Title: Care Planning of Maternal Patients with Cardiac Disease

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Approved by:

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Although its prevalence is relatively low in the pregnant population, cardiac disease remains the leading cause of indirect maternal death. The incidence of pregnancy with cardiovascular disease is increasing. More women with congenital cardiac disease are now able to reach child bearing age, average maternal age is advancing, and there is an increased incidence of risk factors associated with acquired cardiac disease, including diabetes, smoking, hypertension, pre-eclampsia and multiple gestation pregnancies.

These guidelines form part of a formal system to ensure these patients are risk stratified, investigated and appropriately referred in a suitable time frame to allow optimisation of their cardiac condition and planning for subsequent delivery.

Purpose

- To identify higher risk maternal cardiac patients in the antenatal period
- To provide a structured referral pathway for such patients.
- To ensure timely investigations to aid planning of care in pregnancy.
- To prepare an individualised multidisciplinary care plan for these patients, including care in regional tertiary centre if appropriate.
- To help avoid difficulties with unanticipated emergency presentation.

Echocardiogram

All maternal patients with cardiac disease must have an outpatient echocardiogram requested, to coincide with 26-28 weeks gestation. Outpatient echocardiograms are requested via EPR (Powerchart). To confirm the request has been successfully received the Cardiorespiratory department can be contacted on extension 4073. The echocardiogram images and report will be available to review electronically via '**Echo CV Web'** found in **'**Applications and Resources' on the top right hand side of the intranet home screen. Once reviewed the echocardiogram report should then be emailed to the appropriate outpatient email addresses below.

It is the responsibility of the referring clinician to ensure patients have their echocardiogram reports reviewed and forwarded to the relevant clinics via email.

Criteria for referral

All maternal patients with cardiac disease will be categorised according to the WHO classification.

WHO I

- Uncomplicated, small or mild
  - Pulmonary stenosis
  - Patent Ductus Arteriosus
  - Mitral Valve Prolapse
- Successfully repaired simple lesions (atrial or ventricular septal defect, patent ductus arteriosus, anomalous pulmonary vein drainage)
- Atrial or ventricular ectopic beats, isolated

WHO II (if otherwise well and uncomplicated)

- Uncorrected atrial or ventricular septal defects
- Repaired tetralogy of Fallot
- Most arrhythmias

WHO II-III (depending on individual)

- Mild left ventricular impairment
- Hypertrophic cardiomyopathy
- Native or tissue valvular heart disease not considered WHO I or IV (including mild mitral stenosis, moderate aortic/mitral regurgitation, moderate aortic stenosis, moderate pulmonary stenosis and severe pulmonary regurgitation
- Marfan syndrome without aortic dilatation
- Aorta < 45 mm in aortic disease associated with bicuspid aortic valve
- Repaired coarctation

WHO III

- Mechanical valve
- Systemic right ventricle
- Fontan circulation
- Cyanotic heart disease (unrepaired)
- Other complex congenital heart disease
- Aortic dilatation 40-45mm in Marfan syndrome
- Aortic dilatation 45-50mm in aortic disease associated with bicuspid aortic valve

WHO IV

- Pulmonary arterial hypertension
- Severe systemic ventricular dysfunction (LVEF < 30 %, NYHA III-IV functional status - see appendix3)
- Previous peripartum cardiomyopathy with any residual impairment of left ventricular function
- Severe mitral stenosis, severe symptomatic aortic stenosis
- Marfan syndrome with aorta dilatation > 45 mm
- Aortic dilatation > 50 mm in aortic disease associated with bicuspid aortic valve
- Native severe coarctation

Patients fitting the WHO I classification should be referred to the **Bradford Anaesthetic High Risk Outpatient Clinic**

Patients fitting WHO II – IV classification should be referred to the **Leeds Obstetric Cardiac Clinic** and the Bradford Anaesthetic High Risk Outpatient Clinic should be informed of the referral, via email.

Method of referral

Patients with a cardiac condition fitting the **WHO I** classification will be referred to the **Bradford Anaesthetic High Risk Outpatient Clinic**. The referral should be made as soon as possible, via email.

Email : obstetric.AnaestheticClinic@bthft.nhs.uk

Referral should include the following details:

- Name
- Date of birth
- Hospital or NHS number
- Estimated due date
- Name of referring clinician
- Responsible Consultant Obstetrician
- Clinical indication for referral with relevant background information
- Any functional restriction or symptoms attributed to the condition
- Confirmation that echocardiogram requested (and proposed date of scan if known)
- Any additional requirements such as interpreter, transport, etc

The patient should be informed that they have been referred to the anaesthetic clinic, and told the reason for their referral.

The above email should also be used to communicate relevant echocardiogram results or updated multidisciplinary management plans. **It is the responsibility of the referring clinician to ensure echocardiogram reports are reviewed and forwarded to the relevant clinics via email.**

All patients categorised as **WHO II or greater** must be referred to the **Leeds Obstetric Cardiac Outpatient Clinic** via email below. In addition to this, the Bradford Anaesthetic High Risk Outpatients Clinic should be Cc'd into the email referral to ensure they are aware of the patient.

Email: leedsth-tr.obscardiac@nhs.net (Cc: obstetric.AnaestheticClinic@bthft.nhs.uk)

This referral should include all the information outlined above in addition to

- Patient's contact telephone number
- Patient's address
- Source of referral

The patient should be informed that they have been referred to the Leeds clinic, and told the reason for their referral.

The above emails should also be used to communicate relevant echocardiogram results or updated multidisciplinary management plans. **It is the responsibility of the referring clinician to ensure echocardiogram reports are reviewed and forwarded to the relevant clinics via email, or filed in the high risk folder on Labour Ward.**

The Leeds team will then make an assessment of the patient based on the information provided.

Late Presentation

If a patient presents late in their pregnancy (at greater than 28 weeks gestation) with a cardiac condition an urgent echocardiogram should be requested (either as an inpatient or outpatient) using EPR (Powerchart), confirmation of this request should be obtained via the Cardiorespiratory department on extension 4073. An urgent outpatient cardiology clinic referral should be made directly to Dr Steven Lindsey via email (steven.lindsey@bthft.nhs.uk), and the patient should also be referred urgently to the **Bradford Anaesthetic High Risk Clinic**. Due to the limited number of appointments available in clinic, this may require that patients are given an appointment to see the duty anaesthetist on the delivery suite.

Referral pathway

For referral pathway summary see appendix 1

The Bradford High Risk Anaesthetic Clinic

Referral emails will be reviewed by a Consultant Obstetric Anaesthetist. Appointments will be allocated depending on clinical priority for the high risk clinic, which is held twice per month. If we feel that a patient who has been referred does not need to be seen by the anaesthetist, we will contact the referring clinician or midwife to explain the decision. Ideally, we aim to see patients in a timely fashion, to allow enough time to organise any further investigations, specialist medical review or referral to a tertiary centre if needed.

In exceptional circumstances, patients may present late in their pregnancy. We will endeavour to facilitate anaesthetic review at short notice, however, due to the limited number of appointments available in clinic, this may require that patients are given an appointment to see the duty anaesthetist on the delivery suite.

The clinic is consultant led. Assessment will involve a detailed history and physical examination followed by discussion with patient (+/- partner) regarding her risks and medical management on the labour ward. The patient will be offered advice on labour analgesia and anaesthesia in case of operative delivery. A multidisciplinary care plan based on the best current evidence will be prepared for management in labour or in case of emergency.

This information will be documented on MEDWAY and details of the ‘cardiac management plan for delivery’ will be kept in the folder on labour ward. See appendix 2 for format of ‘cardiac management plan for delivery’.

The Obstetrician responsible for the patient will be contacted if a specialist medical referral is required. **The obstetric team remains responsible for referral as well as transfer of care to a specialist centre.**

If the woman fails to attend an appointment, the referring clinician or midwife will be informed by email. If necessary, a further appointment can then be arranged.

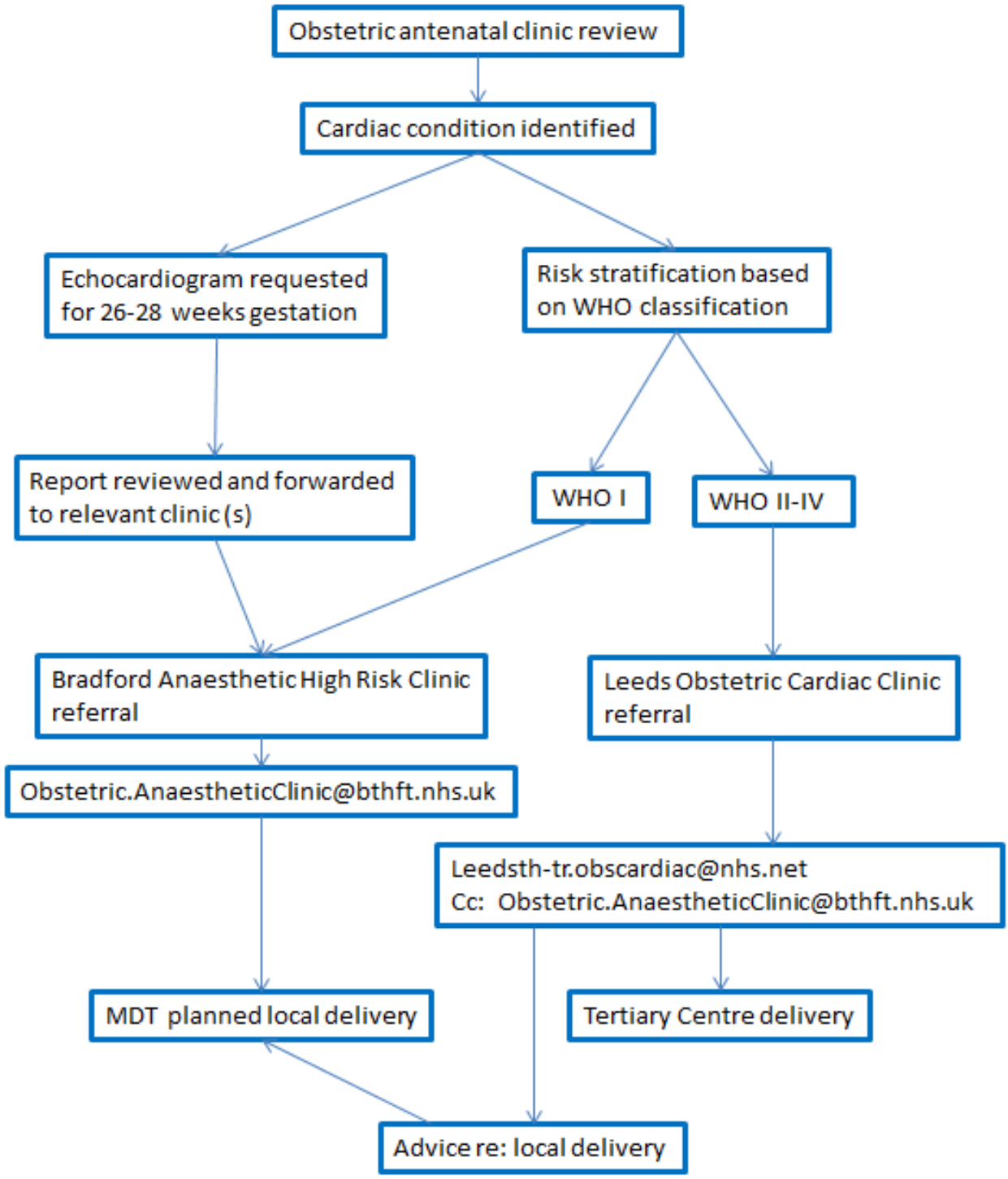
The Leeds Obstetric Cardiac Clinic

This is a joint consultant led clinic, with input from obstetric, anaesthetic and cardiology teams. It involves patient assessment with history, physical examination and relevant investigations. This is usually followed by discussion with the patient (+/- partner) regarding her risk and a plan will be made regarding patient optimization and planning of delivery. A summary of the assessment by the Leeds team should then available on MEDWAY. **Any other correspondence from Leeds must be uploaded to MEDWAY and a copy stored in the high risk folder on labour ward.**

Missed Opportunities

Clinicians who see a patient on labour ward who has not been seen in the high-risk clinic, but who fulfils any of the above criteria, should please inform Dr Sarah Cooper and complete an incident form.

Appendix 1 – referral pathway summary



Appendix 2 – Cardiac Management Plan for Delivery

Cardiac Management Plan for Delivery

Patient details/addressograph

Name.....
DOB.....
Hospital number.....
NHS number.....

Date.....

Due date .....

Cardiac Condition	Foetus	
.....	.....	
.....	.....	
.....	.....	
.....	PMH	
Obstetric history	.....	
.....	.....	
.....	.....	
.....	Medication	
.....	.....	
.....	.....	
Mode of delivery?	Elective LSCS/ Trial of vaginal delivery	
If admitted to Delivery suite please inform		
	Consultant Obstetrician on call Yes/No	Consultant Anaesthetist on call Yes/No
	Obstetric SpR on call Yes/No	Anaesthetic SpR on call Yes/No
Elective LSCS		
Additional monitoring Yes/No		
Anaesthetic technique	Epidural / Spinal / CSE / GA	
	.....	
	.....	
	.....	
IV Oxytocin bolus Yes/No	Dose.....	
	IV oxytocin infusion Yes/No	Dose and rate.....
	IM Oxytocin Yes/No	Dose .....
	VTE prophylaxis	TEDS/Flowtrons/LMWH
Vaginal delivery (1st stage)		
	Epidural for analgesia Yes/No	Timing.....
	Additional monitoring Yes/No	
	HDU chart Yes / No	
	VTE prophylaxis Yes /No	TEDS/Flowtrons
Vaginal delivery (2nd stage)		
	Normal Yes/No	
	Shortened Yes /No	Maximum duration..... mins
	Assisted Yes / No	
Vaginal delivery (3rd stage)		
	Normal active management Yes/ No	
	IV oxytocin bolus Yes/ No	Dose .....
	IM oxytocin bolus Yes/ No	Dose .....
	IV Oxytocin infusion Yes/ No	Dose and rate .....
	IM ergometrine Yes/ No	

Cardiac Management Plan for Delivery

Patient details/addressograph

Name.....
DOB.....
Hospital number.....
NHS number.....

Post delivery

HDU chart Yes/No

Additional monitoring Yes/ No .....

Elective HDU admission Yes/ No

LMWH Yes/ No

Additional medications Yes/ No .....

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.....

Recommended post-natal stay ..... days

Cardiac review post delivery Yes/ No

Contraceptive plans discussed Yes/ No

If patient presents in an **emergency requiring theatre**

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Additional comments

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Plan created by .....

Signed.....

Date .....

Appendix 3 – NYHA classification of functional status

NYHA Classification

Class I	Ordinary physical activity does not cause undue fatigue, palpitations, dyspnea and/or angina
Class II	Ordinary physical activity does cause undue fatigue, palpitations, dyspnea and/or angina
Class III	Less than ordinary physical activity causes undue fatigue, palpitations, dyspnea and/or angina
Class IV	Fatigue, palpitations, dyspnea and/or angina occur at rest

Criteria Committee of the New York Heart Association, 1964.