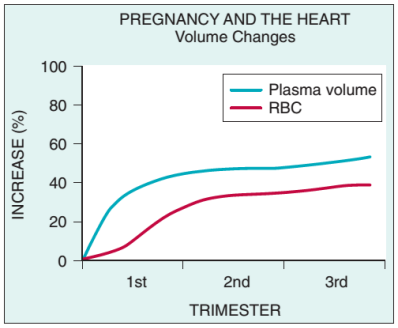
Pregnancy and Heart disease

- 2% of pregnancies involved mother with CV disease resulted in ↑ maternal and fetal risk.
- Most women with CV disease can have pregnancy safely with proper care.
- 3 scenarios: 1. known CV disease, "can I preg"
  2. New S&S of undiagnosed underlying CV disease at the time of pregnancy
  3. CV disease due to pregnancy

Pre-conception counseling

- Discuss effect of pregnancy to the CV condition,
- Discuss risk to mother and risk to baby.
- Avoidance of harmful drugs.
- Multidisciplinary team - Card, OB, anesth
- Genetic counseling
- Alternative options: adoption, surrogate
- Antibiotic prophylaxis, if needed.
- Postpartum care
- Contraception



Normal CV changes during pregnancy

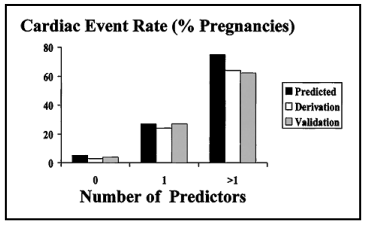
- ↑ Volume load (less increased in RBC) → anemia
- ↓ SVR (placenta is a low resistant system)
- Result in ↑ CO, ↑ SV, ↑ HR, ↓ BP
- Normal findings: edema, ↑ JVP, ↑ S1, wide split S2, S3, flow SEM at AV or PV (flow murmurs), continuous murmurs (cervical venous hum; mammary soufflé). Lateral and prominent apical impulse.

Hemodynamic challenge

- Most increased plasma volume happens during 1st trimester.
- Labor: Abrupt changes due to uterine contraction → ↑ Blood re-circulation. Pain and Valsalva.
- Delivery: Blood loss vs. ↑ venous return, ↑ preload (auto-transfusion), ↑ afterload.
  - In general, prefer vaginal delivery with fetal and maternal monitoring, left lateral position, avoid a long labor, assisted 2nd stage (forceps or vacuum extraction). Antibiotic prophylaxis, if needed.
  - Prefer C/S in dilated aorta (Marfan, bicuspid), severe PH, severe stenotic lesion, eisenmenger, severe HF, warfarin.
- ↑ Volume load → problem in pts with ventricular dysfunction
- ↓ SVR → problem in pts with stenotic lesion eg. AS, LVOT
- ↑ HR → problems in pts with MS
- Hypercoag, → mechanical valve thrombosis, paradoxical emboli

Risk Estimation

- Predictor of CV event: (CARPREG Circ 2001)
  1. Prior cardiac event (h/o HF, TIA/stroke, arrhythmia)
  2. NYHA > II or cyanosis
  3. Left heart obstruction (MVA < 2, AVA <1.5, pLVOT > 30)
  4. Ventricular dysfunction (EF < 40%)



Risk of maternal CV event (pul edema, symp tachy/brady needed Rx, CVA, cardiac arrest, CV death)

0 → 5% (low risk – ok to preg)
1 → 27% (moderate risk – refer to experts)
≥ 2 → 75% (Do not pregnant, terminate pregnancy)

WHO classification of maternal cardiovascular risk: (Heart 2006;92:1520)

WHO I	WHO II	WHO III	WHO IV
• Uncomplicated, small, mild PS, PDA, MVP • Repaired ASD, VSD, PDA, APVR • PAC, PVC	• Unoperated ASD, VSD • Repaired ToF • Most arrhythmias WHO II–III • Mild LV impairment • HCM • valve disease not considered WHO I or IV • Marfan w/o Ao dilatation • Bicuspid AV w Ao <45 • Repaired coarctation	• Mechanical valve • Systemic RV • Fontan circulation • Unrepair cyanotic heart disease • Complex ACHD • Marfan w Ao 40-45 mm • Bicuspid AV w Ao 45–50 mm	• PAH (include eisenmenger) • LVEF <30%, NYHA III–IV • Previous peripartum cardiomyopathy • Severe MS • Severe AS • Severe coarctation • Marfan c Ao >45 mm • BicuspAV w Ao >50 mm
- Very low risk	- Small ↑risk - F/u q trimester	- High risk - Expert counselling - Cardiac and OB monitoring - F/U q 2-4 wks	- Extremely high risk - discuss termination preg

Anticoagulation for mechanical valve

- Warfarin is embryopathy ~ 6% (Bone stippling (chondrodysplasia punctata), blind (optic atrophy), CNS, mental retardation, nasal hypoplasia). Dose related.
- Limited data for management (Arch Int Med.2000;160:191)
- 0-12 wks: - Do not use warfarin. (unless ≤ 5mg /day, may able to use warfarin thru out (embryopathy 2.6 vs. 8%) (JACC 1999;33:1637.)
  - Switch to heparin: low fetal complication, high maternal complication or -
  - Switch to LMWH: bid dosing, check anti Xa level (0.7-1.2 u/ml at 4 hrs after)
- 12-26 wks: - Coumadin or heparin or LMWH
- Delivery: 36 hrs before labor- switch to UFH;
  4-6 hrs before delivery - discontinue UF
  4-6 hrs after delivery - restart UFH.

Cardiac medication and procedure

- Relatively safe: Digoxin, CCB, BB (except atenolol), furosemide, heparin, procainamide, ASA, HDZ/ISDN, adenosine, DC cardioversion, cardiac cath.
- Not safe: ACEI, Coumadin, statin, phenytoin, amiodarone.
- Always check. Need case by case decision.

Guideline

- ESC Guidelines on the management of cardiovascular diseases during pregnancy. Euro Heart J 2011:32:3147-3197)