HEART DISEASE IN PREGNANCY

Physiological changes in pregnancy

- Blood volume increases by 30-40%. Starts from 12 weeks peaks at 32 weeks. Plasma volume increases by 40%,RBC volume by 20%
- Cardiac output increases by 30-40%
- Heart rate increases by 10-15 beats/min
- During labor – each contraction – displacement

of 300 to 500 ml of blood into the general circulation. In first stage cardiac output increases by 30%,second stage 45%,third stage 60% and one hour postpartum 30-50%

WARNING SIGNS

- Worsening dyspnoea or dyspnoea at rest
- Increasing rales and rhonchi in chest
- Worsening chest pain with exertion
- Syncope preceded by palpitation or exertion
- Loud cardiac murmurs
- Cyanosis or clubbing
- Jugular venous distension
- Cardiomegaly or ventricular heave
- Increasing edema
- Increase in limitation of daily activities

New York heart association classification of heart disease during pregnancy

Class I – asymptomatic
Class II - symptomatic with heavy exercise
Class III - symptomatic with light exercise
Class IV - symptomatic at rest

COMPLICATIONS

- CCF
- Pulmonary edema
- Bacterial endocarditis
- Thromboembolism in atrial fibrillation

Periods of danger in pregnancy

1st is between 12 and 32 weeks of gestation

Critical – 28 to 32 weeks of gestation

2nd during labor and delivery

3rd Final dangerous time is 4 to 5 days after delivery

Causes of maternal deaths

1. Puerperal cardiomyopathy
2. Myocardial infarction
3. Aortic dissection
4. Cardiomyopathy and myocarditis
5. Primary pulmonary hypertension
6. Secondary pulmonary hypertension
7. Endocarditis
8. Grade four heart failure
9. Dysarrythmias

Factors causing cardiac failure

- Anaemia
- Increased physical activity
- Fluid or dietary excess
- Infection
- Acute rheumatic carditis
- SABE
- PIH
- Arrhythmias
- Twins/Hydramnios

How to manage the hemodynamic changes ?

Antepartum

1. Preconceptional counselling, Classify according to NYHA grading Evaluation-ECG, ECHO. Chest Xray, Cardiologist consultation
2. Bed rest – Most important is bed rest, increases the venous return to the heart. improves renal perfusion induces diuresis, decreases load on the heart
2. Dietary salt restriction, no extra weight gain
3. Diuretics – most commonly used in chlorothiazide
   Watch for detoriating cardiac status
4. Prevention and treatment of anaemia

CLASS 3 AND 4 ADVISE MTP/HOSPITALISATION

Measures to be taken during labor and delivery

1. Labor and delivery in lateral position
2. Adequate pain relief
3. Restriction of IV fluids 75ml/hr
4. O_2 by mask, Pulse oximeter, Close monitoring
5. Do not give oxytocics
6. Antibiotic prophylaxis
7. Thrombosis prophylaxis
8. Prevention of postpartum pulmonary edema
9. Preferable to have a ICU facility with a cardiologist
10. Cut short second stage

Specific congenital or acquired cardiac lesions can be classified as low, intermediate or high risk

Low risk

1. ASD – Atrial septial defect
2. Isolated VSD
3. PDA
4. Mitral regurgitation
5. Aortic regurgitation
6. Fallots Tetralogy
7. Mitral stenosis NYHA 1,2

MORTALITY 0-1%

Moderate risk

1. Mitral stenosis NYHA 3/4
2. Aortic stenosis
3. Past MI
4. Marfans syndrome with normal aorta

MORTALITY 5-15%

High Risk

Women who should not get pregnant

1. Pulmonary hypertension - 30% to 50% MMR
   - with septal defects
     (as in Elsenmenger's syndrome)
   - without septal defects
2. Severe left ventricular outflow tract obstruction
3. Cyanotic heart disease
4. Marfan syndrome with aortic root involvement

In situations where women with high risk Become pregnant

There are many issues

1. High risk of MMR
2. The women even if she survives has a reduced life expectancy
3. Or suffer from limited physical capacity
4. Risk of passing on a congenital defect to the offspring – Marfran syndrome is a autosomal dominant condition

When women with those conditions present late in pregnancy meticulous monitoring, early hospitalization, O_2 and anticoagulants

Vaginal delivery is recommended

LSCS

1. Marfan syndrome
2. Aortic dissection
3. Women who fail to switch from warfar in to heparin at least 2 weeks before labor

ENDOCARDITIS PROPHYLAXIS

- INJ AMPICILLIN 2g STAT AND INJ GENTAMYCIN 1.5mg/kg IM or IV FOLLOWED BY ONE MORE DOSE OF AMPICILLIN 8 hours later
- HIGH RISK-Prosthetic valves, past history of SABE, Complex CCHD
- Medium risk-Rheumatic valvular heart disease, Hypertrophic cardiomyopathy, MVP with valve regurgitation

Low risk
No antibiotics prophylaxis

1. Physiologic, functional murmers
2. MVP without regurgitation
3. Mild TR
4. Coronary arterial disease – (old CABG)
5. Simple ASD
6. ASD,VSD or PDA (closed more than 6 months before)
7. Previous rheumatic fever
8. People with pacemakers or defibrillators

Medication guidelines during pregnancy

Anticoagulation

3 common agents used during pregnancy Unfractionated heparin(UH), low molecular weight Heparin (LMWH), warfarin

The 6th American college of chest physicians (ACCP) conference on antithrombolytic – Heparin during first trimester & after 35th week & warfarin during the middle period

Warfarin

Crosses the placental barrier can harm fetus
Safe during breast feeding

Warfarin embryopathy – 4 to 10 %

When used in 2nd or 3rd trimester – fetal CNS Abnormalities
Less when low dose <5mg of warfarin per day

Unfractionated Heparin

Does not cross the placenta, safe for fetus but maternal osteoporosis, hemorrhage, thrombocytopenia

Parental infusions should be stopped 4 hours before Cesarean section `

Disease Load

Heart disorders : 0.5-1% of all pregnancies
10% of maternal obstetric deaths

Incidence : Declining rheumatic heart disease
Increasing Congenital heart disease

Case 1 : Progress

Admitted to HDU
IV Lasix 20 mg stat and TID
Monitoring done including SPO2
Went into spontaneous labor
Augmented with Oxytocin
SBE Prophylaxis given
Episiotomy given 1.8 Kg live female baby with good apgar
Post delivery 10 units oxytocin IV infusion + 5 U IV bolus
Inj lasix 20 mg V given. Postnatal uneventful
Amifru continued +Tab Betaloc 25mg ½ -0-0
Baby and mother discharged on day 6
Advice : Continue digoxin 0.25mg 5 days in a week
Amifru 0.25mg 1-0-0
Tab Betaloc 25mg ½ -0-0

Case 2

Mrs. B 33 year old Primi gravida ML : 2 yrs

Referred from a NH of Bangalore at 36 wks GA

H/O breathlessness

Patient had regular check up at another NH

Heart not auscultated

Regular scans done

Admission Echo : Large subaortic VSD
Bidirectional shunt
Severe pulmonary hypertension
-– Eissenmenger syndrome

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Heart not auscultated

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Case 2: Findings

O/E GC Poor, Cyanosis ++ clubbing +
Pulse 70/min, BP 140/90, **SP02 : 84%**
CVS: Parasternal heave + Thrill + Loud pan systolic murmur +
RS: Rhonchi & creps +
PA: Uterus 32 wks irritable, Head at LP mobile, FHS +
PV : Cx admits tip of finger PP high
Hb : 12.7 **PCV : 38.4%** TC 10.02
NST : Reactive
Echo : Situs solitus Large VSD malaligned,
Bidirectional shunt
RA/RV/PA dilated, Coronary sinus dilated
Mild TR, Peak gradient 110mm
Severe PAH, EF : 55% - Eissenmenger Syndrome
U/S scan : SLIG of 33 wks ,1.9 Kg Liquor decreased, IUGR

Case 2 : Progress

Admitted to HDU
Contractions increased
SBE prophylaxis given
Posted for emergency LSCS
Ind : Elderly gravida with sever pulmonary hypertension
PIH /IUGR ,Acting uterus with unfavorable cx
1.84 Kg live female baby with good apgar
Liquor decreased but clear
Placental weight 350 gm
Post Op shifted to ICU
Thrombo prophylaxis started
Shifted to ward on 4th post op day.
Discharged with baby on day 7.
Contraception advised

Case 3 : History

Mrs. R 24 year old Primi gravida , 39 wks GA
Known case of RHD with MS
History of dyspnea class III since 7th month of pregnancy
Palpitation on exertion from VIII month
History of chest pain from 3 days

Patient was referred initially at 28 Wks with severe MS
Was advised admission
In laws not aware of the heart condition.
Patient refused treatment and went back to her town.
She was started on Tab Aten 25 mg 1-0-0
Now was referred back by her Gynec with above complaints

Severe MS

VIVUS® LIVE AND SHINE

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Millers Road, Bangalore 560 052, India.
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email: info@vivushealth.net website: www.vivushealth.net

TRANSTHORACIC ECHO REPORT

NAME	RASHMI R		DATE: 24 / 10 / 06
AGE	24 YEARS	TTE NUMBER	6798 - 06 / HC / V3
GENDER	FEMALE	MRD NUMBER	06-0004325

SCREENING ECHO

BSA (Sq.cm): 1.59

HR (BPM): 106

- NORMAL CHAMBER DIMENSIONS
- NO LEFT VENTRICULAR REGIONAL WALL MOTION ABNORMALITY
- MITRAL VALVE AREA 0.7 – 0.9sqcm, GRADIENT – 37 / 22 mmHg / TRIVIAL MR
- INTER ATRIAL SEPTUM & INTER VENTRICULAR SEPTUM INTACT
- PERICARDIUM NORMAL
- NO INTRA CARDIAC MASS
- TRIVIAL TR, PASP – 60mmHg
- LEFT VENTRICULAR EJECTION FRACTION – 55%

Dr. Rama D.V.

DR. KESHAVA R
CARDIOLOGIST

GS / SRK

Case 3 : Findings

GC Poor, Afebrile

Pulse 100/min, BP 120/80

CVS: MDM +

RS: creps +

Hb : 10.3

Rpt Echo :MVOA : 0.7 sq cm LVEF: 60%

BMV planned the next day

Patient went into spontaneous labor at mid night.

PA: Uterus 36wks, Head at LP FHS + 164/min

PV: Cx 60% effaced, 3 cm dilated Thick meconeum + Vx -3

Emergency BMV done in the night

Post BMV Echo : MVOA: 1.4 sq cm Good LV systolic function

Case 3 : Progress

Post BMV emergency LSCS

2.25 Kg male baby (IUGR) with cord round neck

Liquor thick meconeum stained

Baby shifted to NICU

Patient shifted to ICU.

Infective endocarditis and Rheumatic prophylaxis started

Started on Tab Aten ½ -0-1/2 & Tab Amifru 1-0-0

Further course uneventful.

Risk factors for cardiac failure during pregnancy

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

Predictors

- Prior cardiac events (heart failure, TIA, stroke)
- Prior arrhythmia
- NYHA functional class > 2 *or* cyanosis
- Valvular and outflow tract obstruction
- Aortic valve area < 1.5 cm^2
- Mitral valve area < 2 cm^2
- Left ventricular outflow tract peak gradient > 30 mm Hg
- Myocardial dysfunction (LVEF < 40%)

Management

- Proper positioning to optimize cardiac output
- Administration of drugs to optimize hemodynamic function
- Regulation of IV fluid with infusion pump
- Hemodynamic monitoring / Invasive Monitoring
- Epidural analgesia - Avoid hypotension
- Preferably Vaginal delivery
- Avoid lithotomy position during second stage of labor
- Assisted- Shortened II stage
- Anticipate auto transfusion following delivery
- Prevent prolonged labor/ destabilising iatrogenic factors,
- Antibiotic prophylaxis

Four general classes of medications for CCF
Diuretics, Vasodilators, Inotropics & Beta blockers.

Antibiotic prophylaxis

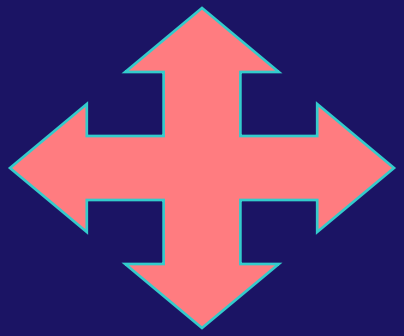
a. 2 gm ampicillin IV/plus
b. 1.5mg per kg gentamicin /IV prior to the procedure , followed by one more dose of ampicillin 8 hours later.

In the event of penicillin allergy 1 gm vancomycin IV can be substituted.

Contraception

Barrier

Hormonal



IUCD

Ligation

What is the Role of M.T.P. ??

MTP Indications

- Eisenmenger's syndrome.
- Marfan's syndrome with aortic involvement
- Pulmonary hypertension.
- Coarctation of aorta with valvular involvement.

Termination should be done before 12 Wks GA

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.

Conclusion

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

Referral to a higher centre especially in presence of moderate to severe disease.

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

INDICATIONS FOR MTP

- Eisenmenger syndrome
- Primary pulmonary hypertension
- NYHA Grade 3 / 4 heart disease
- Heart transplant
- Coarctation of aorta
- Marfans syndrome with aortic involvement
- CCHD
- Severe aortic stenosis

INDICATIONS FOR VALVULOPLASTY

- Progressively worsening cardiac status
- Progressive pulmonary hypertension
- Pulmonary edema
- Failure to respond to conservative treatment
- Massive hemoptysis
- Critical MS
- h/o CCF in last pregnancy

CONTRACEPTION

- Active involvement of male partner important
- Condoms for spacing and vasectomy for permanent sterilisation
- Low dose oral pills
- Progesterone only contraception
- Tubectomy

PRECONCEPTIONAL COUNSELLING

- Surgical correction before conception
- Longer rest periods mean adjustment of work atmosphere
- Avoid pregnancy in high risk lesions
- Change of anticoagulants
- Treat anaemia, reduce weight