Heart Disease in Pregnancy

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- cardiac disease complicates 1 to 4 percent of pregnancies in the United States, maternal cardiac disease is a major cause of non-obstetric maternal morbidity and mortality .
- Care of the high-risk patients requires a **team approach** including a maternal-fetal medicine specialist, cardiologist, and obstetrical anesthesiologist

PHYSIOLOGY OF NORMAL PREGNANCY

- Cardiac output
- Blood pressure
- distended neck veins
- basilar rales
- prominent apical impulse
- exaggerated heart sounds
- wide splitting of S1, splitting of S2
- A physiologic S3 gallop
- "new" systolic ejection murmur
- Preexisting murmurs will be louder
- mammary souffle (systolic or continuous)
- Peripheral edema

Electrocardiographic changes

- Shortening of the PR and QT intervals
- Nonspecific abnormalities of the ST segments and T waves
- slight leftward shifts

Hemodynamic changes during labor and delivery

- marked fluctuations in cardiac output occur
- type of anesthesia
- In spite of the obligatory blood loss ,cardiac output increases after delivery

Minimizing hemodynamic effects

- adequate rest
- Avoid anemia
- minimizing anxiety and pain
- treating infection early

ASSESSING RISK

- history, physical examination, echocardiogram, and electrocardiogram
- evaluating the severity of their valve lesions and the degree of ventricular dysfunction

FETAL RISK

A fetal risk assessment score has not been established

- functional class of the mother
- maternal cyanosis
- maternal medications
- Antepartum fetal monitoring should begin

26 and 32 weeks

Maternal functional class is a major determinant of fetal mortality, with risk ranging from not raised above baseline risk for gravidas who are asymptomatic to about 30 percent for gravidas with severe symptoms

The New York Heart Association (NYHA) Grading of functional capacity of the heart:

CLASS I	No functional limitation of activity	Symptoms with extra ordinary physical work.
CLASS II	Mild limitation of physical activity	Symptoms with greater than ordinary physical work
CLASS III	Marked limitation of physical activity	Symptoms with ordinary physical work
CLASS IV	Severe limitation of physical activity	Symptoms at rest

maternal cyanosis

- cyanotic congenital heart disease but no pulmonary hypertension :
- relatively low maternal risk, although fetal risk is increased.
- fetal growth
- increases prematurity
- fetal loss

Four predictors of cardiac events

- functional class II to IV or cyanosis
- Previous cardiac event :heart failure, transient ischemic attack, stroke or arrhythmia
- Left heart obstruction (mitral valve area of <2 cm2, aortic valve area of <1.5 cm2, peak left ventricular outflow gradient >30 mmHg)
- Left ventricular systolic dysfunction

- 0 point 4 percent
- 1 point 26 percent
- more than 1 point 62 percent
  Women with acquired heart disease who present for prepregnancy or early pregnancy consultation should undergo a complete evaluation.
- risk scores of 1 or greater :

  more frequent evaluations and collaboration between cardiologist and obstetrician

  individuals at greatest risk should be referred to a maternal-fetal medicine specialist

Modified WHO classification

- **Class I:no increased risk of maternal mortality and no/mild increase in morbidity.**
- small patent ductus arteriosus
- mild pulmonic stenosis
- mitral valve prolapse
- successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, or anomalous pulmonary venous drainage)
- isolated atrial or ventricular ectopic beats.

- **Class II :small increased risk of maternal mortality or moderate increase in morbidity.**
- unrepaired atrial or ventricular septal defect
- repaired tetralogy of Fallot
- most arrhythmias

- **class II to III:**
- mild left ventricular impairment
- hypertrophic cardiomyopathy
- bioprosthetic valvular heart disease not considered WHO I or IV
- repaired coarctation
- Marfan syndrome with aortic dimension <40 mm without aortic dissection
- bicuspid aortic valve with ascending aorta diameter <45 mm

- **Class III : significantly increased risk of maternal mortality or severe morbidity**
- mechanical valve
- systemic right ventricle
- Fontan circulation
- cyanotic heart disease (unrepaired)
- bicuspid aortic valve with ascending aortic diameter of 45 to 50 mm
- Marfan syndrome with aortic diameter of 40 to 45 mm.

- **Class IV: extremely high risk of maternal mortality or severe morbidity; pregnancy is contraindicated**
- severe mitral stenosis
- symptomatic severe aortic stenosis
- bicuspid aortic valve with ascending aorta diameter >50 mm
- Marfan syndrome with aorta dilated >45 mm
- severe systemic ventricular systolic dysfunction (left ventricular ejection fraction <30 percent
- New York Heart Association [NYHA] III to IV
- native severe coarctation
- significant pulmonary arterial hypertension of any cause (ie, pulmonary artery systolic pressure >25 mmHg at rest or >30 mmHg with exercise

PRECONCEPTION AND PRENATAL CARE

- complete risk evaluation

  history, prior interventions ,symptom status, a complete physical exam, electrocardiogram, echocardiogram, and an assessment of functional status
- patient education

- frequency of prenatal follow-up :
- **class I**: cardiology follow-up limited to one or two visits
- **class II:** cardiology follow-up every trimester
- **class II to III:** cardiology follow-up every trimester to monthly
- **class III:** cardiology follow-up at least monthly or twice monthly

For class IV pregnancy is contraindicated.

- Routine administration of iron supplements beyond standard should be avoided, particularly in cyanotic patients
- careful surveillance for signs and symptoms of VTE
- Women with congenital heart disease should be offered fetal echocardiography in the 19^{th} to 22^{nd} week