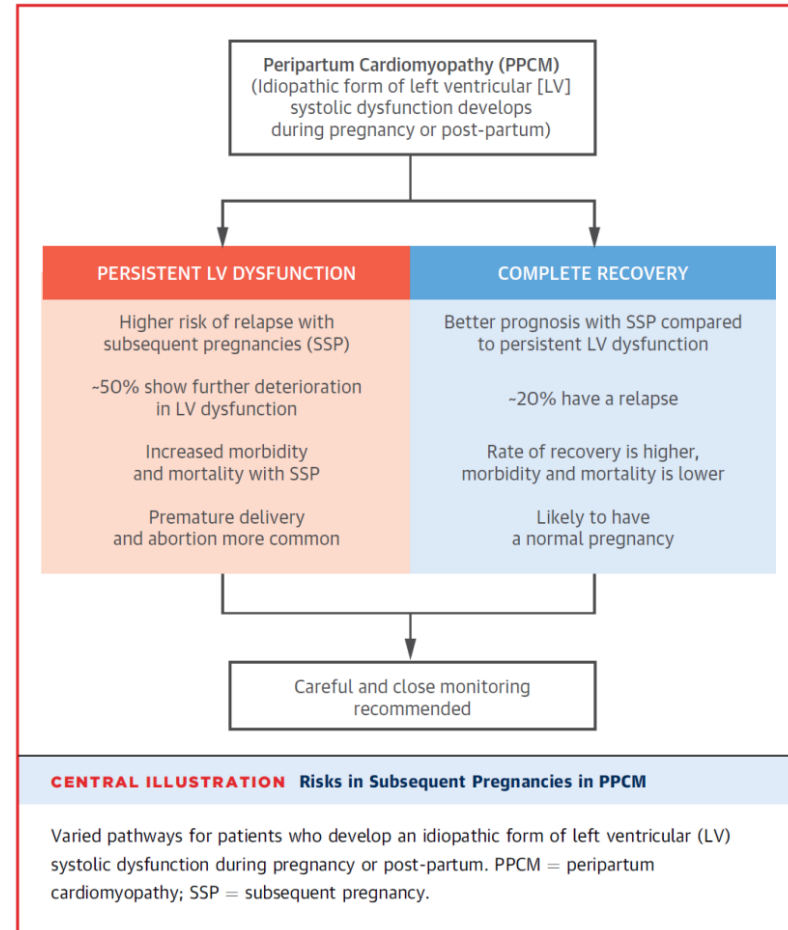
Abbreviations as in Table 2.

TABLE 4 Patients With Normal Left Ventricular Function Before Subsequent Pregnancy

First Author (Ref. #)	Year	No. of Pregnancies	Deterioration of LV Function	Symptoms of Heart Failure	Persistently Decreased LVEF at Follow-Up	Death
Elkayam (10)	2001	23	4 (17)	6 (20)	2 (50)	0 (0)
Avila (12)	2002	6	NA	0 (0)	NA	0 (0)
Sliwa (13)	2004	2	2 (100)	2 (100)	2 (100)	0 (0)
Chappa (14)	2005	4	4 (100)	4 (100)	3 (75)	0 (0)
Habli (16)	2008	21	NA	6 (28)	NA	0 (0)
Chee (21)	2009	2	0 (0)	0 (0)	0 (0)	0 (0)
Fett (19)*	2010	35	8 (17)	NA	1 (12)	-
Mandal (20)	2010	5	NA	2 (40)	1 (50)	0 (0)
Total		98	18/66 (27)	20/63 (32)	9/71 (13)	0/63 (0)

Values are n (%). *Most patients in this study were identified by an Internet support group of living patients with history of peripartum cardiomyopathy; mortality rate was therefore not available.

Abbreviations as in Table 2.





43 yo...
Anti-hypertensives
B Blockers
EF=35%

Pre-
gestational
consult

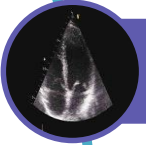
"Pregnancy is
NOT
recommended"



Pregnancy...



High-Risk follow-up



Repeated echo



32w – Deterioration: EF, LV function



Steroids for FLM



Cesarean Delivery



Healthy baby, Maternal Partial Recovery



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