Heart disease in pregnancy focusing on complication of HDP (PET/GH)

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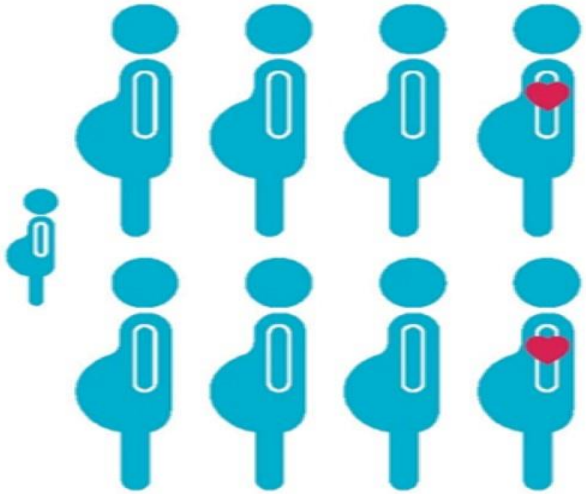
Why are we talking about this today?

Overall maternal mortality

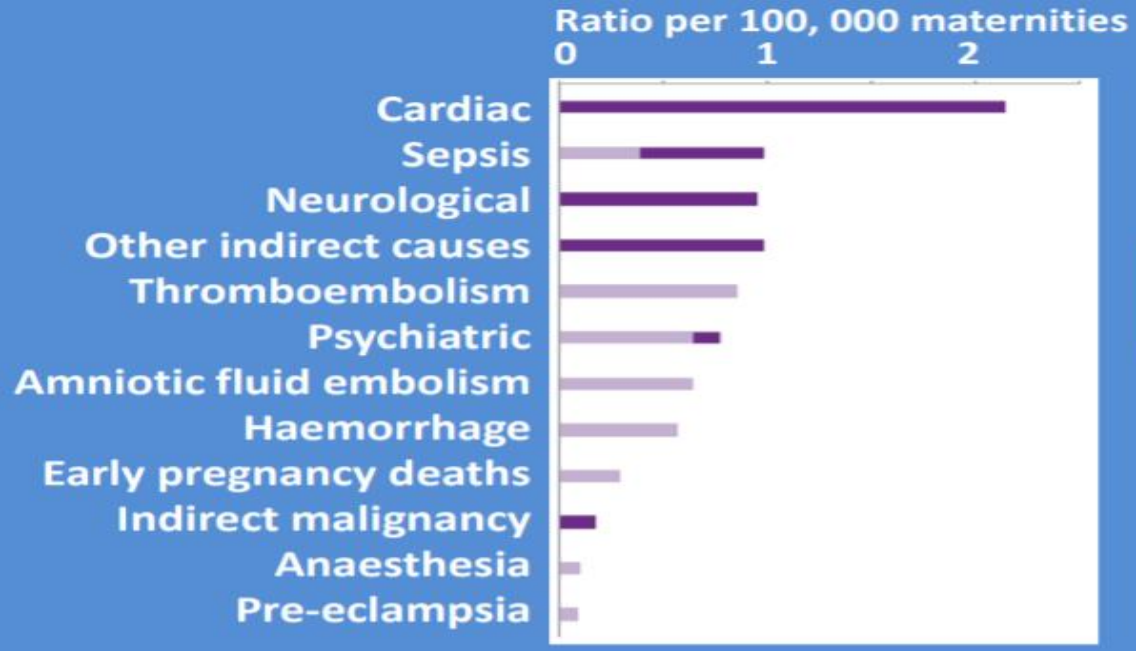


8.5 **women** per 100,000 died during pregnancy or up to six weeks after giving birth or the end of pregnancy in 2012 - 14

2 **women** per 100,000 died from **heart** ❤ **disease**

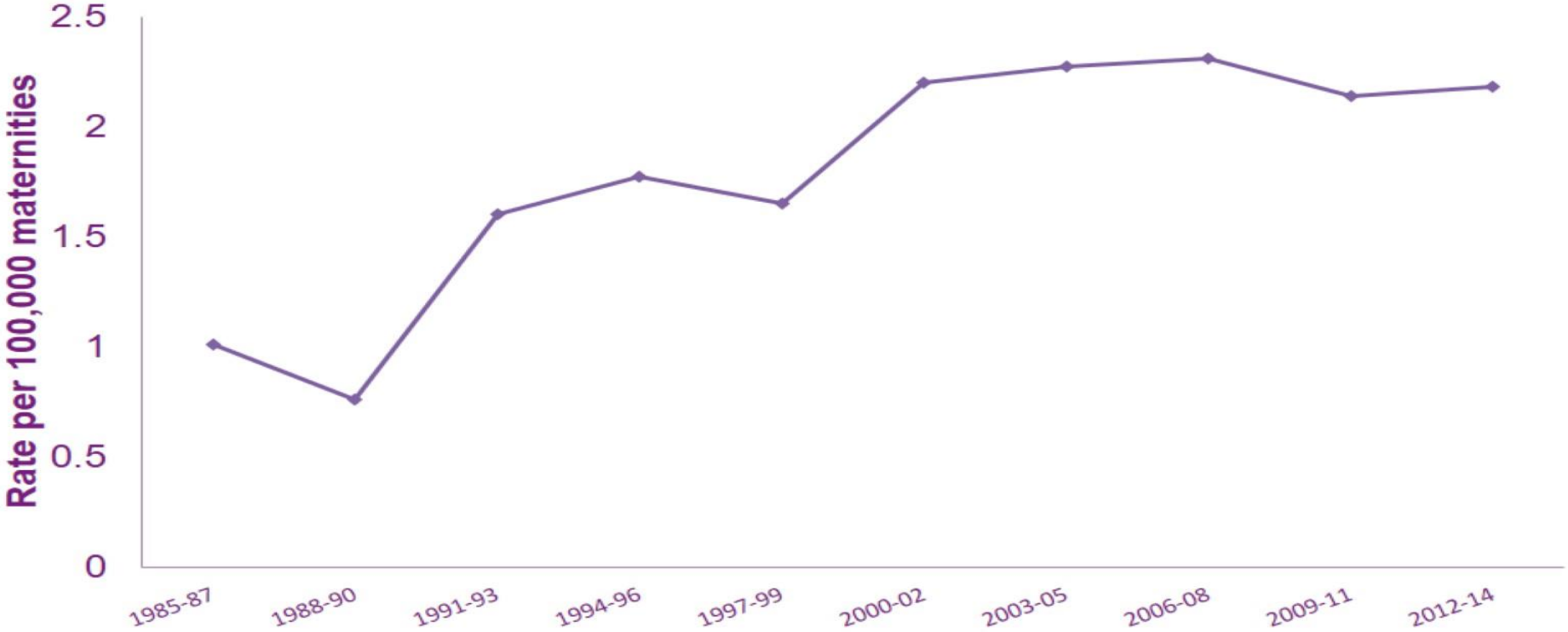
MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

Cardiovascular disease is the commonest cause of maternal death in UK & Ireland



2 women per 100,000 died from heart disease

Cardiac deaths are increasing



Why? increasing obesity, older mothers, better cardiac data & recognition of cardiac pathology at PM

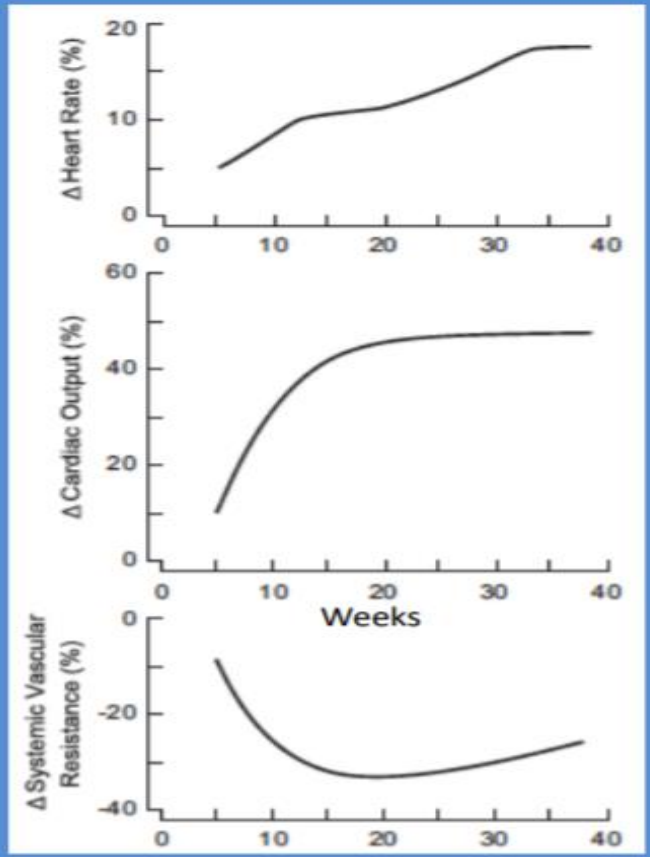
MBRRACE-UK

MBRACE is the tip of the iceberg….

Sorry…but a little bit of cardiac physiology revision….

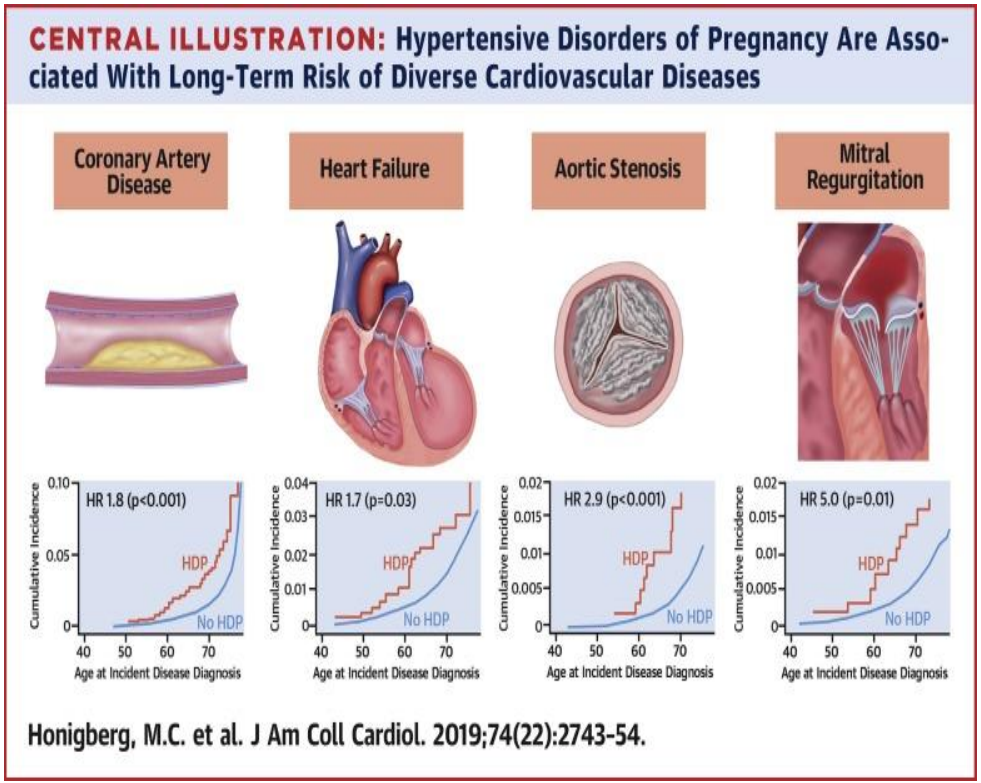
Pregnancy makes significant demands on the cardiovascular system

- **Reduced systemic vascular resistance**
  - 30% reduced at 8/40, nadir at 24/40
- **Rise in cardiac output**
  - 40% for a singleton, 50-60% for a twin pregnancy
- **Increased heart rate**
  - 10 to 20 bpm in early 3rd trimester
- **Increased maternal blood volume**
  - 40% for singleton pregnancy and 66% for a twin pregnancy
  - plasma volume increases 50% & red cell mass by 30%
  - blood volume peaks at 32/40
- **Reduced colloid oncotic pressure**
  - 15% fall in blood albumin level at 24 weeks
- **IVC obstructive pressure from the gravid uterus**
  - 8% of women hypotensive when supine
- **Arterial tree remodelling**
- **Hypercoagulable state**
  - Reduced tPA, Protein C & S production
  - Increased TPA inhibitor, factors V,VII, VIII, IX, X, XII and vWF



It’s not surprising that PET/GH and the adverse remodelling associated….

Long-term this leads to….



[3] Honigberg, M.C., et al., *Long-Term Cardiovascular Risk in Women With Hypertension During Pregnancy*. J Am Coll Cardiol, 2019. **74**(22): p. 2743-2754.

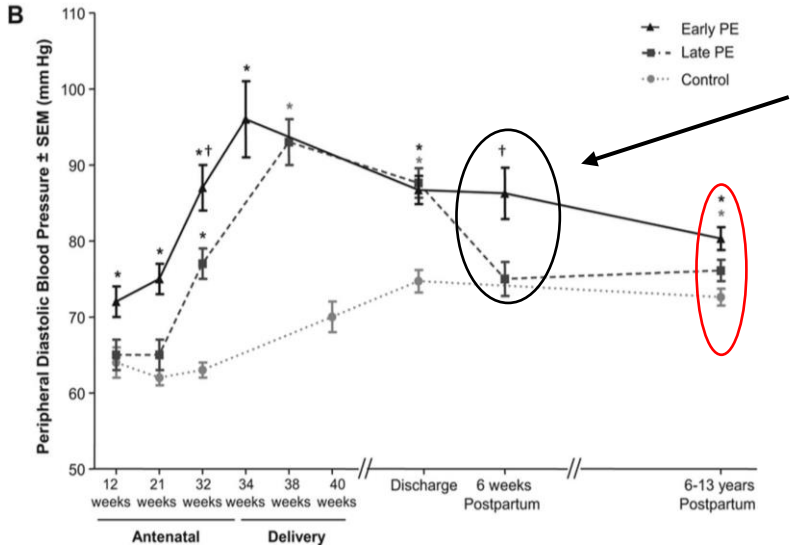
Revision on BP patterns postpartum

- SBP peaks day of delivery and reaches similar highs up to day 5
- DBP peak at day 5-7
- SBP gradually ↓ and falls below preconception level by day 15
- DBP ↓ more gradually reaching preconception level ~6 weeks

Cochrane review by Magee in 2015 showed the mean delay to 1st severe hypertension reading & 1st BP level that necessitated treatment =6 days

Therefore, prior to the usual 7–10 day postpartum check BP varies significantly…<u>cardiovascular morbidity may occur this early!!</u>

Prior work suggests the puerperium is a 'critical window' for intervention

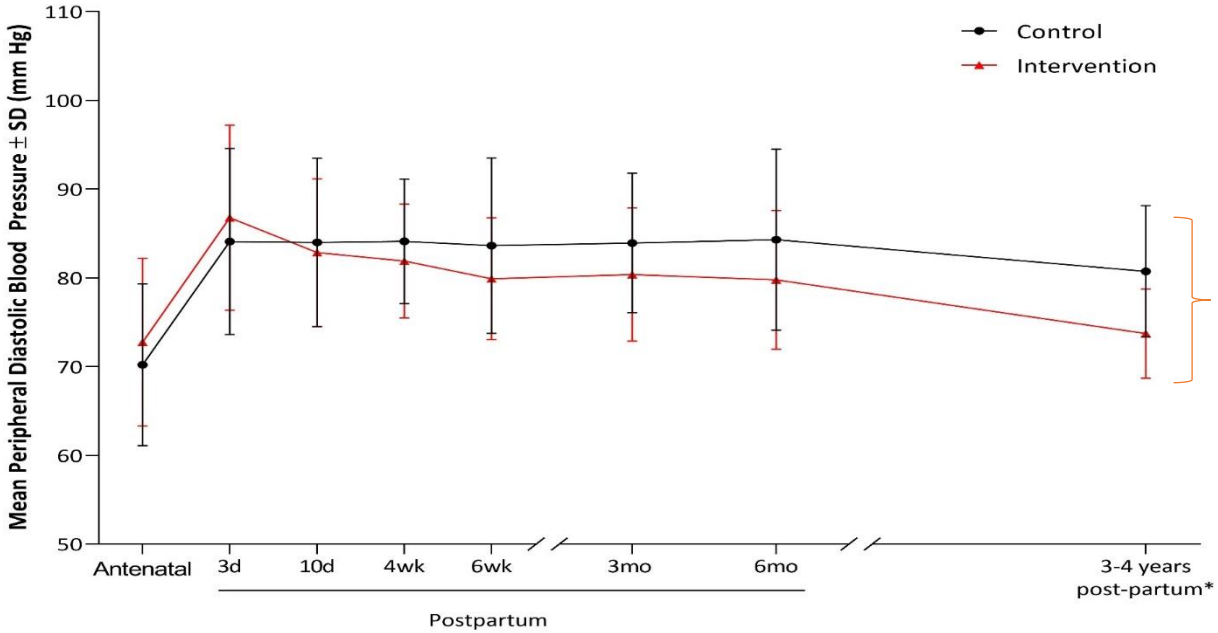


BP 6 weeks postpartum predicted BP 6-13 yrs later

The higher the 6 week BP the higher the later BP

Lazdam et al Hypertension 2012

Longitudinal Diastolic BP data
SNAP-HT → SNAP-HT Extension



*BP at 3-4 years is 24hr overall average diastolic BPmeasured by ABPM

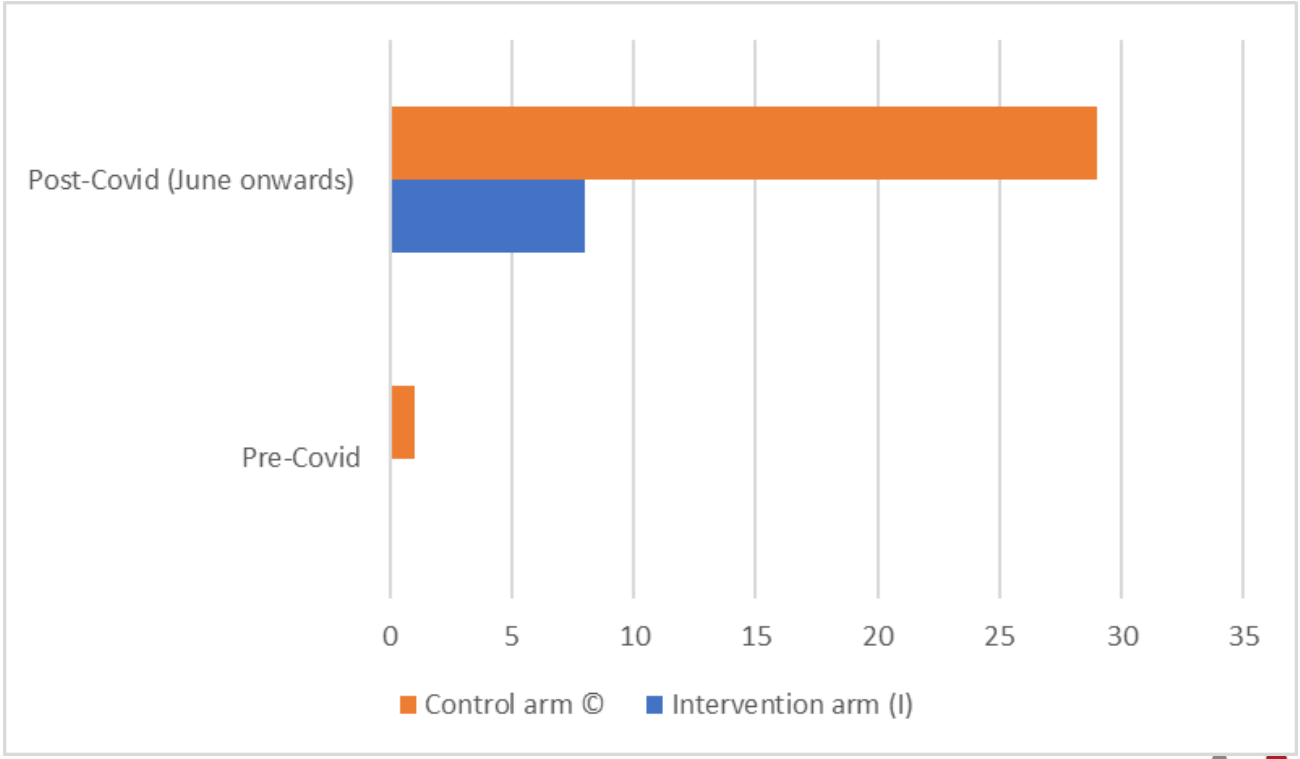
Self-management Group had 7mmHg lower DBP @ 4YRS

SNAP-HT Cairns *et al* *Hypertension* 2018

SNAP-HT EXT Kitt *et al* *Hypertension 2021*

BP related PNRAs

(results data currently under peer review)



Kitt J, *et al*
Postpartum blood pressure self-management following hypertensive pregnancy: protocol of the Physician Optimised Post-partum Hypertension Treatment (POP-HT) trial
BMJ Open 2022;**12:**e051180. doi: 10.1136/bmjopen-2021-051180

Put another way, the POP-HT intervention resulted in the following reduction in PNRAs to Oxford Women's centre:

Absolute risk reduction (ARR) = 20%

Relative risk = 0.265

Relative risk reduction (RRR) = 73.5%

Numbers needed to treat to avoid 1 PNRA = 5
(data under peer review)

POP-HT

Other groups are showing the same i.e. the puerperium is vital

1. ‘Telemonitoring postpartum is ‘ safe and effective when compared to standard care, with 8-fold fewer hypertension-related PNRAs’

Hoppe KK et al Telehealth with remote blood pressure monitoring compared with standard care for postpartum hypertension. American Journal of Obstetrics and Gynecology. 2020;223(4):585–588.

2. ‘Home telemonitoring following HDPs also reduces ethnic disparities in postpartum care. When engaged in a virtual BP monitoring program in one trial, both black and non-black women demonstrated compliance rates of more than 90%.’

Sawyer et al: A Silver Lining of the Coronavirus Pandemic. AJP Reports. 2020;10(3):E315–E318

3. HBPM most importantly is well-liked by women

Thomas, N.A., et al., Patient perceptions, opinions and satisfaction of telehealth with remote blood pressure monitoring postpartum. BMC Pregnancy Childbirth, 2021. 21(1)

Other groups breaking new ground in this period

1. ‘ForBP’ trial by Perdigao et al 2021

RCT in just under 400 women of a 5-day course of 20 mg oral furosemide vs. placebo in women with HDP demonstrated a 60% reduction in the prevalence of persistently elevated BP at 7 days

2. ‘PickUP trial by Ormesher and Myers at al 2020

RCT in ~60 women adding 20mg Enalapril (titrated) to usual anti-hypertensive therapy showing improved cardiovascular remodelling (diastolic and wall thickness) as well as improved BP control – diastolic BP particularly

CARDIOMYOPATHY

MBRRACE data

27 deaths from cardiomyopathy

Most frequent mode of death was out of hospital arrest after delivery

9 considered peri-partum cardiomyopathy

'Consider cardiomyopathy in the ΔΔ dyspnoea in pregnancy'

Orthopnoea and PND are 'not symptoms of pregnancy'

'Don't withold investigations and treatment on the grounds of pregnancy and breast-feeding'

Peripartum CM

- Idiopathic Cardiomyopathy in the last trimester → 6/12 postpartum
- 1/3000 pregnancies (1/500 PET cases)
- African ancestry, >30yrs

& multiparity also RFs

- ~75% get partial to complete recovery of LV function at 6 months

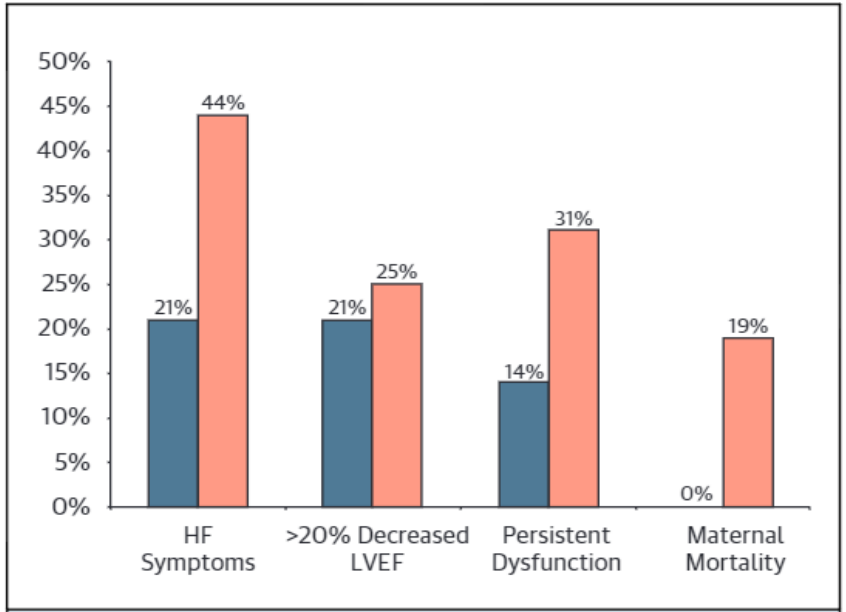


FIGURE 2 Maternal Complications Associated With Subsequent Pregnancy in 44 Patients With a History of Peripartum Cardiomyopathy

Slate bars are group 1, women with left ventricular ejection fraction (LVEF) ≥ 50% before subsequent pregnancy. **Salmon bars** are group 2, women with LVEF <50% before subsequent pregnancy. HF = heart failure. Reprinted with permission from Elkayam et al. (10).

Things to think about in PPCM

- Breast-feeding cessation vital = not easy!
- ACEi 1st line in NICE NG133 now (Enalapril/Captopril) = safe to breast-feed/and express
- Add Bisoprolol once off-loaded (earlier if euvolaemic and BP allows)
- Cabergoline = alternative to Bromocriptine
- If LVEF severe – consider Spironolactone – can't breast feed

Conclusions

1. Pregnancy hypertension is associated with significant increased risk of later cardiovascular disease

2. Post-partum period closely relates to long term risk (observational)

3. Very limited evidence base for BP management peri- and post partum at present(NICE NG133 is adapted from NG136 for general adults) - Giant-PANDA RCT

4. Modifications in this period impact short & medium term blood pressure: ***Pick-UP, SNAP-HT, SNAP-HT EXT, POP-HT***

Practically…what to do right now

1. Sensible to measure BP for at least the first ten days postpartum (L. Magee Cochrane review, NICE NG133)

2. Given significant diurnal variation with BP (↑ in afternoon/evening in ~ 50% of women with HDP) : **twice daily readings** appropriate.

3. If HBPM is timed ~9am and late afternoon it allows early recognition and adjustment ‘in office hours’ of medication. (↑ Frequency ≠ risk of ↓compliance)