

PREGNANCY AND CARDIOVASCULAR DISEASE

1. Pregnancy increases plasma volume &, to lesser extent, erythrocyte mass, causing increased blood volume & relative anemia.
2. Changes in HR, SVR, PVR, & BP cause increased cardiac output, which plateaus at 40% above prepregnancy level by the 32nd week.
3. At time of delivery, cardiac output is as much as 80% above prepregnancy level due to increases in HR & BP.
4. Prior cardiac events or arrhythmia, left heart obstruction, LV systolic dysfunction independently predict maternal cardiac complications.
5. LVEF <40% with NYHA class III/IV CHF carries high risk of maternal and fetal complications & is a contraindication to pregnancy.
6. Severe obstructive cardiac lesions cause symptomatic deterioration during pregnancy; intervention prior to pregnancy is recommended.
7. Severe pulmonary arterial hypertension carries a maternal mortality of 30 – 50%; such patients should be counseled against pregnancy.
8. Once a woman with cardiovascular disease becomes pregnant, special attention should be paid to her hemodynamic response.
9. Time & route of delivery should be planned before labor occurs.
10. Vaginal delivery with a facilitated second stage (forceps delivery or vacuum extraction) is preferred for women with heart disease.
11. C-section should be performed for obstetrical reasons, in patients fully anticoagulated with warfarin, & with pulmonary hypertension.
12. Peripartum CM (PPCM) is LV dysfunction in the last trimester & up to 6 months postpartum without an identifiable cause.
13. PPCM is more frequent in multifetal preg; multiparous; > 30 yrs age; black; gestational HTN, preeclampsia, treatment with tocolytics.
14. PPCM is the major cause of pregnancy-related death in North America; related to CHF, thromboembolic events, and arrhythmias.
15. LVEF improves within 6 months after delivery in 50% of PPCM cases.
16. Management includes early delivery & treatment for CHF.
17. Medical therapy for CHF during pregnancy includes β -blockers, digoxin, & diuretics, but excluding ACEi and ARBs until after delivery.
18. Anticoagulation is recommended with LVEF < 35%. Transplantation referral should be considered for refractory systolic dysfunction.
19. IV immunoglobulin (for lymphocytic myocarditis seen in PPCM) & pentoxifylline (inhibits TNF- α , high in PPCM), may be considered.
20. Recurrence of PPCM is common and may be fatal; subsequent pregnancies are discouraged esp. with persistent LV dysfunction.
21. β -Blockers cross the placenta & are present in human breast milk; If used, fetal & newborn HR & blood glucose monitoring is indicated.
22. Low birth weight, early delivery, & small fetal size for gestational age are seen with atenolol; metoprolol should be used as an alternative.
23. ACEis & ARBs are contraindicated during pregnancy but can be restarted after delivery and are safe to use while breastfeeding.
24. Aldosterone antagonists should be avoided during pregnancy. Hydralazine & isosorbide may be used cautiously.

25. Anticoag. for Afib & heart disease, paradoxical emboli, venous/pulm thromboembolism, antiphospholipid Ab & recurrent miscarriage.
26. For LMWH, measuring anti-Xa levels is required. Unfractionated heparin & warfarin can also be used with meticulous monitoring.
27. Warfarin crosses the placenta, increasing spontaneous abortion, prematurity, embryopathy, stillbirth, fetal intracranial hemorrhage.
28. Mechanical valve anticoagulation during pregnancy is controversial. Continuous anticoagulation with meticulous monitoring is required.

Normal Versus Abnormal Cardiac Symptoms and Signs in Pregnancy

Symptom or Sign	Normal	Pathologic
Shortness of breath	Mild, with exertion	Orthopnea, PND, cough
Palpitations	Atrial and ventricular premature beats	Atrial fibrillation or flutter; ventricular tachycardia
Chest pain	No	Chest pressure, heaviness, or pain
Murmur	Basal systolic murmur grade 1/6 or 2/6 present in 80% of pregnant women	Systolic murmur \geq grade 3/6; any diastolic murmur
Tachycardia	Heart rate increased by 20%–30%	Heart rate >100/min
Low blood pressure	Blood pressure typically is unchanged	Low blood pressure associated with symptoms
Edema	Mild peripheral	Pulmonary edema
Gallop	S ₃	S ₄

Predictors of Maternal Cardiac Events in Women with Congenital or Acquired Cardiac Disease

RISK FACTOR (PREDICTOR): OPERATIONAL DEFINITION.

- Prior cardiac event or arrhythmia: CHF, TIA, stroke, arrhythmia.
- Baseline NYHA class > II or cyanosis: Mild symptoms (mild dyspnea and/or angina pain) and slight limitation during ordinary activity.
- Left heart obstruction: Mitral valve area < 2 cm²; aortic valve area < 1.5 cm² or peak left ventricular outflow tract gradient > 30mmHg.
- Reduced LVEF (< 40%).

Predictors Risk (%) Recommendation

0	4	Consideration of preconception cardiac intervention for specific lesions; increased frequency of follow-up; delivery at community hospital
1	31	Consideration of preconception cardiac intervention for specific lesions; referral to regional center for ongoing care
>1	69	Consideration of preconception cardiac intervention for specific lesions; referral to regional center for ongoing care

Risk (%) = estimated risk of cardiac events; pulmonary edema, tachyarrhythmia, embolic stroke, cardiac death.

Anticoagulation for Prosthetic Valves in Pregnancy

