

Cardiac Diseases in Pregnancy

It ranges from 0.1% to 4% .,Sharp decline in the incidence of chronic rheumatic heart disorders because of ,Advances in the medical and surgical The incidence and changing pattern of heart disease

treatment of patients with congenital heart defects has resulted in an increased survival to reproductive age .

Maternal mortality from heart disease

- Statistics have demonstrated a decline in maternal mortality from cardiac disease since 1950 from 5.6 to 0.3 per 100 000 births .
- Because of improved medical care of the pregnant cardiac patient and a sharp decrease in the incidence of rheumatic heart disease .

Cardiovascular Physiology of Pregnancy:-

Normal pregnancy is associated with an increase of 30 to 50 percent in blood volume

- Blood volume increases, starting at the sixth week and rising rapidly until mid pregnancy; the levels peak by 20 to 24 weeks of pregnancy and then are either sustained until term or decrease
- Increase in cardiac output is most significant change during pregnancy .
- It begins to rise in first trimester and steadily rises to peak at 32 weeks by 30 to 50% .
- Cardiac output is normally 4.2 L/min., is 6.5 L/min. at 8-10 weeks of pregnancy and remains so till near term .
- Increase in cardiac output is achieved by rise in stroke volume (in early pregnancy) and Heart Rate (in latter part of pregnancy) adjusting together

Later in pregnancy, the rise is related to an acceleration of heart rate (25%), since stroke volume decreases as a result of vena caval compression .

- Blood Pressure remains almost to prepregnant levels except a tendency to fall during pregnancy (particularly during midtrimester) as the systemic vascular/peripheral resistance falls .

- Colloid oncotic pressure is another important variable

- Both plasma and interstitial colloid oncotic pressure decrease throughout pregnancy

- There is accompanying increase in capillary hydrostatic pressure .

- An increase in hydrostatic pressure or a decrease in colloid oncotic pressure may overcome the delicate balance that favors oedema formation

Simulating cardiac disease :-

Owing to these normal changes, many healthy pregnant women have symptoms

mimicking those of cardiac disease (Including :

fatigue, dyspnea, and light-headedness (number of “abnormal” findings on physical

examination, electrocardiography, and echocardiography .

Normal physiological changes of pregnancy that mimic symptoms and signs of cardiac disease :- Symptoms like Tiredness, Dyspnoea, Orthopnoea Syncope and Light-headedness.

Physical signs like Peripheral oedema ,Hyperventilation, Distended neck veins with prominent A and V waves Brisk, diffuse, and displaced left ventricular impulse ,Palpable right ventricular impulse, Increased S1 intensity, Persistent splitting of S2 ,Early ejection systolic murmurs at lower left sternal edge or pulmonary area and Cervical venous hum Mammary soufflé.

Electrocardiogram :-

Left axis deviation

ST segment and T wave changes

Small Q, inverted P or T wave in lead III

Increased R wave amplitude in lead V2

Atrial or ventricular ectopics

Chest X-ray :-

Straightened left upper cardiac border

Horizontal heart position and Increased lung markings ,

Echocardiogram :-

Increased left/right ventricular dimensions

Mild increase in left/right atrial size

Slightly improved left ventricular systolic function

Functional tricuspid/pulmonary insufficiency

Small pericardial effusion

Management areas

Areas be considered in the clinical approach to the woman with heart disease who is pregnant or considering pregnancy :

Pre-conceptual

Antepartum management ‘

Peripartum management

Recurrence of congenital lesion in the neonate.

(Site of antepartum and peripartum care .

Pre-conceptual counselling

- This is an important aspect of management or the cardiac patient planning a pregnancy .
- Ideally, the obstetrician and cardiologist should work together to help the patient make an informed decision .
- Prevent an unwanted pregnancy and avoid the risks associated with pregnancy continuation or termination .

Maternal mortality risk and cardiac disease

Group Cardiac disease Associated mortality risk

I Atrial septal defect*, <1% Ventricular septal defect *, Patent ductus arteriosus *, Pulmonary/tricuspid valve disease, Corrected tetralogy of Fallot , Bioprosthetic valve, Mitral stenosis and NYHA Class I, II (all these conditions with maternal mortality risk of <1%

II Coarctation of aorta without valvular involvement , 5% - 15%, Uncorrected tetralogy of Fallot , Marfan's syndrome with normal aorta, Mechanical prosthetic valve , Mitral stenosis with atrial fibrillation or NYHA Class III, IV , Aortic stenosis

and Previous myocardial infarction(all these conditions with maternal mortality of 5% - 15%,

III Pulmonary hypertension—primary or secondary 25% - 50%

Coarctation of aorta with valvular involvement

Marfan's syndrome with aortic involvement

Peripartum cardiomyopathy

A careful history is obtained to identify previous cardiac complications .

- The patients functional status as per The New York Heart Association(NYHA) is defined

NEW YORK HEART ASSOCIATION FUNCTIONAL CLASSIFICATION OF CARDIAC DISEASE

CLASS I No functional limitation of activity .

- No symptoms of cardiac decompensation with activity .
- CLASS II Mild amount of functional limitation .
- Patients are asymptomatic at rest. Ordinary physical activity results in symptoms .
- CLASS III Limitation of most physical activity .
- Asymptomatic at rest
- Minimal physical activity results in symptoms .
- CLASS IV Severe limitation of physical activity results in symptoms .
- Patients may be symptomatic at rest/heart failure at any point of pregnancy .
- CLASS V If patient is on inotropic support, ventilator, Assisted circulation or having comprised renal or pulmonary function necessitating dialysis/EMCO to maintain vital signs .

Antepartum Care

The chief aim of management of the patient in pregnancy is to keep patient within her cardiac reserve .

- It is preferable to have detailed baseline information prior of pregnancy .

Antepartum care :

- is helpful in severely Limiting activity affected women with ventricular dysfunction ◊

- left heart obstruction, or class III or IV symptoms .
- Hospital admission by mid-second trimester may be advisable for some .
- Problems should be identified early and treated aggressively, especially pregnancy induced hypertension, hyperthyroidism, infection, and anemia.
- Beta-blockers rather than digoxin should be used to control the heart rate for patients with functionally significant mitral stenosis .
- Empiric therapy with beta-blockers is offered to patients with coarctation, Marfan syndrome, and ascending aortopathy for other reasons (eg, a bicuspid aortic valve .)

Anticoagulation therapy :

Oral therapy with warfarin is effective and logistically easy .

However, it can affect embryonic organ development, although some evidence shows that a dosage of 5 mg per day may not be teratogenic .

Fetal intracranial bleeding is a risk throughout pregnancy, particularly during vaginal delivery, unless warfarin is stopped before labor .

Heparin in adjusted subcutaneous doses does not cross the placenta and so has no teratogenic effects .However, it may cause maternal

thrombocytopenia and osteoporosis and is less effective in preventing thrombosis in

patients with prosthetic valves .

More recent guidelines recommend either:-

1- adjusted-dose heparin during the entire pregnancy or adjusted-dose heparin until the 13th week of gestation ‘

warfarin from the 14th week to the middle of the third trimester, and then restart adjusted-dose heparin .

* Low-molecular-weight heparin in adjusted doses is easier to administer and has been suggested as an alternative to adjusted-dose unfractionated heparin .

At week 36,* Discontinue warfarin* Change to UFH titrated to a therapeutic aPTT or anti-factor Xa level .

At Delivery :

*Restart heparin therapy 4 to 6 hr after delivery if no contraindications

*Resume warfarin therapy the night after delivery if no bleeding complications

#if labor begins while the woman is receiving warfarin, anticoagulation should be reversed and caesarean delivery performed .

Peripartum management

Cesarean section is indicated only for the following conditions :

- Aortic dissection
- Marfan syndrome with dilated aortic root
- Taking warfarin within 2 weeks of labor .

Preterm induction is uncommon .However, once fetal lung maturity is assured ,

a planned induction and delivery may be warranted for high-risk patients to ensure

that appropriate staff and equipment are available .

Antibiotic prophylaxis for endocarditis is not routine. AHA guidelines do not recommend routine endocarditis prophylaxis for cesarean section delivery or for uncomplicated vaginal delivery without infection.

However, some centers do administer endocarditis prophylaxis for vaginal delivery

in women with structural heart disease, as an uncomplicated delivery cannot always be anticipated .

Positioning the patient on her left side and lessens the hemodynamic fluctuations associated with contractions when the patient is supine .

Forceps or vacuum extraction should be considered at the end of the second stage of labor to shorten and ease delivery .

- Postpartum monitoring

Because hemodynamics do not return to baseline for many days after delivery, patients at intermediate or high risk may require monitoring for at least 72 hours postpartum .

- Lactation should be encouraged unless patient is in failure .

- Cardiac output is not compromised during lactation .

- Lactation is a pathway for fluid excretion and diuretic requirement may actually fall .

Contraception

- Barrier methods – unreliable .

- COC contraindicated .

- Progesterone only pill have better side effect profile & long acting slow releasing as Mirena intrauterine system have improved efficacy .

- Sterilization where family completed. (Laparoscopic clip sterilization carries risk .(

Conclusion

Pregnancy causes significant haemodynamic changes and imposes an additional burden on the cardiac patient, especially around the time of labour and in the immediate puerperium .

To achieve a successful pregnancy outcome, a clear understanding of these haemodynamic adaptations as well as meticulous maternal and foetal surveillance for risk factors and complications throughout the pregnancy is essential .

Appropriate contraceptive and family planning advice as well as pre-conceptual counselling are also important .

The concerted efforts of a team consisting of the obstetrician, cardiologist, anaesthetist, cardiothoracic surgeon, neonatologist, and paediatric cardiologist are mandatory to ensure optimal results.

References :-

DEWHURST TEXTBOOK AND TEN TEACHER OBSTETRICS TEXTBOOK