Clinical Guideline

MATERNAL CRITICAL CARE

SETTING
Central Delivery Suite, St Michael's Hospital

FOR STAFF
Medical, nursing and midwifery staff

PATIENTS
Patients requiring Maternal Critical Care

GUIDANCE

Maternal Critical Care on delivery suite provides an intermediate level of care between that on a ward and Intensive Care. This equates to women receiving Level 1 and 2 Care (High Dependency Care) on delivery suite (see Appendix 3 for levels of care). Women requiring multiple organ support or requiring mechanical ventilation (Level 3 Care) can be stabilised at St Michael's but then will need transfer to an intensive care unit (ICU).

Aims of Maternal Critical Care (MCC)

- The care of unwell or clinically unstable patients who require continuous monitoring but who do not meet the criteria for admission to Critical Care Facilities outside the maternity unit.
- To provide more frequent observation and monitoring than can be safely provided on the ward.
- To care for women who have been recognized as being unwell by Early Warning Scoring. (See Guidance for using Maternity Obstetric Early Warning (MOEWS) Chart on reverse of MOEWS Chart)
- To stabilize a patient before transfer to Critical Care Facilities outside the maternity unit.
- To provide individualized multidisciplinary care

Criteria for women requiring Maternal Critical care

This is not an exclusive list and eligibility for maternal critical care will ultimately be dependent on the clinical needs of the woman and be decided by the multidisciplinary team of obstetricians, anaesthetists and senior midwives.

- Severe pre-eclampsia (see CDS guideline PreEclampsia, Eclampsia and Severe Hypertension)
- Diagnosed HELLP Syndrome (Haemolysis, Elevated Liver Enzymes, Low Platelets)
- Diagnosed Disseminated Intravascular Coagulopathy (DIC)
- Haemorrhage causing maternal compromise.
- Suspected or diagnosed pulmonary embolism (with cardiorespiratory compromise) or pulmonary oedema.
- Use of invasive monitoring: arterial line or central venous pressure monitoring
- Signs of shock (septic, hypovolaemic or cardiogenic) or anaphylaxis.
- Any medical or surgical condition that compromises the maternal condition e.g. peripartum care of a woman with cardiac disease
Place of Care

Any delivery room on CDS at St Michael’s can be used as a Critical Care area; this may include room 4 and recovery if two patients are requiring similar levels of care. Where CDS capacity allows use rooms 1, 2, 3, 5 & 6 in preference to other delivery rooms. Critical Care equipment is readily available within the unit (see Appendix 1 for equipment needed and location).

Staff responsibilities when caring for women requiring Maternal Critical care

All staff

- Women requiring maternal critical care must be discussed with the senior obstetric trainee (ST3 or above) and coordinating midwife.
- The obstetric and anaesthetic consultants should be informed early of any changes in clinical condition and involved in all management decisions.
- Clinical decisions should always be made jointly by obstetricians, anaesthetists and midwives.
- Regular, clearly written clinical notes must be documented in the women’s notes and communicated to the obstetric team i.e. obstetrician, midwife and anaesthetist.
- There should be a detailed handover between clinicians at the end of each shift.

Medical Staff (Obstetricians and Anaesthetists)

- A management plan should be formulated to include as a minimum: - fluid balance, analgesia, frequency of observations and type of monitoring required.
- The obstetric and anaesthetic registrar (ST3 or above) will be jointly responsible for the immediate care of these women liaising with the appropriate consultants.
- Women requiring critical care should be jointly reviewed at each labour ward round, more frequently if unstable; and clinically assessed where required.
- Senior clinicians from other disciplines should be involved early in the care of women with significant system compromise (see below) after discussion with the Obstetric Consultant.

Midwifery/Nursing staff

- Midwives caring for women requiring critical care must be trained to do so or under the supervision of a critical care trained midwife (see below).
- Observations will be recorded on a specialized observation chart according to the frequency documented in the plan of care.
- Women receiving critical care must be cared for (by the midwife) on a 1:1 or 1:2 basis depending on clinical need.
- Midwives should ensure that women are treated with privacy and dignity in accordance to the principles of ‘Essence of Care’. They are responsible for the assessment of Waterlow scores and the care of pressure areas.
- After delivery the midwife should ensure that there is opportunity for skin-to-skin contact with the baby and the mother encouraged to breastfeed. If the baby is admitted to NICU then support to express breastmilk will be offered.
Nutrition

- Nutrition will be provided as soon as is safe, and women should be allowed to eat when there are signs of bowel activity (bowel sounds present on auscultation) or once there is no immediate risk of operative intervention.
- Women who are unable to eat for > 8 hours should be provided nutrition as per the BRI Intensive Care Nutrition Guideline http://nww.avon.nhs.uk/dms/Download.aspx?r=2&did=4968&f=FeedingProtocolForCriticalCare-4.pdf

Process for ensuring the availability of medical equipment in line with National Guidance

The equipment required to provide safe and effective MCC is contained in the MCC equipment list (appendix 1), the equipment is checked on a monthly basis by a member of the CDS staff.

Involvement of clinicians outside of the maternity service

There are a number of conditions that may require involvement of specialist clinicians outside of the maternity service for example; acute renal failure, acute respiratory disorders, cardiac failure, and neurological disorders.

Advice must be sought at the appropriate clinical level; as a minimum Registrar to Registrar (ST 3 or above) referral should occur; with early escalation to the relevant consultant in urgent situations.

In all cases the patient’s named consultant obstetrician or the consultant obstetrician on call will be informed of the need to involve other specialists.

Ultrasound/ radiology

The need for urgent ultrasound/ X-ray imaging will be discussed directly with the ultrasound department at St Michael’s, if unsure of the best mode of investigation the case should be discussed with Dr John Hughes or the Consultant Radiologist on call.

Where urgent CT/MRI is required the case should be discussed with the coordinating radiographer at the BRI, urgent request faxed and the appropriate radiologist contacted

Plain X-rays

It is BRI policy that plain X-rays are not routinely reported by a radiologist. It is the responsibility of the requesting clinician to ensure that X-rays are reviewed by a competent doctor; it is strongly advised that a formal radiology report is requested for all Chest and Abdominal X-rays, contact the radiology hub on extension 23141.

Sepsis

Obstetric patients can deteriorate rapidly when they become infected as the maternal immune system is suppressed. Early intervention with the appropriate antibiotic therapy should be commenced and microbiological advice sought if the patient fails to respond or deteriorates. Tel ext 22539 in normal working hours or contact the Microbiologist on call via switchboard (ext 100)

Non Obstetric Illness

Where clinical assessment of a patient reveals a non-obstetric cause for symptoms early second opinion should be sought

- Urgent medical or surgical opinion is requested by contacting the relevant registrar on call via switchboard (dial 100 and specify the specialty required)
• Urgent Neurology advice is available by contacting the neurology specialist registrar on call at North Bristol (dial 770 for NBT operator). Less urgent referrals should be faxed to Dr Sieradzan’s secretary at Frenchay on 0117 3406672 (tel. 0117 3403954 to confirm referral received).

• Renal Physicians: the nephrology unit is based at Southmead Hospital. Dr Steven Harper is the nephrology liaison via the maternal medicine clinic at St Michael’s and can be contacted via switchboard. Out of normal working hours or in an emergency contact the on-call nephrologist via the NBT switchboard 770.

• Cardiology advice: Dr Graham Stuart and Dr Steph Curtis (Consultant cardiologists) from the Grown-Up Congenital Heart (GUCH) team provide cardiology advice to the maternal medicine clinic; they can be contacted directly for advice via switchboard. If out of hours contact the adult cardiology registrar on-call via switchboard.

• Haematology advice: Amanda Clark (Consultant haematologist) provides haematology advice to the maternal medicine clinic; she can be contacted directly via switchboard. In the event of a major Obstetric Haemorrhage the Consultant haematologist on-call should be contacted via switchboard.

• Respiratory advice: contact Consultant involved in their care. Respiratory registrar available 9-5 on bleep 6059; out of hours contact medical registrar on call.

• If the reason for deterioration is a pre-existing medical disorder for which the patient is under consultant care then liaise with that consultant’s team directly.

Admission to Critical Care Facilities outside of the Maternity Unit – criteria for and transfer arrangements

Criteria: Women who require more than one major organ support, mechanical ventilation or those who need intervention, management and observations greater than can be provided within the delivery suite.

Critical Care facilities include Adult Intensive Care Unit (I.C.U.), Cardiac Intensive Care Unit (C.I.C.U.), Coronary Care Unit (C.C.U) and Paediatric Intensive Care Unit (P.I.C.U.). The choice of Critical Care facility will depend on the age and the underlying diagnosis/ medical history of the woman.

Transfer arrangements:
• The Consultant obstetrician and Consultant general/obstetric anaesthetist will liaise with the on call ICU consultant regarding transfer and agree on the most appropriate location of care for an individual patient.
• A named lead obstetric consultant will be identified to assist in the management of the woman in Critical Care (this may not be the consultant under whom the patient is booked).
• Communication.
  o The obstetric/ anaesthetic consultant lead will make contact with ICU via the consultant ‘On Call’ for that day.
  o There is an ICU consultant ‘On Call’ 24 hours a day via ICU. The nurse’s station is on extension 22793.
  o The patients name should remain on the CDS workload board as an outlier, and
should be recorded on the CDS ward round sheet, to be formally handed over at each change of team.

- Intensive care should start when it is needed and not be delayed until admission to ICU; immediate care should be provided in Obstetric theatre with early involvement of the ICU Consultant.
- Women are transferred in an ambulance accompanied by a minimum of 2 trained attendants: a medical practitioner with appropriate training - an anaesthetist or obstetrician (competent in airway care, ventilation, resuscitation and other organ support) and a paramedic or anaesthetic assistant. The midwife and obstetrician may in addition be able to accompany the woman and her attendants.
- Both sets of notes (buff and yellow hand held) will be taken to ICU.
- Notes should be photocopied and an incident form completed as soon as is practical.

If the woman is ventilated the anaesthetist must obtain the transport ventilator from Intensive Care. See Transfer to Critical Care Facilities outside of the Maternity Unit flow chart (Appendix 3)

Obstetric responsibility for patient on ICU

- The named consultant lead and an experienced midwife will liaise directly with ICU to advise / assist with the planning of on – going care.
- Ongoing advice and support may be required more frequently than daily; the timing will depend on the severity of the woman’s condition. Ward rounds on ICU are 08.30 and 17.00. The named obstetrician should verbally handover the care of the patient to the consultant on-call for ongoing out of hour’s obstetric support.
- The on-call obstetric team (ST3 or above) should contact ICU for an update of the patient’s condition after the 22.00 ward round and inform the consultant on call of their clinical status (as part of the night time telephone ward round).

Child Protection

- When a mother is transferred to Critical Care Facilities outside of the Maternity Unit the baby should be transferred to the neonatal unit for ongoing care.
- The baby should not be released to its father unless the parents are married or the father has legally registered the birth.

Discharge from Critical Care Facilities outside of the Maternity Unit

- Transfer from Critical Care Facilities outside of the Maternity Unit back to CDS will be a joint decision between the ICU consultant, the obstetric consultant, obstetric anaesthetic consultant, the midwife & nurse co-ordinators on CDS and ICU.
- Transfer will be by ambulance escorted by ICU staff along with all the woman’s notes (Buff and hand held). There will be a verbal hand over of care and a hand written discharge summary from the ICU medical staff.
- If ongoing care is required in a non-obstetric setting this decision will be made between the ICU consultant, the obstetric consultant, and consultant from the non-obstetric specialty involved in the patients care.
- Where suitable women should transfer back to St Michael’s at the earliest opportunity to be reunited with baby.
**Discharge to non-maternity wards**

- Where the maternal condition dictates that ongoing care is required at the BRI communication will be maintained
  - A named non-obstetric consultant will be identified and will liaise with the named obstetrician.
  - The patients name will remain on the CDS workload board as an outlier to be formally handed over at each change of staff.
  - The named obstetrician is responsible for ensuring regular obstetric reviews of the patient as determined by the clinical condition.
  - The community midwifery office at St Michael's (ext. 25241) should be informed of the patient’s transfer to ensure Midwifery checks are undertaken.

- If the woman is discharged home from a non-obstetric ward the labour ward co-ordinator must be informed to ensure the community midwife is notified of discharge.

**Discharge criteria from Maternal Critical Care**

- The discharge of women from critical care should be a joint decision between the coordinating CDS midwife, senior obstetrician and anaesthetist. (ST3 and above or consultant)
- Women should be discharged from critical care when the condition that led to the escalation of care has been adequately treated.
- Care should be stepped down gradually with reduced frequency of observation and normalisation to the level of care available on the postnatal ward to which they are being transferred.

**Transfer to the post natal wards**

- The woman is alert and orientated
- There are no signs of haemorrhage.
- The uterus is well contracted and the lochia is normal
- Any wound is clean and dry.
- Temperature, pulse, blood pressure and respirations are within normal limits and have been documented. Intensive / invasive monitoring is no longer required and 4 hourly recording of vital signs using the MOEWS chart is considered appropriate.
- Urine output is normal and if catheterised on free drainage.
- The woman is comfortable and adequate analgesia has been prescribed.
- Anti-embolic stockings worn as per guidelines for thromboprophylaxis, with Clexane as indicated.
- On going medication has been prescribed.
- Documentation has been completed.
- A bed has been booked on the postnatal wards.
- There has been a verbal hand over to the receiving ward – midwife to midwife.
- An on-going plan of care has been clearly written by the obstetrician.
Documentation Requirements

- Care will be recorded in the relevant section of the handheld record / partogram for women receiving Maternal Critical Care on CDS; this will include the management plan for women on escalation to Maternal Critical Care as well as all medical and midwifery assessments.
- The indication for maternal critical care will be recorded on the MCC Observation Chart.
- Observations will be recorded on a specialized observation chart according to the frequency documented in the plan of care.
- Where clinicians outside of the maternity service are involved in the provision of MCC the indication for their involvement, their clinical assessment and appropriate management plan will be documented in the patient’s record.
- If women require transfer to Critical Care Facilities outside of the maternity service the indication for this will be recorded in the maternity records and documentation completed as per the Handover of Care Guideline.

Training in Maternal Critical Care

All staff providing maternal critical care should be trained according to the unit Training Needs Analysis.

Monitoring Process

<table>
<thead>
<tr>
<th>Process</th>
<th>Tool</th>
<th>Responsibility of</th>
<th>Frequency of review</th>
<th>Responsibility for: (plus timescales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases with recurring themes, rare diagnosis or those which present potential significant learning will be reviewed at the maternal morbidity meetings</td>
<td>Case Note review</td>
<td>Maternal Morbidity</td>
<td>Annual</td>
<td>Maternal Morbidity</td>
</tr>
<tr>
<td>Documentation of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Involvement of staff from outside of the maternity services</td>
<td>Audit of case notes of all women requiring transfer to Critical Care Facilities at the BRI</td>
<td>MCCWP</td>
<td>Annual</td>
<td>Presented to Women’s Services Clinical Audit Meeting</td>
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The above table outlines the minimum requirements to be audited; additional audits will be commissioned in response to deficiencies identified within the service through morbidity and mortality reviews/benchmark data provided by CHKS or in response to national initiatives e.g. NICE, RCOG guidelines, CNST standards.
Version 2.2

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Consultation
MCC working party

Ratified by
MCC Working Party

Date May 2012
Review May 2015

REFERENCES
NHS Guidelines for Admission to High Dependency Units – Department of Health paragraph 2.3 (1996)
Intensive Care Society Guidelines for the Transport of Critically Ill Adult. London 2002
SAFETY

No unusual or unexpected safety concerns (to staff or patient)

QUERIES

Contact Emma Treloar, Consultant Obstetrician, bleep 2789; Lisa Damsell, Matron CDS, extension 25211; Senior Obstetrician or Coordinating Midwife on CDS, extension 25214.
Appendix 1

Equipment requirements as per OAA/AAGBI Guidelines for Obstetric Anaesthesia Services

All delivery rooms have:
- Oxygen
- Suction equipment
- Non invasive blood pressure monitoring equipment
- Tympanic thermometer
- Access to resuscitation equipment

The following are readily available:
- ECG monitoring
- Pulse oximetry
- Invasive monitoring
- PCA equipment
- Infusion devices

Support equipment is available when required:
- Rapid infuser
- Warm air blankets
- Difficult airway trolley
- Infusion pumps

It is the responsibility of staff members to ensure that they hold the necessary competencies for the use of the above

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen saturation</td>
<td>Store room CDS</td>
</tr>
<tr>
<td>HDU /Transport integrated monitor: ECG, SaO2, NIBP, IABP, CVP</td>
<td>Store Room CDS</td>
</tr>
<tr>
<td>Warm Air Blanket</td>
<td>Anaesthetic Room CDS</td>
</tr>
<tr>
<td>Rapid Infuser</td>
<td>Anaesthetic Room CDS</td>
</tr>
<tr>
<td>Difficult Airway Trolley</td>
<td>Theatre 2 Delivery Suite</td>
</tr>
<tr>
<td>Infusion Pumps:</td>
<td>Store room CDS</td>
</tr>
<tr>
<td>• Alaris (volumetric)</td>
<td></td>
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<tr>
<td>• Graseby (syringe)</td>
<td></td>
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<tr>
<td>• Epidural</td>
<td></td>
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<tr>
<td>Cardiac Arrest Trolley</td>
<td>Store room CDS</td>
</tr>
<tr>
<td>Obstetric Emergency Trolley</td>
<td>Store room CDS</td>
</tr>
<tr>
<td>12 lead ECG Machine</td>
<td>Store room CDS</td>
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</table>
Appendix 2

**LOCObS**

**LEVELS OF CARE IN OBSTETRICS**

**LEVEL 0**

Routine obstetric care without complications e.g.:
- normal labour and delivery
- induction of labour
- assessment potential early labour
- instrumental delivery in labour room

**LEVEL 1**

More observation and/or monitoring needed e.g.:
- augmentation of labour
- epidural analgesia for labour
- Caesarean section (all categories) including recovery for up to one hour after
- other obstetric related surgery including recovery for up to one hour after
- instrumental delivery in theatre
- evidence systemic infection (pyrexia and/or raised white cell count)
- chronic medical condition at risk of deterioration but not needing organ support
- risk of massive haemorrhage
- mild to moderate pre-eclampsia
- CTG (cardiotocograph) giving cause for concern sufficient to require fetal blood sampling
- Any other problem requiring observations and/or blood tests more frequently than routine

**LEVEL 2** (roughly equivalent to "high dependency")

Intensive monitoring and/or support of one organ system e.g.:
- continuous oxygen for > ½ hour
- infusion of one antihypertensive drug to control hypertension in pre-eclampsia
- invasive arterial and/or central venous blood pressure monitoring
- blood loss sufficient to need 1000ml any IV fluid (or 20% blood volume) within 20 minutes
- transfusion any blood products
- fluid restriction protocol for pre-eclampsia
- hourly urine output
- magnesium infusion to treat or reduce risk of eclamptic fits
- non invasive ventilation

**LEVEL 3** (roughly equivalent to “intensive care”)

Advanced airway support alone – or support of two or more organ systems e.g.:
- Invasive ventilation (including continued ventilation after surgery whilst waiting for ICU bed)
- Infusion >1 antihypertensive or other vasoactive drug not including magnesium
- Combination massive haemorrhage and severe pre-eclampsia

**A Critical Care patient is one requiring level 2 or level 3 care**

**SUGGESTED ADDENDUM FOR BABY CARE**

Letter added for each delivered baby being cared for with the mother
- N = Normal baby
- T = Transitional care baby

**e.g. level 2NN = healthy twins being cared for with mother who needs level 2 care**

Adapted with permission from Sarah Wheatly, Consultant Anaesthetist, South Manchester.
Flow Chart for transfer of an Obstetric Patient from Delivery Suite to Critical Care Facilities outside of the Maternity Unit

Patient identified as requiring transfer to Critical Care Facilities outside of the Maternity Unit following assessment by Consultant Obstetrician and Obstetric Anaesthetist
i.e. needing ventilatory support or support of more than one organ system

**Arrange Ambulance Transfer - request blue light transfer**
(Bristol Paramedic Ambulance 9729020)
(Ambulance Control 01454 455433)

**Personnel required for safe transfer of patient**
Minimum 2 attendants
- 1 paramedic/technician familiar with equipment
- Medical practitioner with training in intensive care medicine, anaesthesia, or acute medical speciality
- Midwife should accompany patient
- Take both hand-held notes and Buff notes

**Discussed with Consultant On Call for Adult Intensive Care**
(contact via switchboard)
(Direct Line to Nurses station 22793)

**Patient Accepted and Bed available**

**To remain ventilated under direct care of Anaesthetist in CDS theatre/ until transfer possible**

**Obtain transport ventilator from ITU.**

**Liaison between Consultant Staff & S.O.M. to plan ongoing place of care**