Obstetric emergencies

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Abstract

For more than 60 years the confidential enquires into maternal deaths triennial reports and later reports from mothers and babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) have helped build a picture of maternity care within the United Kingdom (UK), highlighting not only our successes, but also failures in caring for women within the puerperal period. Despite most obstetric emergencies being well described and having clear management strategies and guidance, there continues to be sub-standard management with poor outcomes recorded. This article describes some common obstetric emergencies with which the anaesthetist will become involved. It emphasizes management related to some deficiencies identified in the MBRRACE-UK report as well as highlighting a multidisciplinary approach throughout. Good communication between team members is paramount in all aspects of medical care but this approach should be fostered routinely to ensure that rapid and appropriate decisions are made in a safe and timely manner.

Keywords Amniotic fluid embolus; emergency caesarian section; local anaesthetic toxicity; magnesium toxicity; maternal collapse; maternal resuscitation; MBRRACE; multidisciplinary obstetric emergency simulation; sepsis

Royal College of Anaesthetists CPD Matrix: 1B03, 1B04, 2B05, 2B06

Learning objectives

After reading this article, you should:

- understand common causes of obstetric emergencies and their management
- be aware of the need for early detection and management of the critically unwell parturient
- understand the differences in resuscitation of the pregnant patient
- understand the role of simulation in the reinforcement of teaching and retention emergency skills

Introduction

The MBRRACE report published in December 2014 covering the period 2011–2013 continued to show an overall reduction in maternal mortality with respect to direct obstetric deaths. Maternal deaths due to genital tract sepsis have decreased and the mortality attributed to pre-eclampsia and eclampsia is now at its lowest ever value.[1]

Deaths attributed to indirect causes have not seen such a reduction and thus indirect causes of death now account for double those due to direct.[1] Failure to record a full set of observations and take appropriate action is a key area of concern. Timely recognition and management of sepsis, early involvement of senior colleagues, including microbiology, and adequate critical care input are also important recommendations. Cardiac disease and non-genital tract sepsis were responsible for the majority of indirect deaths. The influenza pandemic resulted in a number of maternal deaths and the 2014 report highlights the need for vaccination against flu. The number of deaths related directly to anaesthesia has remained stable.[1]

This article identifies some causes of common emergencies in obstetrics seen (Table 1) and highlights key treatment points in their management to help improve outcome. Major haemorrhage, pre-eclampsia and eclampsia are mentioned in detail within other articles in this series, as are emergencies related specifically to anaesthetic practice.

Maternal sepsis

Sepsis remains a significant aetiology behind maternal death and was responsible for 2.04 deaths per 100,000 maternities in 2009–2012.[1] Sepsis in an obstetric population can be divided into obstetric causes (further divided into genital tract, and non-genital causes) and non-obstetric causes (e.g. community-acquired pneumonia, cellulitis, etc.). A decrease in mortality attributed to genital tract sepsis specifically has been seen between 2006 and 2008 and 2010 and 2012.[1] Rates reached a peak of 1.13 per 100,000 maternities in 2006–2008, falling to 0.50 in 2010–2012.[1] Improvements in the recognition and management of sepsis based on such campaigns as Surviving Sepsis in

Obstetric emergencies which may present challenges to the anaesthetist. Anaesthetic-related emergencies mentioned for completeness

Haemorrhage - Antepartum - Postpartum	Fetal distress of any cause
Sepsis	Emergency caesarean section - for any cause
Pre-eclampsia and eclampsia	Uterine rupture
Thromboembolism	Uterine inversion
Amniotic fluid embolism	Shoulder dystocia
Maternal cardiorespiratory arrest	Cord prolapse
Anaphylaxis	Emergency cervical cerclage
Anaesthetic related: Total/high spinal; failed/ difficult intubation; LA toxicity	

Table 1

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addition to the UK Royal College of Obstetricians and Gynaecologist (RCOG) Green Top Guidance on 'Sepsis in Pregnancy' may be responsible, though cyclical changes in disease prevalence have been seen.[1]

The largest risk factor for developing sepsis is surgery or trauma to the uterus or genital tract, whilst patient factors such as obesity, anaemia, impaired-glucose-tolerance and sickle-cell disease or trait may also increase risk. Genital tract infection with group A streptococcus was the risk factor most associated with progression to severe sepsis and septic shock and most commonly occurs in early pregnancy and peripartum.[1] The most common causative organism associated with genital tract infection in the second trimester was *Escherichia coli*.[3] Infection from a non-genital tract or 'indirect' source, represent the most common cause of maternal mortality in the 2014 MBRRACE report, after cardiac disease. The majority of these deaths were due to the Influenza pandemic within the 2009–2012 period.[1]

Sepsis is defined as systemic inflammatory response syndrome (SIRS) associated with an identifiable pathogenic organism (definitions due to change February 2016 with an emphasis on 'red flags'). Currently SIRS, in adults, is defined as the presence of ≥2 of:[2]

- temperature >38.3 °C or <36 °C
- heart rate >90 min^{-1}
- respiratory rate >20 min^{-1}
- white blood cell count >12 × 10^9 cells $litre^{-1}$ or <4 × 10^9 cells $litre^{-1}$

Severe sepsis is sepsis-induced tissue hypoperfusion or organ-dysfunction. Septic shock is sepsis with hypotension despite adequate fluid resuscitation.[4]

The physiological changes of pregnancy and labour may mask or confuse these criteria; signs of critical illness are often attributed to pregnancy, labour and pain. Temperature rises in labour are common; the heart rate increases by 25%; the respiratory rate may increase to 15 min^{-1} during pregnancy and further to 22–70 in labour; there is a leukocytosis of up to 15 × 10^9 cells $litre^{-1}$ in labour and immediately after. However, there is evidence that a Modified Early Obstetric Warning Score System (MEOWS) is effective at recognizing unwell patients, with sensitivity and specificity of 89% and 79%, respectively.[5] These values should return towards normal post-delivery, therefore perseverance or recrudescence of abnormal values post-delivery should cause concern.

Research has focused on the use of biomarkers to diagnose sepsis and track response to treatment, such as procalcitonin (a pro-peptide of calcitonin, un-recordable in health and raised in bacterial infection).

Management

Clinicians are encouraged to 'Think Sepsis' at an early stage and employ key actions in its diagnosis and management:[1]

- timely recognition including measurement of a complete set of observations
- fast administration of IV antibiotics within 1 hour
- quick involvement of experts-review by senior medical staff
- early involvement of a microbiologist or an infectious disease expert.

Management of sepsis should be focused and organized with a multidisciplinary approach. Resuscitation following an ABCDE approach, investigation and treatment including organ support, IV fluids and antibiotics should occur concurrently.

Investigations should include:

1. Generic blood tests: FBC, U + E, Lactate, CRP, LFTs, clotting studies, ABG.
2. Microbiology: swabs of everything including breast milk, urine and blood cultures (ideally before, but not delaying, antibiotics). A nasopharyngeal aspirate or throat swab in those with respiratory tract signs or symptoms.
3. Imaging as appropriate (CXR, pelvic/abdominal US or CT).

Table 2 highlights the tasks that the medical team should aim to perform in the initial hours from presentation with severe sepsis.[2] This requires a collaborative approach from those involved in management and may ultimately require admission to the Intensive Care Unit. Recent recommendations state that all consultant-led delivery suites should have a level 2 High Dependency care area managed by the multidisciplinary team.[1]

Definitive treatment involves delivering the right antibiotic early whilst supporting the patient's organ systems. Every hour delay in administering antibiotic therapy is thought to increase mortality by 8%.[6] Intravenous antibiotics should be started empirically and changed to a definitive antibiotic with culture results, reviewed daily and continued for a sufficient time. The choice of the initial antibiotic should be guided by local antibiotic protocols, but should include a broad spectrum of activity including anaerobe cover. Early advice from microbiology

Tasks to be completed within the first 3 hours of time of presentation with severe sepsis. Modified from the Surviving Sepsis Campaign Resuscitation 'Bundle' (group of therapies)[4]

Obtain blood cultures prior to antibiotic administration (but do not delay antibiotics)
Administer broad-spectrum antibiotic within 1 hour of recognition of severe sepsis
Measure serum lactate
In the event of hypotension and/or a serum lactate >4 mmol/l deliver an initial minimum 20 ml/kg of crystalloid or an equivalent.
To be completed within 6 hours of time of presentation
Apply vasopressors for hypotension that is not responding to initial fluid resuscitation to maintain mean arterial pressure (MAP) >65 mmHg
In the event of persistent hypotension despite fluid resuscitation (septic shock) and/if lactate >4 mmol/l, re-assess volume status and tissue perfusion
Re-measure lactate if initial lactate elevated
NB: The SSC committee has revised the bundle excluding use of CVC line & $ScvO_2$

Table 2