

Cardiac disease with
pregnancy

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Objectives

- By the end of this lecture the student will be able to
 - Explain the cardiovascular change during pregnancy
 - Discuss the effect of pregnancy to heart & the effect of heart to pregnancy
 - Discuss the nursing intervention

Physiological changes in cardiovascular system during pregnancy

- *In normal pregnancy the hemodynamic progress alters in order to meet the increasing demands of the growing fetoplacental unit .*
- *This increases the work load of the heart .*

These increases include :-

1) Increase blood volume and cardiac out put .

- *Started in 10th -12th week of pregnancy ,and gradually reaches their maximum effect between 32th -38th weeks of pregnancy.*

2) Blood flow :- increase to organs with an increased work load and increase to uterus and kidneys.

3) pulse:- increase by 10-15 beat /m at term .

4) Blood pressure :- decreases slightly reaching its' lowest point during the second trimester .

- **5) stasis of the blood in the lower extremities**
- *The enlarging uterus puts pressure on the pelvic and femoral vessels ,interfering with returning blood flow and causing stasis of the blood in the lower extremities ,lead to dependant edema and varicosity of the veins in the legs and rectum (In late pregnancy , cause hemorrhoids) and vulva varicosity .*

6) hypotensive syndrome or venacaval syndrome

- *When pregnant woman lies supine the enlarging uterus may press on the vena cava thus reducing blood flow to the right atrium ,decreasing the blood pressure and causing dizziness ,pallor .*
- *This condition can be corrected by having the woman lie on her side .*

7) heart :-

- *diaphragm is progressively elevated during pregnancy ;heart is displaced to the left and upward ,with the apex moved laterally .*
- *Systolic murmurs are common ,disappear after delivery .*

- ▶ *most cases of heart disease with efficient and good management can go through pregnancy and labor successfully ,but there is always an additional risk .*

- *The maternal risk varies according to the nature of the cardiac lesion .*
- *The risks generally are those of cardiac failure and acute pulmonary edema .*
- *Adequate rest and avoidance of infections are important .*

Classifications of heart disease :-

- *Classified into :-*
- Rheumatic heart (75%): mitral valve affection is the commonest followed by aortic valve .
- Congenital heart diseases (10%):
 - more common, includes septal defects and patent ducts arteriosus

[cont]

- Others (15%): e.g. ischaemic heart disease, arrhythmias and cardiomyopathy

Mitral valve stenosis :-

Definition :-

is progressive thickening and contracture of the valve with narrowing of the orifice and progressive obstruction to blood flow .

- ▶ *In pregnancy venous return increase preload
So the cardiac out put slow ,kidneys retain fluid
,and cause hypervolaemia.*
- ▶ *Such patients are at high risk of pulmonary edema .*

Clinical presentation :-

- *with mild disease patient have few symptoms include :-*
- *Dyspnea on exertion .*
- *Palpitations .*
- *Syncopal attacks .*

Aortic stenosis :-

Definition :-

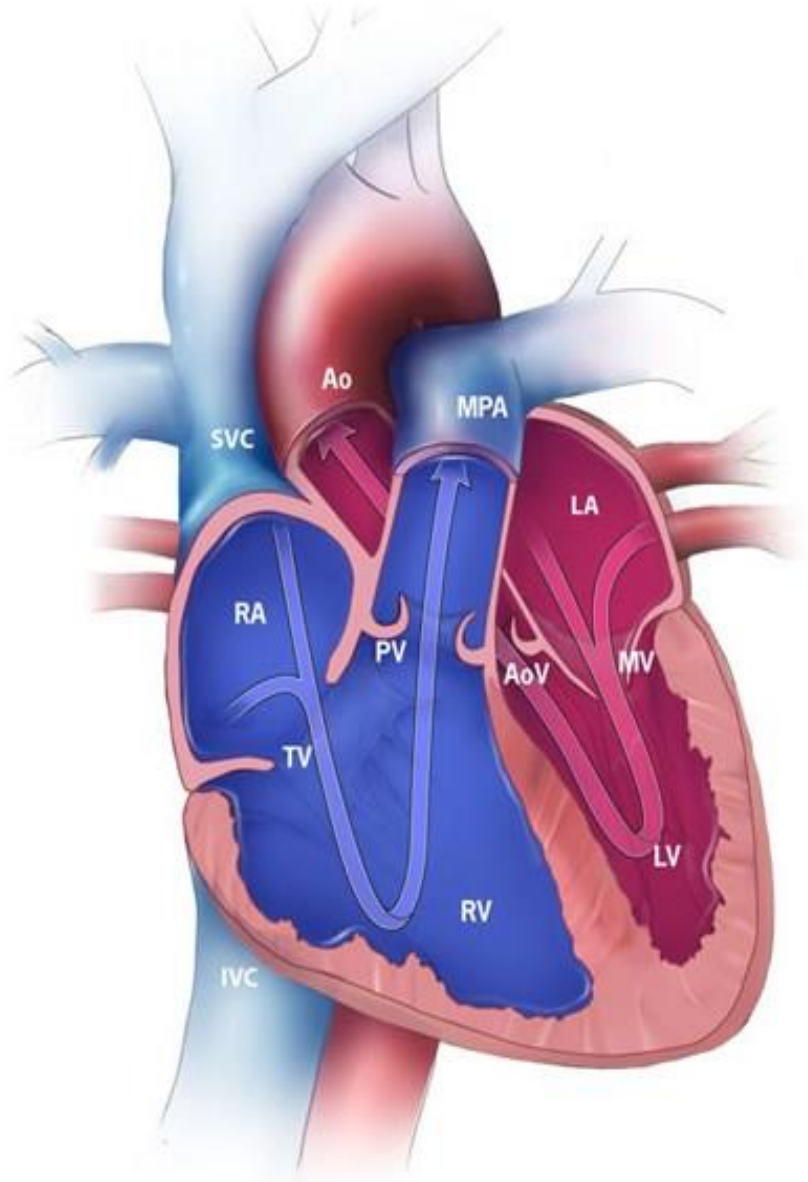
- *Is a narrowing of the orifice between the left ventricle and the aorta .*
- *Inadequate cardiac output result in reduce amount of blood ejected into the circulation result in ,angina ,and even myocardial infarction .*
- *Labor is a dangerous period , supine position is avoided .*

Congenital heart diseases :-

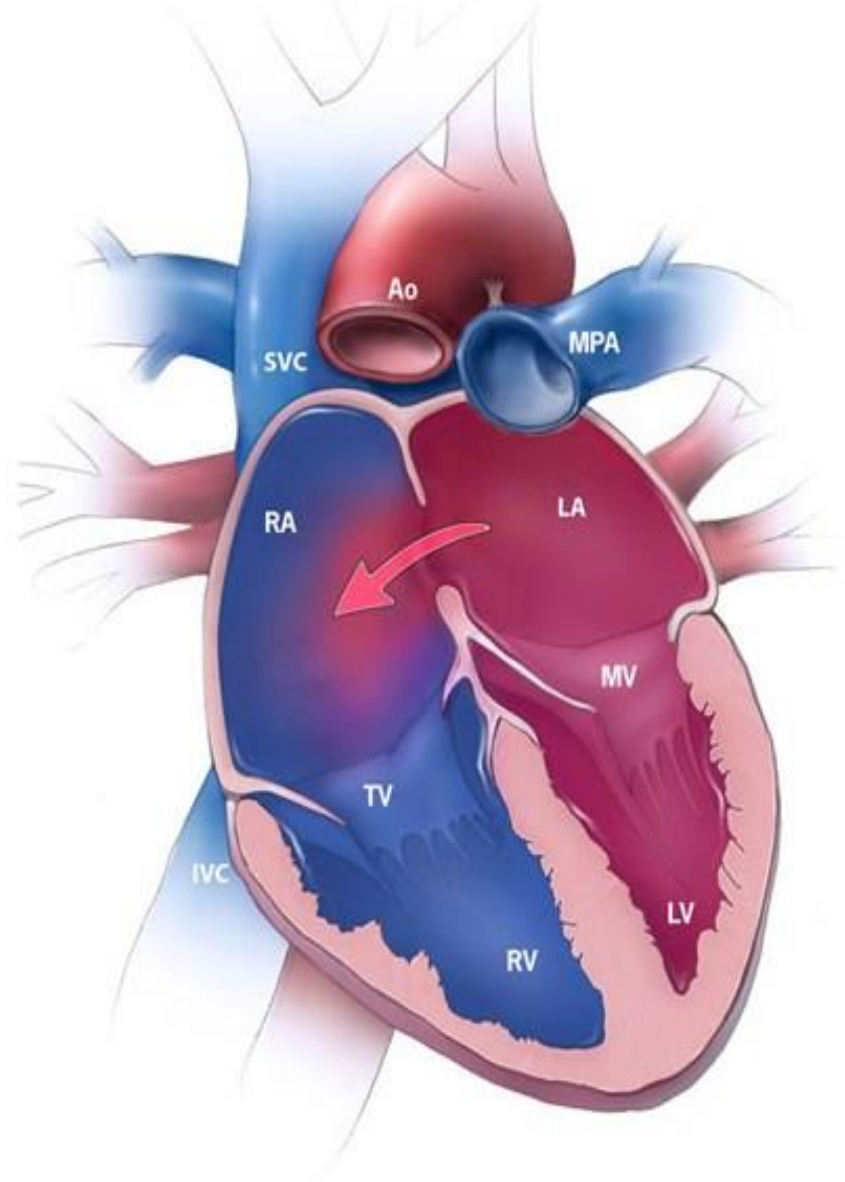
Atrial septal defect :-

- *Abnormal communication between the left and right atrial .*
- *During pregnancy they may have increased pulmonary hypertension .*
- *Labor is usually uncomplicated ,need delivered in hospital with fully equipped cardiac care unit .*

Normal Heart



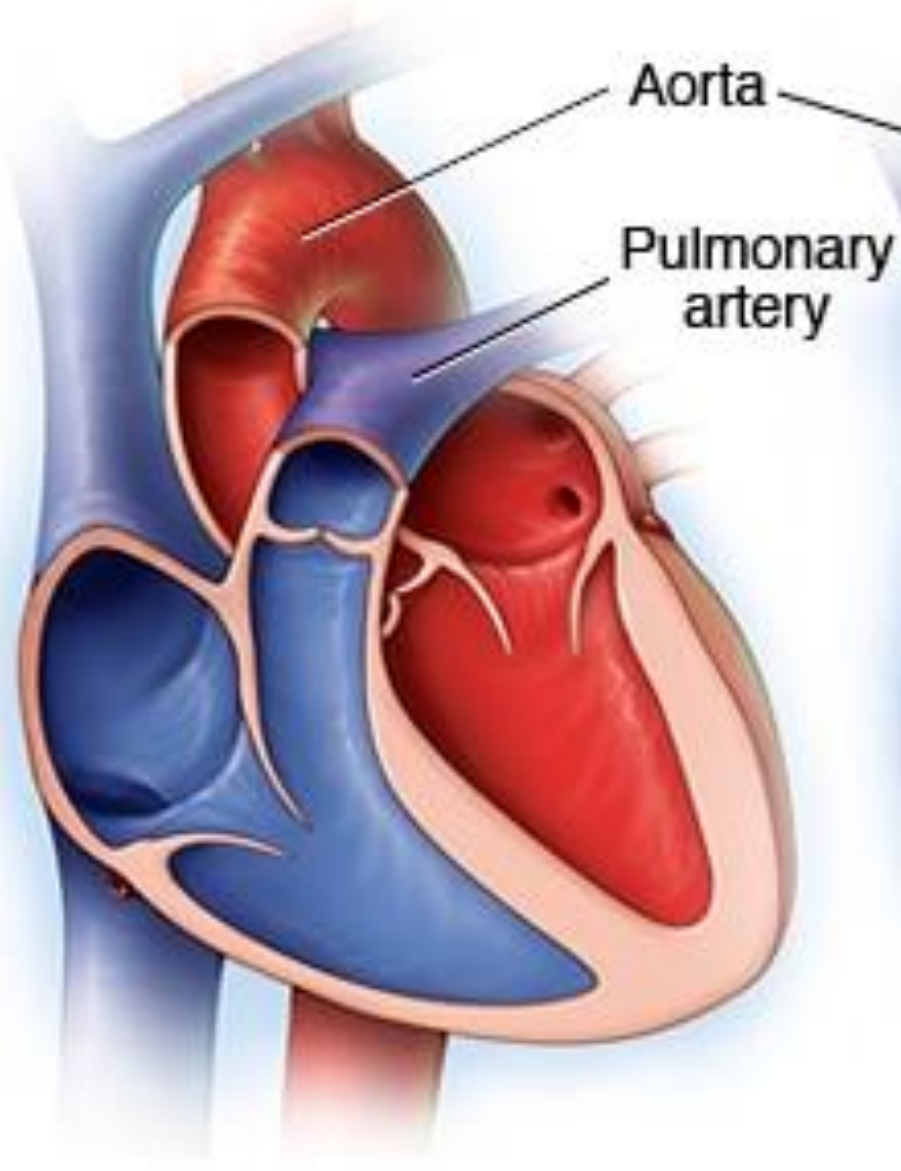
Atrial Septal Defect (ASD)



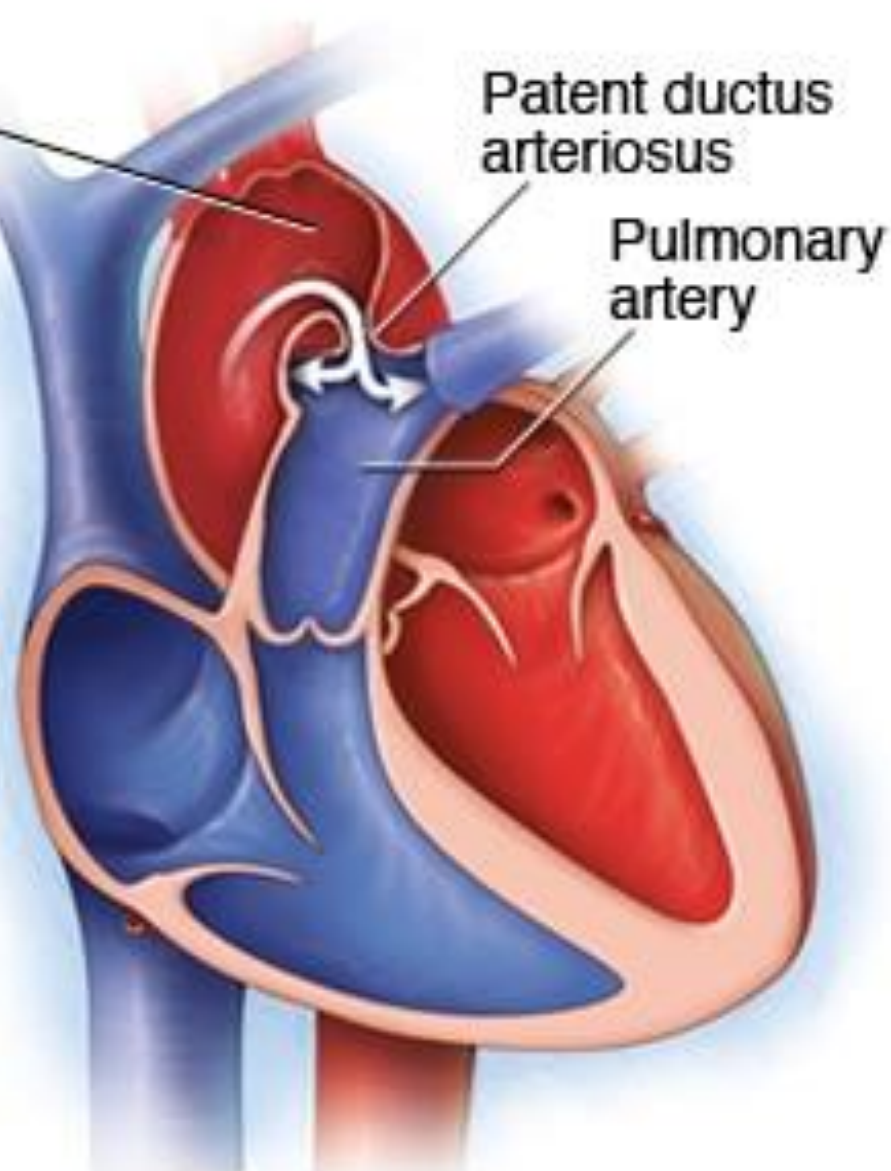
Patent ductus arteriosus (PDA) -

- *Failure of closure of ductus arteriosus lead to blood flow from the aorta (high pressure)into the low pressure pulmonary artery resulting in pulmonary over circulation lead to loaded left ventricle .*
- *In pregnancy lead to pulmonary hypertension*

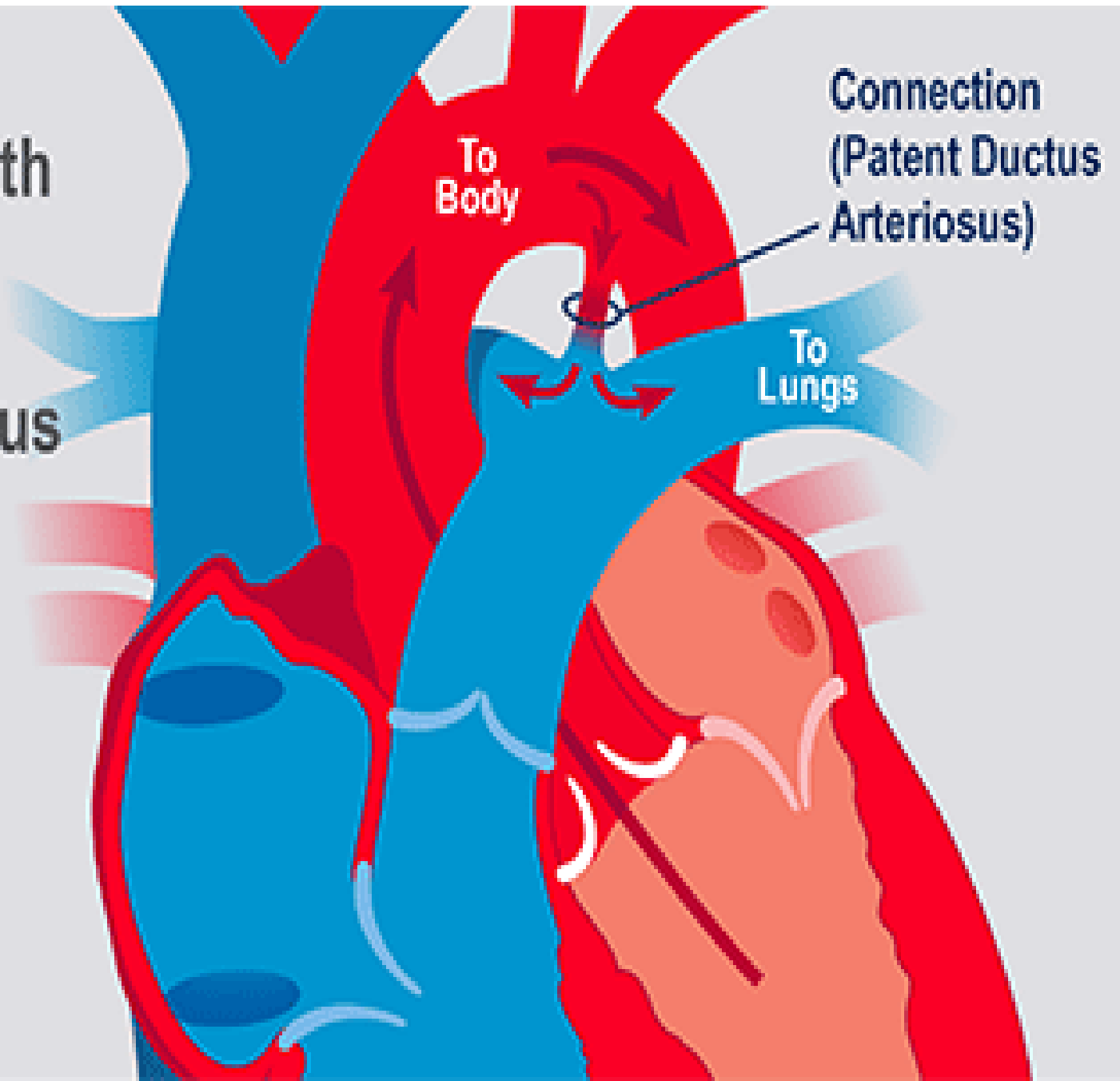
Normal heart



Patent ductus arteriosus



Inside a
Heart with
Patent
Ductus
Arteriosus



Connection
(Patent Ductus
Arteriosus)

To
Body

To
Lungs

- *Classification of heart disease depending on the functional impairment that patient experiences according to New York Heart Association (NYHA):-*
- *Class 1* :no limitation of physical activity .
- *Class 2* :slight limitation of activity patient comfortable at rest .
- *Class 3* :marked limitation of physical activity patient are comfortable at rest .
- *Class 4* : Severe limitation of physical activity & symptomatic even at rest

- **Diagnostic test**
- SPECIAL CARDIOVASCULAR TESTS
- After a thorough history, physical examination, and clinical observation
- Electrocardiography (ECG), the primary tool for evaluating cardiac status
- Chest X-rays may reveal an enlarged heart and aortic dilation
- Cardiac catheterization is used to evaluate chest pain
- Echocardiography.

Effect of Pregnancy on Heart Disease

[cont.]

- After delivery, heart failure may occur due to loading of the circulation by the blood from the placental sinuses after retraction of the uterus.
- Subacute bacterial endocarditis: may develop in the puerperium

Effect of Heart Disease on Pregnancy

- Abortion.
- Intrauterine growth retardation.
- Still birth.
- Premature labour.
- These complications are encountered especially in cyanotic heart diseases.

- 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.

Management in antenatal period

➤ ***Team work obstetrician and cardiologist***

➤ ***General management:***

- More frequent antenatal visits.
- Advice in avoiding stress and anxiety and adequate rest

-
- Diet is directed to restrict weight gain, low sodium, iron-rich diet
- prevent anaemia as it increases cardiac strain
 - by maintain Hb levels, so give advice on diet and iron supplementation

- Infection should be avoided and properly treated (Prophylactic antibiotic is essential against sub acute bacterial endocarditis)

- Hospitalization: if signs of decompensation occur, the earliest evidence is tachycardia exceeding 100 beats/ minute and crepitations at the lung bases. Rest in a hospital is desirable in the last 2 weeks of pregnancy

- regular fetal wellbeing and growth monitoring and teach the mother to keep a fetal movement

Specific Management in antenatal period

Medical treatment:

- Digoxin: is indicated in atrial fibrillation to slow the ventricular response and in acute heart failure to increase myocardial contractility.
- Diuretics are used in acute and chronic heart failure with potassium supplements in prolonged therapy.
- Beta-blockers: as propranolol may be indicated for arrhythmia associated with ischaemic heart disease.

[cont]

- Aminophylline: relieves bronchospasm.
- Heparin: is indicated in patients with artificial valves or atrial fibrillation.

[cont.]

Acute pulmonary oedema is urgently treated by:

- Cardiac bed
- furesamide
- Morphine 15 mg IV, to allay anxiety and reduce venous return.
- Oxygen.
- Digoxin 1 mg IV, except in severe mitral stenosis as the increase in right heart output cannot be handled by the mitral valve.
- Aminophylline 250 mg IV.
- Venesection, removing 500 ml blood rapidly may be indicated in severe cases.

[cont.]

- Surgical treatment: Therapeutic abortion: should be considered in class III and IV if the patient is seen early in pregnancy.
- Cardiac surgery: It may be an alternative to therapeutic abortion. The principal indication is recurrent pulmonary oedema with mitral stenosis and heart failure not responding to medical treatment.

[cont.]

- There is no increased risk to the mother or the foetus in closed cardiac surgery e.g. mitral valvotomy but there is higher incidence of foetal loss with open surgery

Management of labour

- There is no indication to induce labour because increases cardiac strain..
- If induction of labour is indicated for an obstetric cause e.g. ante partum hemorrhage a low amniotomy + oxytocin in a concentrated glucose solution is the best method. This minimizes the incidence of pulmonary oedema.

[cont.]

- Avoid active directed pushing, as the consequent increase in heart rate(Pushing increases vagal tone(vagus nerve) and may worsen bradycardia)

Epidural analgesia may be useful as tachycardia secondary to pain increases cardiac work

[cont.]

➤ a void supine position, because vena caval compression restricts pulmonary blood flow .
Oxygen mask or ventilation if heart failure or cyanosis develop.

(O2 +Cardiac tray [forceps-lasix-morphine-digoxin-cannula]).

[cont.]

- Vaginal delivery is preferable but should be an easy and shorten the second stage by forceps or ventouse , require an episiotomy

[cont.]

- Ergometrine is to be avoided as it causes sudden load of the circulation with blood from the uterus leading to acute heart failure. Oxytocin can be used instead.
- Prophylactic antibiotic is essential to guard against subacute bacterial endocarditis.

[cont.]

Following delivery, the return of the uterine blood flow into the systemic circulation results in an increase of cardiac output. Stroke volume, Venesection removing 500 ml blood rapidly , Diuretics are used and oxygen are important in this period

[cont.]

- observation for 48 hours is essential as the risk of heart failure is high in this period. Although bed rest is essential, early ambulation is desirable to avoid thromboembolism.

[cont.]

- **Breast feeding** is allowed unless there is heart failure.
- **Oestrogens** should not be used to suppress lactation and **bromocriptine** can be used.
- Review medications prior to discharge

Contraception suitable for cardiac patient [cont]

1. OC pills are not ideal as they can cause thrombo embolism
2. IUCD can cause infection- endocarditis.
3. Barrier contraceptives – Have high failure rates.
4. Progestin only pills or Long acting injectable progesterone are better

- **INJECTABLES :**
- Medroxy progesterone 150mg IM every 3 months.
- 5. Sterilization may be advised if decompensation occurred in this pregnancy.

Any Question

Thank you