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Aims of obstetric critical care management

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The aims of critical care management are broad. Critical illness in pregnancy is especially pertinent as the patient is usually young and previously fit, and management decisions must also consider the fetus. Assessment must consider the normal physiological changes of pregnancy, which may complicate diagnosis of disease and scoring levels of severity. Pregnant women may present with any medical or surgical problem, as well as specific pathologies unique to pregnancy that may be life threatening, including pre-eclampsia and hypertension, thromboembolic disease and massive obstetric haemorrhage. There are also increasing numbers of pregnancies in those with high-risk medical conditions such as cardiac disease. As numbers are small and clinical trials in pregnancy are not practical, management in most cases relies on general intensive care principles extrapolated from the non-pregnant population. This chapter will outline the aims of management in an organ-system-based approach, focusing on important general principles of critical care management with considerations for the pregnant and puerperal patient.

Key words: pregnancy; high risk; complications; pre-eclampsia; postpartum haemorrhage; thromboembolism; intensive care; critical care.

GENERAL OVERVIEW

Maternal mortality is fortunately rare in the UK, with 13.95 maternal deaths per 100 000 deliveries in 2003–2005.[1] However, despite modern-day advances in care,

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this figure has remained static over the last few decades, and this may relate to a higher number of high-risk pregnancies progressing to term.[2] Worldwide, maternal mortality is greater with 55–920 maternal deaths per 100 000 live births[3], with the highest rates in sub-Saharan Africa. The most common reasons for intensive care unit (ICU) admissions in the UK are pre-eclampsia, sepsis and haemorrhage.[4] Overall, 0.9% of pregnant women require ICU admission in the UK, comparable to US figures.[5] The most common cause of maternal death on ICU is acute respiratory distress syndrome (ARDS). UK maternal mortality could be improved with prompt recognition of critical illness, earlier use of critical care facilities and earlier senior involvement. Perinatal mortality rates are up to 20–25% depending on the underlying maternal diagnosis.

The assessment and management of obstetric admissions to critical care can be challenging, with unique disease states and physiological changes seen. These changes occur in all major systems and persist for up to 6 weeks post partum. In 50–80% of cases, pregnant women require ICU admission due to a direct obstetric cause; the remainder relate to medical causes. There may be diseases specific to pregnancy (massive obstetric haemorrhage, amniotic fluid embolism, pre-eclampsia, peripartum cardiomyopathy); an increased susceptibility to certain diseases due to pregnancy (venous thromboembolism, urinary tract infection, varicella pneumonia); pre-existing disease exacerbation (asthma, cardiac disease); or incidental diseases during pregnancy (e.g. diabetic ketoacidosis). The requirement for critical care support for one or more organ failures usually results from the development of a multisystem disorder such as shock, ARDS or sepsis.

The aim of critical care management in any population is to ensure adequate oxygen delivery and tissue perfusion. There are specific conditions requiring attention in pregnancy, and this review will consider general ICU principles and these with reference to obstetric physiology. The altered maternal physiology should be considered during each stage of assessment, resuscitation, monitoring, use of pharmacological therapies, and single or multiple organ support. Young, previously healthy patients often show relative compensation in critical illness. The signs of sepsis and haemorrhage are often masked initially and abnormal signs may overlap normal signs of pregnancy. Some signs always indicate abnormality, including tachypnoea and metabolic acidosis. Obstetric and medical staff should be trained in the recognition of critical illness in this population as the disease processes can follow a rapid and fulminant course.

The effects on fetal perfusion are dependent on placental perfusion and oxygen delivery, both reflecting maternal wellbeing. The fetus is adapted to living in a relatively hypoxic environment with the oxygen dissociation curve shifted to the left, high haematocrit and high cardiac output (CO). Despite this, small changes in maternal homeostasis may have an adverse effect on the fetus. If the mother does become critically ill, premature delivery may be indicated with the associated neonatal complications of respiratory distress syndrome, jaundice, intracranial haemorrhage and necrotizing enterocolitis.

AIMS OF ORGAN SUPPORT IN CRITICAL CARE

General supportive care

Immediate resuscitation is the primary aim in the management of any critically ill patient, with systematic assessment of deranged physiology using an organ-based systematic approach. This is generic, irrespective of the underlying pathology, and is followed by more specific diagnostic consideration when the patient is more stable.