Maternal critical care

Care worthy of the name?

Do you manage critically ill mothers during pregnancy and labour? Are you frustrated with deficiencies in the quality of care? Are we compromising our standards of care by allowing sick mothers to stay on the maternity unit (compared with the care given on a critical care unit with appropriately trained staff and facilities)? In this article we address the scope of the problem, the current evidence and areas for improvement emphasising the key role of anaesthetists in implementing changes.

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Increasing numbers of sick mothers with more complex problems are being seen on isolated maternal critical care (MCC) units. These units operate outside the standards and guidelines of the critical care environment and manage a wide spectrum of critically ill obstetric patients, and mothers who may or may not have had a 'high risk pregnancy'. The obstetric anaesthetist is the key player in developing a model of care that works in individual hospitals linking into and organising the necessary groups.

Scope of the problem

Increasing numbers

The latest confidential enquiry[1] shows a significant number of deaths associated with suboptimal care of the critically ill mother and, in particular, an increase in deaths from sepsis and genital tract infection. Between 2006–08 there were 29 deaths from sepsis, including 13 direct deaths from *Streptococcus pyogenes* genital tract sepsis in pregnancy. Lack of recognition of the signs of sepsis and a lack of guidelines on its management were both identified as problems in the report. Risk factors for sepsis include obesity, diabetes, anaemia, history of pelvic infection or Group B Streptococcal infection and black or minority ethnic origin. In April 2012, the RCOG published 'green top guidelines' on managing bacterial sepsis during and following pregnancy[2,3] on a background of increasing national and international awareness of the seriousness of the problem in the population as a whole. The Sepsis group[4] and the Surviving Sepsis Campaign (SSC), developed by the European Society of Critical Care Medicine, the International Sepsis Forum, and the Society of Critical Care Medicine, have identified the problem to be more common than acute coronary syndrome and more deadly than stroke. These groups are working to meet the challenges of sepsis and to improve its management, diagnosis, and treatment in all patients including obstetrics.

More complex cases

Clinicians are now facing increasingly complex medical and obstetric problems. For every death there are at least nine women who develop severe maternal morbidity. The Intensive Care National Audit and Research Centre (ICNARC) has been collecting data on critical care admissions of pregnant women since 2006. The latest report[5] shows that 11.4% (513) women aged 16–50 years admitted to ICU in the UK were obstetric patients and the majority were 'recently pregnant' (418) versus 'currently pregnant' (95). The main obstetric cause of ICU admission in 'recently pregnant' was haemorrhage, and pneumonia was the major reason in 'currently pregnant'. The ICNARC numbers translate to 2.4 ICU admissions/1,000 maternities. Moreover, the incidence of Level 2 care (ICS classification) can be up to 20 times Level 3 care needs[1] and this is usually delivered within the maternity unit. The Scottish Confidential Audit of Severe Maternal Morbidity (SCASMM)[6] identified 1.4 ICU admissions/1,000 live births and a rate of serious morbidity of 5.7/1,000 deliveries.

Critical care training for midwives, obstetricians and obstetric anaesthetists

Midwives are no longer nurses; most midwives in practice now come via a direct entry degree course of three to four years. There is a strong focus on studying 'normality' in pregnant women, and the undergraduate curriculum does not address the specialised training required for looking after critically ill parturients. This is compounded by a national shortage of midwives and a higher proportion of maternity support workers.

Early specialisation and 'streamlining' of obstetric training in the UK add to the issue as obstetric trainees do little general medicine training. After two years of foundation training, trainees apply for a seven-year 'run-through' in obstetrics. There is minimal MCC in the obstetric core curriculum.

Historically, obstetric anaesthetists have undergone training in intensive care medicine (ICM) similar to colleagues taking up posts in smaller intensive care units. In August 2012 it became possible to train solely in ICM and, although consultant obstetric anaesthetists will still receive training in ICM, they will not be trained to deliver the same level of critical care as future intensivists. Interestingly, approximately half of those appointed to the new ICM training posts this summer did not come from an anaesthetic background and therefore may be unfamiliar with current obstetric anaesthetic practice.

Maternal critical care (MCC) is a sub-specialty where many disciplines are required to define their remit, limitations and professional standards. Clinical staff looking after such a unit should be suitably trained, maintain CPD, have allocated time in their job plans and work with the rest of the hospital's critical care service.

The former Joint Standing Committee's document, 'Providing Equity of Critical and Maternity Care for the Critically Ill Pregnant or Recently Pregnant Woman' PECCW, aimed to summarise existing standards in not one but many models of care[7] to take into account local variation in training and facilities. This publication recognised various models of care working throughout the country but underlined the need to ensure standards are being met.

The current evidence

MCC unit models

The Department of Health's document 'Comprehensive Critical Care'[8] in 2000 stated that care of the critically ill patient should be of a high standard irrespective of the location of the patient within the hospital–the so called 'critical care without walls'. Unfortunately, the funding and initiatives for critical care teaching training and audit were not taken up by obstetrics in many hospitals. Maternity units often function as a separate site within the hospital and have their own guidelines, managing the majority of maternal critical care cases. There are many models of care depending on the size of unit, numbers of high risk patients, facilities and staff training. Some units transfer all critically ill patients, some manage certain cases especially pre-eclampsia and massive haemorrhage. Often larger centres (Liverpool, Birmingham, Leeds) manage the vast majority of critically ill cases (around 5% of deliveries) in their own units.

Auditing standards – a pilot scheme in Yorkshire

Critical Care Networks exist in 27 regions throughout the country. Key intensive care unit members from the various trusts meet regularly to discuss critical care issues and changes on a regional basis (although this is currently under review with the imminent changes in NHS funding).

Since October 2010 the West Yorkshire Critical Care Network has supported a maternal critical care group that meets four times a year, chaired by an obstetric anaesthetist (AQ), MCC@WYCCN. Key representation within the group includes obstetric anaesthetists, obstetricians, intensivists, midwives, critical care and outreach nurses and clinical educators from each trust with links to the maternity forum of NHS network and Chief Nurses group. Earlier in the year the Yorkshire and Humber NHS Network supported the MCC@WYCCN in a benchmark of important sections from PECCW including: examination of physiological observations (MEWS); response strategy (track and trigger); handover of care on ward; competency trained staff; obstetric input on general ICU; documentation of multidisciplinary working; care bundles, e.g. sepsis care bundle; separation of mother and baby; VTE prophylaxis; and patient feedback on critical care experience. An audit was carried out in the 15 trusts within Yorkshire and Humber NHS resulting in the following action plans/ recommendations being developed:

- Improved education around sepsis.
- Ensure early warning scores and protocols for escalation are in place and regular audit of obstetric areas to encourage compliance.
- Encourage obstetric staff to attend a course with ABCDE approach to recognising acutely ill patients, e.g. ALERT, AIM, PROMPT, REACTS.
- Promote links between obstetric departments and critical care/ outreach.

Importantly, in recognition of the lack of staff with HDU competency training identified generally throughout the region, the group are working on MCC

competency teaching, training and audit documentation and policy, to be ratified on a regional basis based on the new national HDU competencies published in December 2012.

Areas for improvement

Critical care funding

Each designated critical care unit within a trust records the level of care for a given patient using the critical care minimum dataset, CCMDS. This is roughly translated into PBR, Payment by Results. Payments in obstetrics are different and are in broad groups – for vaginal delivery, caesarean section and high risk pregnancy – but there is no breakdown for the level or intensity of nursing care in a severely ill patient. Imminent changes to the NHS funding may provide an opportunity to identify a revenue stream to establish and support high quality maternal critical care teaching and training. Maternity services constitute one of the four new NHS Senates and the maternity pathway tariff for mothers requiring 'intensive postnatal care' has been highlighted in www.dh.gov.uk/en/Publicationsandstatistic/publications/PublicatinPolicyAndGuidance/obstetrics. The new tariff aims to encourage normal births but, in recognition of the high risk patients, an extra £825 is available if they require intensive postnatal care.

Achieving 'designation' for any maternal critical care unit would be difficult as certain numbers and levels of intervention (e.g. invasive lines) are required (less frequently used in obstetrics). Other units, e.g. coronary care, receive extra funding without 'designation' and this method may be more applicable to MCC. Whatever the route, anaesthetists are a crucial link between the specialties of obstetrics and intensive care and should be involved in MCC funding discussions both at national and local levels.

Workforce planning

A trust MCC forum should be established in the delivery suite including clinical and managerial leads and an implementation team with documentation and policy to span both. There should also be clear links with intensive care and outreach. MCC numbers should be audited and outcomes on all levels including analysis of critical incidents. Regular multidisciplinary meetings are required to review severe maternal morbidity cases to ensure that resources, such as HDU equipment, are in place. At least one member of the nursing/midwifery staff should be available per shift and free to focus complete attention on a sick mother. Often this senior member of staff is of experience similar to a team leader and under pressure to perform a dual role. This should be discouraged. Identifying a lead obstetrician for MCC is key with combined ward rounds or clinics for high risk patients and those returning after critical illness in pregnancy or childbirth.

Teaching and training

Obstetric anaesthetists have several resources to maintain their skills in MCC such as MOET, MOSES and PROMPT courses, the Obstetric Anaesthetists Association (OAA) and the Royal College of Anaesthetists (RCoA) study days on MCC and several simulator based regional courses on obstetric anaesthesia. However, the training deficits are often at the midwifery and nursing level on our maternity wards (our obstetric anaesthetic trainees will verify this) and we need to address this.

This should include training in early recognition of acutely ill and deteriorating patients and their initial resuscitation. Midwives should be competent in recording MEOWS as suggested by NICE[9] and escalating care using the track and trigger system. Here the link between the obstetric anaesthetist, the intensivist with obstetric interest, obstetricians, midwifery and critical care staff is important.

Only a few units around the country have HDU trained staff available to care for sick mothers. The Scottish Multiprofessional Maternity Development Group (SMMDG) (www.scottishmaternity.org) has been developed to co-ordinate training (REACTS) for all healthcare professionals who participate in the care of pregnant women. We need to encourage our obstetric colleagues to develop an MCC sub-specialty interest with rotations to ICU during their

Figure 1 Recent literature in maternal critical care

training. The obstetric anaesthetist can liaise with critical care and outreach to support midwifery in establishing critical care teaching and training as well as helping to develop their own in-house courses. The PECCW document provides a suggested core curriculum and courses, appendices 8 and 9.

A university course

The Care of the Critically Ill Childbearing Mother (CCICM) at Leeds University is a unique postgraduate course in the UK specifically for midwives interested in MCC. The PGCert comprises pre-course preparation material in the form of video podcasts, followed by a training day with simulated scenarios, case discussions and resuscitation training including obstetricians, midwives and anaesthetists. Funding for midwives comes from the strategic health authority. The same course material is mandatory training for trainee obstetricians in the Yorkshire obstetric postgraduate training scheme. The course provides a theoretical basis for clinical skills training without too much initial study leave, but requires continued commitment and investment by all concerned.

Summary

A safe environment is fundamental to optimal patient care. In the case of patients requiring a high level of organ support, Level 3 care should be provided in a general intensive care unit. Normal mothers should be cared for in a 'close to normal' environment. This article considers ways to manage the sick obstetric patient requiring Level 1 or 2 care. Suitably trained obstetric anaesthetists are best placed to lead the development of MCC owing to their range of skills, including resuscitation and management of critically ill patients but all members of the team need to recognise deficits in training and potential challenges ahead.

Many countries outside the UK practise different models of care; in these countries patients requiring a higher level of care go to the main HDU/ICU. UK culture is different with sicker patients being cared for on the delivery suite. It is important to recognise the advantages and disadvantages of this so that our sickest patients get the best care. The Obstetric Anaesthetists' Association is currently setting up a multi-disciplinary maternal critical care subcommittee to examine and guide practice in this area.

For the obstetric anaesthetist, contributing to a quality MCC service should be an overall rewarding experience with motivated staff and facilities similar to those in units for non-pregnant patients. This should be the aim of all obstetric units managing increasingly complex cases needing higher levels of care. Adequate time and resources for this should be identified and assigned in job plans. With increasing recognition and expansion of the sub-specialty of maternal critical care this will hopefully become an easier task. It will be important to promote links with critical care and outreach services to help ensure staff are adequately trained in early recognition of a critically ill parturient and to optimise the use of physiological early warning systems to increase safety on the delivery suite. We need to recognise that patients admitted as 'low risk' may subsequently deteriorate on a postnatal ward. The incidence may be small but a sick mother and her newborn deserve the best care in UK hospitals. National audits continue to indicate there is room for improvement.

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References

1 Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer 2006–2008. The Eighth Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom. Centre for Maternal and Child Enquiries (CMACE). *BJOG* 2011;**118**:1:1–203.

2 Sepsis in Pregnancy, Bacterial (Green-top 64a). *RCOG*, London (www.rcog.org.uk/womens-health/clinical-guidance/sepsis-pregnancy-bacterial-green-top-64a).

3 Sepsis following Pregnancy, Bacterial (Green-top 64b). *RCOG*, London 2012 (www.rcog.org.uk/womens-health/clinical-guidance/sepsis-following-pregnancy-bacterial-green-top-64b).

4 The Surviving Sepsis Campaign (www.survivingsepsis.org/About_the_Campaign/Pages/default.aspx).

5 The Intensive Care National Audit and Research Centre (ICNARC) Report. Updated 2009. *RCoA*, London (www.rcoa.ac.uk/system/files/PUB-ICNARC-ObsReport.pdf).

6 Scottish Audit of Severe Maternal Morbidity: 6th Annual Report. Reproductive Health Programme. *NHS QIS*, Scotland 2008 (www.nhshealthquality.org/nhsqis/files/SCASMM_REP_APR10.pdf).

7 Providing equity of critical and maternity care for the critically ill pregnant or recently pregnant woman. *RCOG, OAA, RCN, BMFM, ICS and RCoA*, London 2011.

8 Comprehensive Critical Care: a review of adult critical care services. *DH*, London 2000.

9 Acutely ill patients in hospital; CG50. *NICE*, London 2007 (www.nice.org.uk/cg50).