Pregnancy in women with impaired ventricular function

Cardiac Problems in Pregnancy
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No disclosures

Risk stratification in women with impaired ventricular function

Disease specific risk data unavailable

Use CARPREG and WHO classification

Table 4 Predictors of maternal cardiovascular events and risk score from the CARPREG study[12]

Prior cardiac event (heart failure, transient ischaemic attack, stroke before pregnancy or arrhythmia).
Baseline NYHA functional class >II or cyanosis.
Left heart obstruction (mitral valve area <2 cm^2, aortic valve area <1.5 cm^2, peak LV outflow tract gradient >30 mmHg by echocardiography).
Reduced systemic ventricular systolic function (ejection fraction <40%).

CARPREG risk score: for each CARPREG predictor that is present a point is assigned. Risk estimation of cardiovascular maternal complications
0 point 5%
1 point 27%
>1 point 75%
LV = left ventricular; NYHA = New York Heart Association.

Conditions in which pregnancy risk is WHO IV (pregnancy contraindicated)
• Pulmonary arterial hypertension of any cause
• Severe systemic ventricular dysfunction (LVEF <30%, NYHA III–IV)
• Previous peripartum cardiomyopathy with any residual impairment of left ventricular function
• Severe mitral stenosis, severe symptomatic aortic stenosis
• Marfan syndrome with aorta dilated >45 mm • Aortic dilatation >50 mm in aortic disease associated with bicuspid aortic valve
• Native severe coarctation

WHO: mild LV impairment: WHO II-III
severe LV impairment (LVEF<30%, NYHA III): WHO IV

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Causes of ventricular dysfunction

Pre-existent

- Congenital heart disease
- Previous chemotherapy
- Cardiomyopathy
- Ischemic heart disease

De novo during pregnancy

- Previously undiagnosed heart disease
- Peripartum cardiomyopathy

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Pre-conceptional assessment & counseling

Detailed evaluation of cardiac status

- Previous history (heart failure, arhythmia)
- ECG
- Echocardiogram, advanced imaging
- Exercise testing

Weigh maternal and fetal risks in a multidisciplinary team

- CARPREG and WHO classification
- Unpredictable risk of (permanent) deterioration of ventricular function

Review / reconsider medication used

- Stop ACE-inhibitors, ARB, aldosteron antagonists, atenolol

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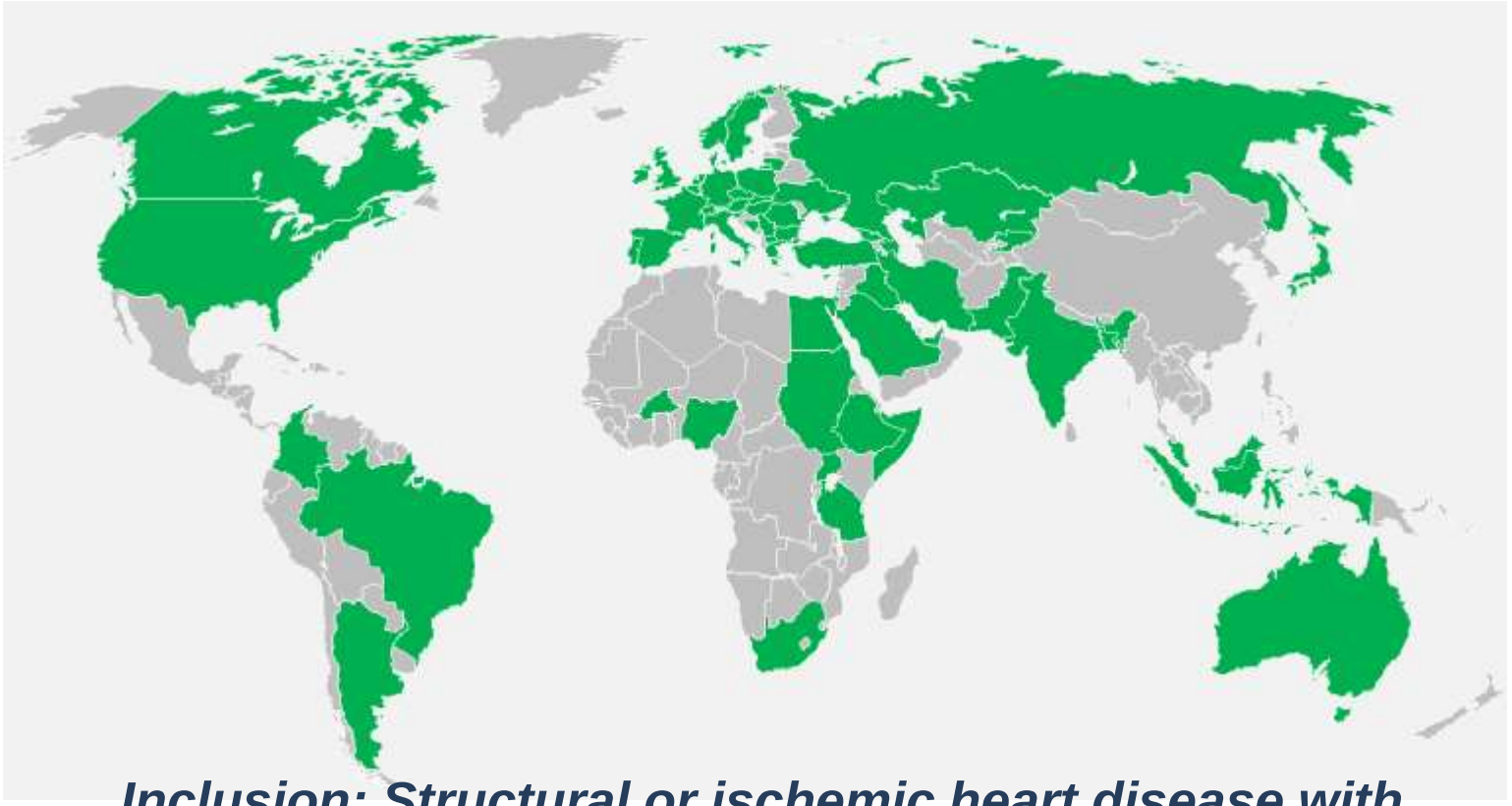
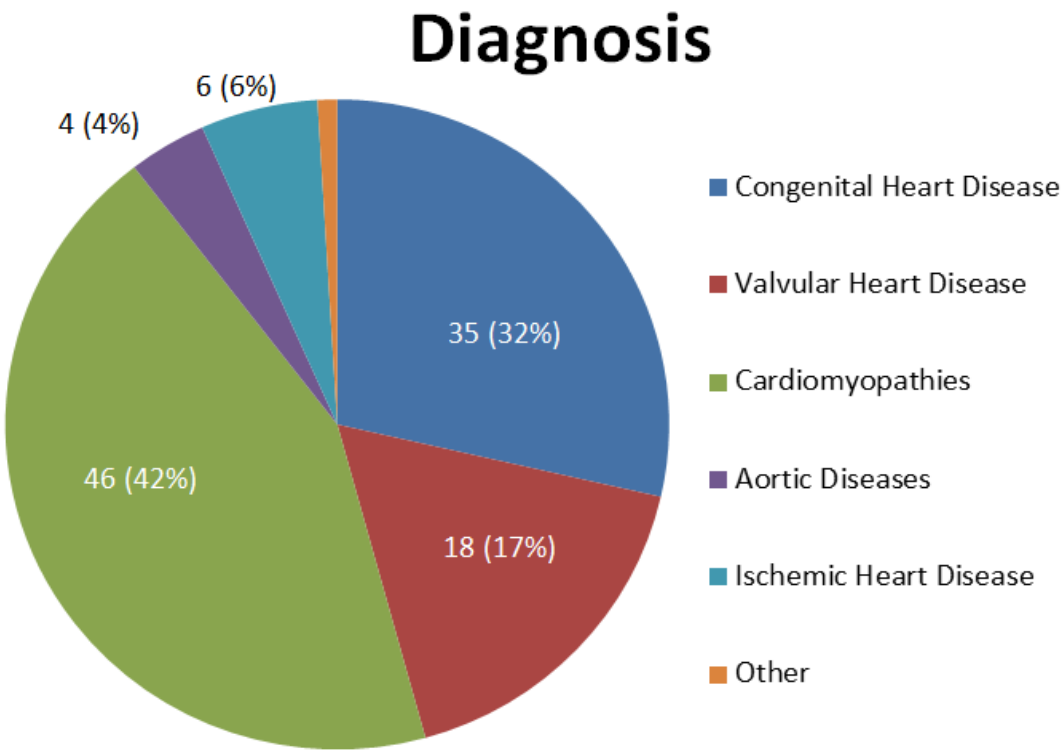
REGISTRY OF PREGNANCY AND CARDIAC DISEASE (ROPAC)



Inclusion: Structural or ischemic heart disease with LVEF < 40%

104 patients included



Patient characteristics	
	N = 104
Mean age (SD)	30.3 (5.7)
Hypertension	15 (14%)
LMIC	39 (38%)
Heart failure	21 (20%)
Medication use	
betablocker	42 (40%)
ACE-inhibitor	23 (22%)
Diuretics	28 (27%)

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Results – cardiovascular outcome

44 patients had a cardiovascular event* (42%)

***Combined CV event**:*
- *maternal mortality*
- *ventricular and supraventricular arrhythmia*
- *heart failure*
- *ischemic event*

	N = 104
Heart failure during pregnancy	37 (36%)
Supraventricular arrhythmia	3 (3%)
Ventricular arrhythmia	8 (8%)
Maternal mortality	2 (2%)
Ischemic event	1 (1%)

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Results – obstetric outcome

12 patients had an obstetric event* (12%)

***Combined obstetric event**:*
- *PIHD*
- *Pre-eclampsia*
- *Secondary caesarean section*
- *Post-partum haemorrhage*

	N = 104
PIHD	3 (3%)
Pre-eclampsia	4 (4%)
Caesarean section	24 (23%)
Post-partum haemorrhage	6 (6%)

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Results – fetal outcome

Fetal events* occurred in 36 patients (35%)

**** Combined fetal event**:*
- *Miscarriage*
- *Preterm birth (<37 weeks gestation)*
- *Low birth weight (<2500g)*
- *IUGR*
- *Neonatal and fetal mortality*

	N = 104
Miscarriage	1 (1%)
Pregnancy duration (median, IQR)	37.4 (35.9-39.0) weeks
Preterm birth	29 (29%)
Low birth weight	27 (26%)
Median birth weight	2800 (2390-3270)
IUGR	7 (7%)
Late fetal mortality	1 (1%)
Neonatal mortality	2 (2%)

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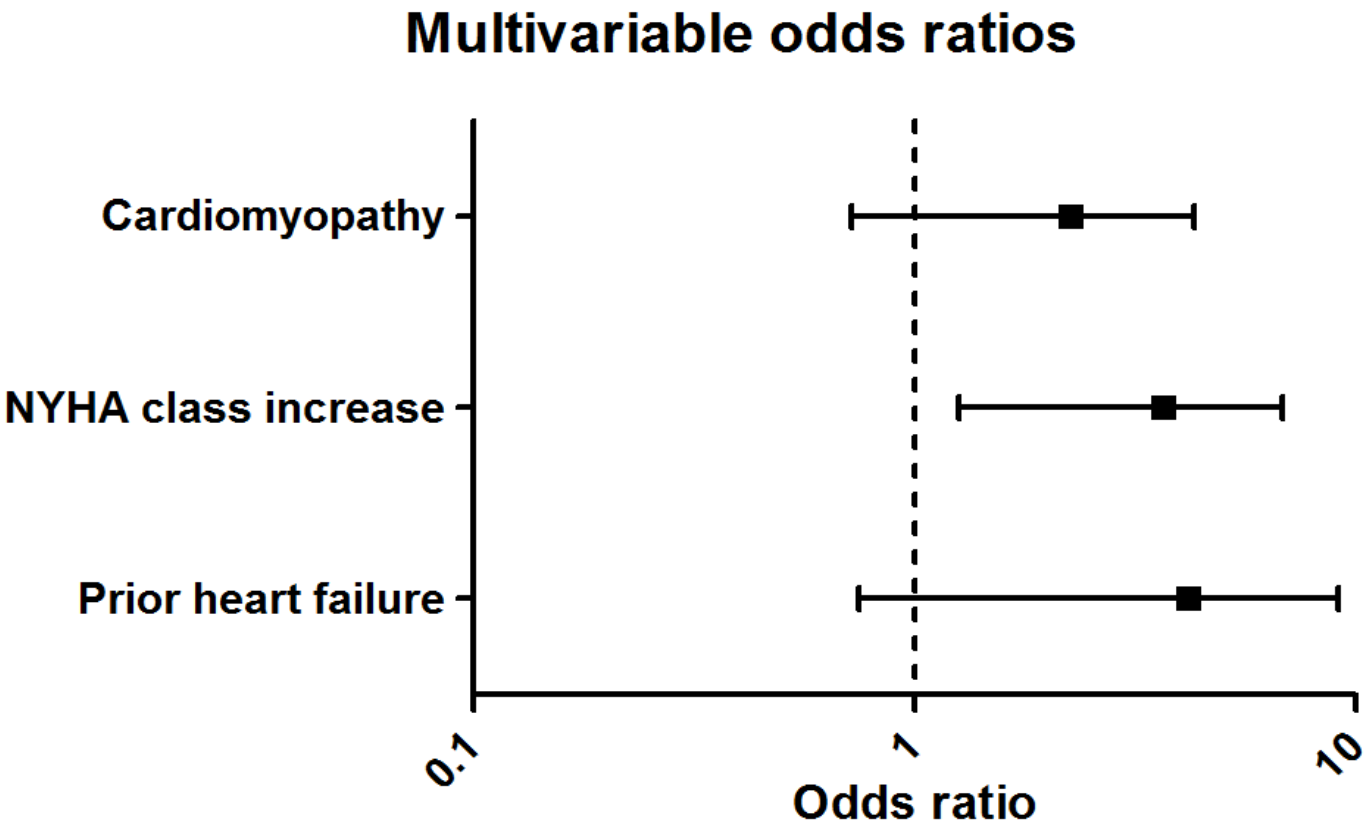
Predictors of MACE - multivariate



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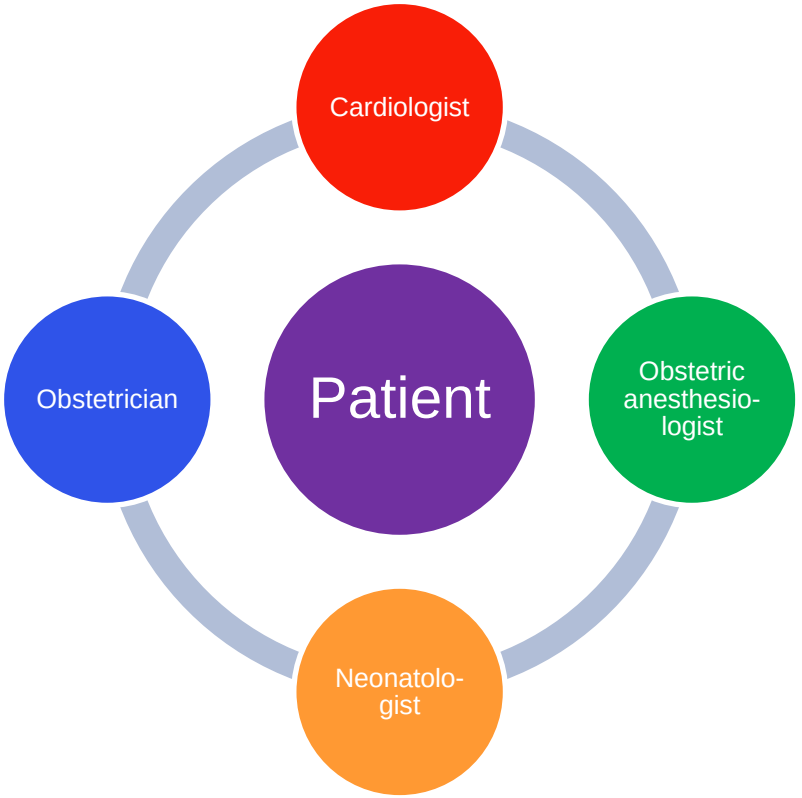
Monitoring of pregnancy in women with impaired ventricular function

High risk patients monitored in a tertiary center, by a multidisciplinary team *Every trimester - every month*

Signs of heart failure vs. pregnancy related fluid retention *NT-pro-BNP*

Echocardiography to monitor changes in ventricular function

Timely preparation of a delivery plan, including post-partum in-hospital observation



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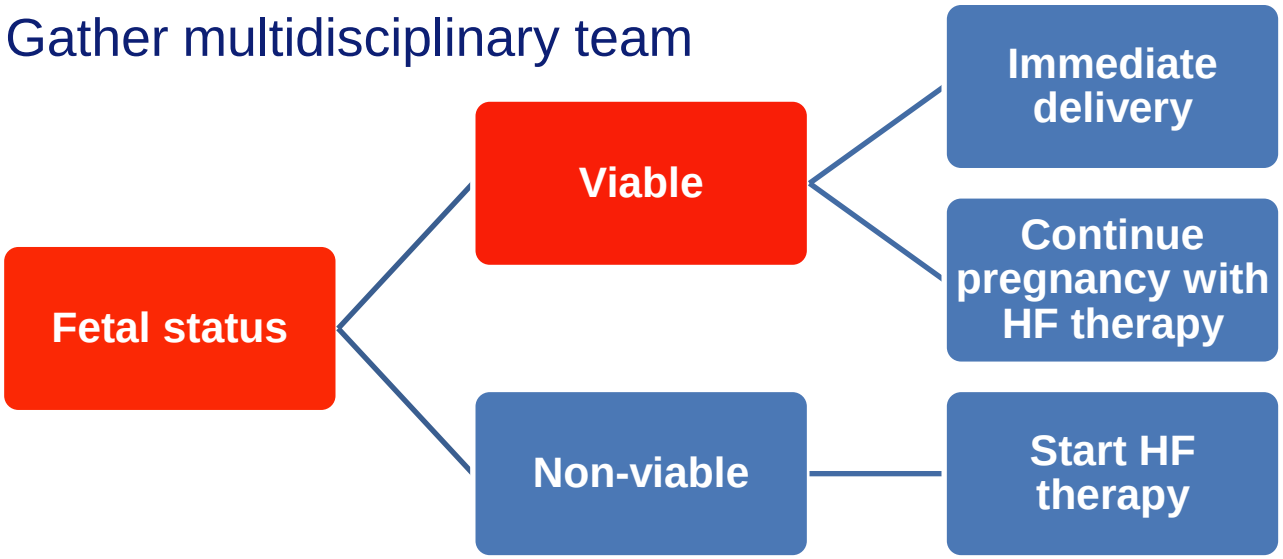
Treatment of heart failure in pregnancy

Highest risk around 26-27 weeks AD - first week postpartum

Bed rest
Gather multidisciplinary team



Heart failure therapy:

- Loop diuretics
- Hydralazine + nitrates for afterload reduction
- Low dose betablockers (no atenolol)
- Inotropics (dopamine, levosimendan)
- LMWH in case of severe ventricular dysfunction

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Mode of delivery

- Preferrably vaginal delivery
- Consider induction of (preterm) delivery
- Caesarian section in case of severe heart failure

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Post partum period

- Hemodynamic changes take several weeks to resolve
- HF may not present until after delivery
- Post partum in-hospital observation for 48 hours – 7 days
- Consider re-starting discontinued medication before discharge

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Take home messages

1. Women with impaired systemic ventricular function are at increased risk of cardiac as well as fetal complications in pregnancy (risk increases with increase in NYHA-class)

2. Pre-pregnancy counseling is mandatory

3. Monitoring of pregnancy by experienced doctors, moderate - high risk in tertiary center

4. HF treatment in pregnancy is like routine HF treatment, with a few exceptions

5. Delivery by CS only in severe HF

6. Be aware of HF in the (early) post-partum period

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Literature

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Thank you for your attention

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