

HEART DISEASE IN PREGNANCY

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Pre-conceptional counseling

- a. Objective Risk assessment with
 - » 1. Clarke's table
 - » 2. NYHA
 - b. Feasibility of pregnancy care
 - c. Necessity of a child-
-
- The Indian Scenario-
 - totally different



- How do you grade the functional capacity of heart?



The New York Heart Association (NYHA) Grading of functional capacity of the heart: 1928

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



❖ What is the mortality associated with the various cardiac lesions ?



❖ Mortality associated with specific cardiac lesions;

Clarke et al 1987

1. Group I :Low risk of maternal mortality (less than 1%).
 - (a) Septal defects.
 - (b) New York Heart Association classes I and II.
 - (c) Patent ductus arteriosus.
 - (d) Pulmonary / tricuspid lesions.
2. Group II: Moderate risk of maternal mortality (5-15%).
 - (a) NYHA classes III and IV mitral stenosis.
 - (b) Aortic stenosis.
 - (c) Marfan's syndrome with normal aorta.
 - (d) Uncomplicated coarctation of aorta.
 - (e) Past history of myocardial infarction.
3. Group III: High risk of maternal mortality (25-50%).
 - (a) Eisenmenger's syndrome.
 - (b) Pulmonary hypertension.
 - (c) Marfan's syndrome with abnormal aortic root.
 - (d) Peripartum cardiomyopathy.



❖. What is the prognosis for a woman with a cardiac disease depending on the NYHA classification?



➤ Prognosis depending on the functional status

- ❖ In general, women in NYHA classes I and II lesions usually do well during pregnancy and have a favorable prognosis with a mortality rate of $<1\%$.
- ❖ Patients in NYHA classes III and IV may have a mortality rate of 5% to 15%. These patients should be advised against becoming pregnant.



Causes of maternal death

- 1. pulmonary hypertension 30%
- 2. CAD 39%
- 3. Endocarditis 22%
- 4. cardiomyopathy 09%

» De Swiet, 1993



➤ What are the causes for increased cardiac output during a normal pregnancy?



Cardiac output begins to rise in the first trimester and continues as a steady increase to peak at 32 weeks gestation by 30% to 50% of pre pregnancy level.

Causes for increased cardiac output are

1. Increases in stroke volume (early pregnancy)
2. Increase in heart rate (late pregnancy)
3. Decreased peripheral resistance
4. Decreased blood viscosity



➤ What are the causes for fall in the peripheral resistance?



The fall in the peripheral resistance is about 20-30% at 21-24 weeks & returns to normal at term.

This fall is due to

1. Due to the trophoblastic erosion of endometrial vessels, the placental bed serves as a large arteriovenous shunt causing lowered systemic vascular resistance
2. There is physiological vasodilatation which is believed to be secondary to endothelial prostacyclin and circulating progesterone.



What are the conditions where reduction in 'Afterload' is beneficial ?



- a. Cardiomyopathy
- b. Aortic Regurgitation
- c. Mitral Regurgitation

are benefitted by reduced
cardiac output.



What are conditions where
reduction in ' afterload ' is
harmful?



- a. Intracardiac shunts
- b. Stenotic lesions with fixed cardiac output.



✓ **What are physiological changes during labour ?**



Physiological changes during labour and puerperium.

1. First stage.

Cardiac output increases by 15%. Uterine contractions increase venous return, causing an increase in cardiac output & can cause reflex bradycardia.

2. Second stage

Increase in intra abdominal pressure (Valsalva's) causes a decrease in venous return and cardiac output. Also there could be a 50% rise in CO.

3. Third stage

Normal blood loss during delivery (around 250-350 ml).

It leads to

- a. Decrease blood volume
- b. Decrease cardiac output.

also there could be 'autotransfusion'



❖ **What are the clinical features in a normal pregnancy which can mimic a cardiac disease ?**



he clinical features in a normal pregnancy which can mimic a cardiac disease are

- . Dyspnea - due to hyperventilation, elevated diaphragm..**
- . Pedal Edema**
- . Cardiac impulse- Diffused and shifted laterally from elevated diaphragm.**
- . Jugular veins may be distended and JVP raised.**



➤ **What are the criteria to diagnose cardiac disease during pregnancy ?**



- Criteria to diagnose cardiac disease during pregnancy:
 1. Presence of diastolic murmurs.
 2. Systolic murmurs of severe intensity (grade 3/6 or more).
 3. Unequivocal enlargement of heart (X-ray).
 4. Presence of severe arrhythmias, atrial fibrillation or flutter



What informations you get by
'Echocardiography' ?



1. Left ventricular ‘ ejection fraction ‘
2. Pulmonary artery systolic pressure
3. qualitative analysis of right ventricular function
4. Evaluation of valve anatomy and function



How to calculate the pressure gradient across the valve by echo- ?



Pressure Gradient = $4 v$ square

V= doppler derived velocity



❖ **What are the indications for Termination of pregnancy?**



The indications for Termination of pregnancy.

Because of high maternal risks, MTP is indicated
in:

.Eisenmenger's syndrome.

.Marfan's syndrome with aortic involvement

.Pulmonary hypertension.



❖ **What is warfarin fetal embryopathy ?**



Warfarin use in first trimester can be teratogenic and can cause fetal embryopathy(15 to 25 %) which includes

- Nasal cartilage hypoplasia,
- Stippling of bones,
- IUGR and
- Brachydactyly.



What are the risk factors for cardiac failure during pregnancy ?



Risk factors for cardiac failure during pregnancy

- ❖ Infection
- ❖ Anemia
- ❖ Obesity
- ❖ Hypertension
- ❖ Hyperthyroidism
- ❖ Multiple pregnancy



What is the prophylaxis for Sub acute bacterial endocarditis (SABE) while performing any obstetric and gynecological procedures during pregnancy?



Antibiotic prophylaxis:

- a. 2 gm ampicillin IV/plus
- b. 1.5mg per kg gentamicin /IV prior to the procedure ,
followed by one more dose of 1 gm.
ampicillin 6 hours later.

In the event of penicillin allergy ;
1 gm Vancomycin IV (1-2h)can be substituted.

Dajani et al, AHA, JAMA 277:1794, 1997



Which is the ideal contraceptive for women with heart disease ?



Contraception

1. OC pills are not ideal for CHD as they can cause thromboembolism.
2. IUCD can cause infection- endocarditis. 1 in 1 million patient years
3. Barrier contraceptives – Have high failure rates.
4. Progestin only pills or Long acting injectable progesterone are better- does not cause thromboembolism.

PILL - Desogestrel

INJECTABLES

- a. Medroxy progesterone 150mg IM every 3 months.
 - b. Norethisterone.200 mg every 2 months
5. Sterilization is best.



What is the percentage increase in blood volume during pregnancy at term?





40-50%



At which period of gestation is the cardiac output maximum during pregnancy?





28-32 weeks



What is the increase in heart rate above the non-pregnant level during pregnancy?



✓ 10-12 beats per minute



What is the site of apical impulse in pregnancy?



4th intercostal space, as much as 2.5-3 cm to the left of its normal presentation



Is there a change in the 1st heart sound during pregnancy?



Loud widely split 1st heart sound
(88% women)

Cutforth and MacDonald(1996)



What is the change in 2nd heart sound in pregnancy?



□ 2nd sound is little affected



Can 3rd heart sound be heard during pregnancy?



Yes, loud 3rd heart sound can be heard in
84% pregnant women

Cutforth and MacDonald(1996)



Are murmurs physiological during pregnancy?



Yes, systolic ejection murmur and early diastolic murmurs can be heard in 92% and 18% pregnant women, respectively.



Is there any additional sound heard
which can be confused for cardiac
murmur?



Yes, mammary bruits



How do you differentiate between
mammary bruits and cardiac murmurs?



Pressure with the finger or stethoscope
may abolish or modify bruit



How do you differentiate between functional and organic murmurs?



IN *FUNCTIONAL MURMURS*,

- a. Patient is asymptomatic
- b. No h/o rheumatic fever or heart disease
- c. Murmur is typically soft, short and localised
- d. It may alter or disappear with posture and stage of respiration



What are the ECG changes in pregnancy?



Lead III often shows a very deep Q wave and inversion of T wave

Unipolar leads V2-V4 may show flattening of T wave with depression of ST segment



How do you assess the functional grades according to NYHA?



Class I

Patients with cardiac disease but without resulting limitation of physical activity.

Ordinary physical activity does not cause undue fatigue, palpitations, dyspnea, or anginal pain.



Class II

Patients with cardiac disease resulting in slight limitation of physical activity.

They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.



Class III

Patients with cardiac disease resulting in marked limitation of physical activity.

They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea, or anginal pain.



Class IV

Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort.

Symptoms of heart failure or the anginal syndrome may be present even at rest.

If any physical activity is undertaken, discomfort is increase



What diet advice should be given to a cardiac pregnant lady?



Diet high in protein and as low as possible in carbohydrate, with no added salt



What are the commonest causes of cardiac failure in pregnancy?



a. Anemia

b. Upper respiratory tract infection



What are the signs and symptoms for hospitalisation- in heart disease- in pregnancy ?



1. Fever or persistent cough
2. Tachycardia
3. JVP > 2 cm
4. Presence of basal crepitations
5. Presence of more than trivial ankle edema



When is hospitalisation indicated in the management of pregnant cardiac case- depending on NYHA ?



Patients with --

- a. Grade 2 disability : 1-2 weeks before EDD
- b. Grade 3 : depending on response to treatment
(discharged on regression to grade 1 or 2)
- c. Grade 4 : should not be allowed outside hospital until after delivery



Indications for digitalisation in pregnancy?



1. Patients who start the pregnancy in grade 2 or more

2. Patients who deteriorate to grade 2 or more during pregnancy

3. Cardiac enlargement or auricular fibrillation associated with rheumatic disease



Should all cardiac cases be induced
at term?



No, there is no place for induction on the grounds of heart disease alone.

Patient with no obstetrical complications is best allowed to go in to spontaneous labour



When is epidural analgesia
contraindicated in patient with cardiac
disease?



Severe aortic stenosis



In which cardiac condition is
administration of oxytocin
contraindicated in late second stage?



1. Tight mitral stenosis

2. Cyanotic congenital heart disease



In Mitral stenosis – when is mitral valvotomy more likely to be successful?



Pure or almost pure stenosis without
much cardiac enlargement



What is the urgent indication for mitral valvotomy?



Profuse and uncontrollable haemoptysis
in the presence of severe mitral stenosis
associated

-With pulmonary hypertension



Is coarctation of aorta an absolute indication for caesarean section?



No, vaginal delivery presents no increased hazard to the patient with coarctation, provided there is no obstetrical indication

Goodwin and Shanahan et al



What are the indications for termination of pregnancy in cardiac patients?



ABSOLUTE INDICATIONS

Eisenmenger syndrome

Solitary pulmonary hypertension

RELATIVE INDICATIONS

Prosthetic heart valves maintained on anticoagulation

Severe aortic stenosis

Cyanotic CHD

Coronary artery disease

Hypertension with previous unsuccessful pregnancy despite good management

Celia Oakley



What is Rheumatic Fever ?



An immunologic response to
Group- A haemolytic
streptococcus infection



Natural life history of Mitral Stenosis ?



- Asymptomatic- 10 year survival greater than 80%
- Symptomatic – 10 year survival less than 15%
- Presence of Pulmonary Hypertension- mean survival – less than 3 years.



- NYHA functional class II- & III valve size equal to less than 2.5 square cm.
- NYHA functional class IV-
less than 1 square cm

Normal valve size- 4 to 5 square cm



- What should not happened during antenatal period ?



- A. Changes in cardiac out put
- B. Changes in the pulse rate
- Eg. Hypertension, anaemia, infection



- What should not happen in labour ?



- A. Pain
- B. Prolonged labour
- C. Maternal exhaustion



- What are the indications for valve replacement in Mitral Regurgitation ?



- 1. symptomatic patient
- 2. atrial fibrillation
- 3. ejection fraction less than 50 to 60%
- 4. left ventricular end diastolic dimension greater than 50 mm
- 5. pulmonary systolic pressure greater
 - than 50 mm



- What are the conditions in which Mitral Valve prolapse is important ?



- A. Marfan's syndrome
- B. Ehler- Danlos syndrome



Prosthetic valves

- What are complications of Mechanical valves in pregnancy ?



- A. Foetal loss 27%
- B. Premature birth 06%
- C. Valve deterioration 05%
- D. Thromboembolic event 05%



Anticoagulation

- Which guideline you will follow for anticoagulation ?



- ACC/AHA guideline.
- Heparin in the first 12 weeks
- Warfarin till 36 weeks
- Heparin till delivery- activated partial thromboplastin time (aPTT) 2 to 3 times the control



CHD

- Major risk factors:
 - 1. cyanosis
 - 2. left (systemic) ventricular dysfunction
 - 3. pulmonary hypertension- right ventricular dysfunction



Congenital anomaly

- CHD - 30% of the congenital anomalies are CHD
- 5 to 14 to 50%
- Cardiac mal-development is inherited not the same lesion



Eisenmenger's syndrome

- Pulmonary to systemic shunt
- Cyanosis
- Increased pulmonary pressure secondary to pulmonary vascular disease



Eisenmenger's syndrome

- High risk for:
- CCF
- Haemoptysis
- Sudden death due to arrhythmia
- Cva
- Hyperviscosity syndrome



Eisenmenger's syndrome

- ✓ Low pressure- high flow- shunt is seen in ASD
- ✓ High-pressure – high flow shunt is seen in VSD and PDA. Pulmonary hypertension is common in this condition.
- ✓ Sudden hypotension is ‘the cause of death’



Peripartum cardiomyopathy

- Maternal mortality: 25 to 50%
- 50% show improvement with in six months-
good prognosis
- In the remaining cases – 85% will die with in 5
years.



Indications for invasive haemodynamic monitoring

- 1. severe pre-eclampsia
- 2. ARDS
- 3. Sepsis
- 4. pneumonia
- 5. undiagnosed heart disease
- 6. severe obstetric hemorrhage



In which cardiac condition is
methy-ergometrine beneficial?



Hypertrophic obstructive cardiomyopathy



THANK YOU

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