

3 MEDICAL DISORDERS ASSOCIATED WITH PREGNANCY

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Authorised by: OGCCU
Review Team: OGCCU

3.2 Cardiac Disease and Pregnancy
Section B
Clinical Guidelines
King Edward Memorial Hospital
Perth Western Australia

3.2 CARDIAC DISEASE AND PREGNANCY

INTRODUCTION

Cardiac disease affects approximately 1% (range 0.1% to 4%) of pregnant women and accounts for 15% of pregnancy related to maternal morbidity.^{1,2}

The cause of cardiac disease is predominantly congenital heart disease in first world countries.³

Rheumatic cardiac disease is still an important cause of cardiac disease in developing countries and groups living in poor socio economic conditions.

Ischaemic heart disease in pregnancy, although still rare is becoming more prominent with a higher number of older women giving birth, obesity and the incidence of diabetes increasing.

Mortality of women with cardiac disease is low except in certain conditions such as Eisenmenger's syndrome, pulmonary hypertension and Marfan's syndrome with pathology of the aorta.

Pregnant women with cardiac disease are at risk of serious morbidity such as heart failure, arrhythmias and stroke.

If the woman has congenital heart disease the risk of fetal congenital heart disease varies between 6 to 50%.⁵

CLASSIFICATION OF CARDIAC DISEASE

Cardiac disease is classified according to functional status^{1,2}

1. Class 1 asymptomatic
2. Class 2 symptoms with greater than normal activity
3. Class 3 symptoms with normal activity
4. Class 4 symptoms at rest.
5. Significant pulmonary hypertension in pregnancy is a high risk situation. Preconception counselling should be undertaken with multidisciplinary specialists as to the risks posed by the pregnancy, including risk of maternal death. In the event of an unplanned pregnancy, early consultation is essential for assessment of maternal risk if the pregnancy continues and discussion of all options.

ANTENATAL

1. Ideally women with known cardiac disease will have been assessed in the preconception period.³
2. Careful screening with a physical examination should be performed on women who come from developing countries as the incidence of rheumatic heart disease is high in these areas.^{3,6}

3. Referral sent to obstetric physician for woman with:
 - A past history of cardiac disease
 - Symptoms or signs of cardiac disease

An ECG shall be done on referral; other investigations should be left to the obstetric physician.
4. Planning for birth should be undertaken by the Obstetric Medical team in consultation with other members of the multidisciplinary team which may include cardiologists, maternal fetal medicine specialists, anaesthetists and midwives.³ The obstetric management plan is to be documented on the MR 004.

Vaginal birth usually carries the lowest risk of complications, although ideally long and difficult labours should be avoided.
5. A woman with significant cardiac disease will require more frequent antenatal assessments. The suggested frequency is two weekly after 28 weeks gestation and weekly after 36 weeks gestation. At each assessment check for signs and symptoms of cardiac failure (e.g. auscultate lungs, check jugular venous pressure, pulse rate and rhythm).
6. In the case of congenital heart disease of the mother, increased nuchal thickness of the fetus at the 12 week gestation scan is associated with congenital cardiac disease (some studies suggest it may have a sensitivity of up to 90% for cardiac lesions). Careful fetal anatomy scanning at 20-24 weeks should be performed looking for cardiac abnormality.³
7. Prevent anaemia.
8. Encourage rest in the third trimester and admit to hospital if there is a major risk of cardiac failure. Admit if chest infection or cardiac failure occurs. Women with significant cardiac disease require thromboprophylaxis when admitted to hospital for bedrest in pregnancy, and may require it in the postpartum period.
9. Ask the obstetric physician's opinion on:
 - Endocarditis prophylaxis in those women with a history of rheumatic carditis or any valve abnormality.
 - Appropriate antibiotic cover for dental (penicillin) and surgical (amoxicillin and gentamicin) procedures.

ACUTE CARDIAC FAILURE

Treat with upright posture, oxygen, morphine and frusemide. Except in an emergency, digoxin is to be commenced by the obstetric physician and is rarely utilised. Postpartum, Angiotensin converting enzyme inhibitors including enalapril and ramipril may be used.

LABOUR

Labour is potentially the most dangerous period for many women as this is the period with the greatest increase in cardiac output.¹⁻³

Consider two groups:

Major Risk - those women with increased risk of cardiac failure - such as, women with Grade III and IV cardiac disease, mitral stenosis and atrial fibrillation.

Minor Risk - those women with relatively minimal disease - such as, women with Barlow's Syndrome or a small atrial septal defect.

MANAGEMENT IN LABOUR

1. **Notify:**
 - In all cases - obstetric registrar.

- In all major risk cases - Senior Obstetric Registrar, Obstetric Consultant, Obstetric Physician, Anaesthetic Registrar, Labour and Birth Suite Consultant Anaesthetist (the obstetric physician will indicate if he/she is to be notified).

2. In addition to routine labour **observations**:

- Respirations half-hourly. Women with a major cardiac risk must have half-hourly observations (pulse, respirations and blood pressure) and be nursed in a sitting or semi Fowler's position.
- Relevant cardiac examination at least 4 hourly.
- Strict fluid balance chart.
- Oxygen if required.
- Invasive haemodynamic monitoring and pulse oximetry if indicated.^{1,3}

3. **Antibiotic cover:**

Use in all women with
 valvular dysfunction (e.g. rheumatic heart disease) including mitral valve prolapse with significant regurgitation
 congenital heart disease (cyanotic and non-cyanotic)
 prosthetic valve(s) of any type
 previous infective endocarditis
 presence of surgically constructed systemic-pulmonary shunts or conduits
 hypertrophic cardiomyopathy.
 Start when labour commences or at induction (including cervical ripening).

For women NOT allergic to penicillins, betalactams or cephalosporin antibiotics	
Amoxicillin	Initially 2 grams intravenously. Thereafter 1 gram intravenously 8 hourly. An additional intravenous dose 6 hours after birth.
PLUS	
Gentamicin	5mg/kg intravenously once a day. If the birth is within 24 hours of commencing gentamicin no additional postnatal dose is required. If the birth is 24 hours or more after commencing antibiotics, a repeat dose of gentamicin 5mg/kg should be given.
NOTE	Amoxicillin based regimens may need alteration if a woman has required a course of antibiotic therapy in the preceding month or is on long term prophylactic penicillin therapy for rheumatic fever.

For Women Allergic to Penicillins, Betalactams or Cephalosporin Antibiotics	
Vancomycin	25mg/kg up to 1.5 grams intravenously over one hour twice a day. Dilution: 500mg vancomycin/100mL 0.9% sodium chloride.
PLUS	
Gentamicin	5mg/kg intravenously once a day If the birth is within 24 hours of commencing gentamicin no additional postnatal dose is required. If the birth is 24 hours or more after commencing antibiotics, a repeat dose of gentamicin 5mg/kg should be given.

Note: Continuation of antibiotic prophylaxis for 24 to 28 hours postnatally is not currently recommended although this may be indicated in certain clinical circumstances.

Women having an Elective/Non-elective Caesarean Birth	
Antibiotic prophylaxis at the time of induction in accordance with Clinical Guidelines, Section P 4.2 Antibiotic prophylaxis for Caesarean section An additional dose of cefazolin intravenously 6 hours post Caesarean section.	
PLUS	
Gentamicin	5mg/kg intravenously No additional dose of gentamicin is usually required.
NOTE	For women allergic to penicillins, betalactams or cephalosporin antibiotics replace cefazolin with vancomycin as per above recommendations. No additional dose of vancomycin post Caesarean section should be required.

Treat any suspected infection aggressively with parenteral antibiotics after blood and other appropriate cultures are taken.

Contact the on-call Clinical Microbiologist for specific advice.

4. **Epidural** analgesia may be used for obstetric indications. For high-risk women managing their pain well will decrease their cardiac workload during labour. The Anaesthetic Registrar must first discuss major risk cases with the Anaesthetic Consultant.³
5. Continuous electronic **fetal heart rate monitoring**.
6. Shorten the **second stage** if there is major risk of cardiac failure or hypertension. Intervention carries a risk of infection. Avoid routine mid cavity forceps birth.

7. Do not use ergometrine routinely. Use **oxytocin** by intravenous infusion in preference to oxytocin 10 units intramuscular or intravenous bolus. A suggested regime is oxytocin 60 units in 500ml Hartmann's solution by intravenous infusion (rate to be documented by attending obstetric physician). Rapid infusion of oxytocin may cause hypotension so, if given intravenously as a bolus, should be given slowly.³
8. If **acute cardiac failure** develops:
 - Sit the woman up and lower her legs
 - Administer oxygen
 - Intravenous frusemide 40mg and/or intravenous morphine 5mg to 10mg administered slowly
 - Consult the physician
9. Manage high-risk cases in Adult Special Care Unit (ACSU) **postpartum**. Haemodynamics do not return to normal for several days. Monitoring in ACSU should be continued until the maximum risk period has passed. This will depend on the nature of the cardiac disease.³

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