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Invited Editorial

Critical care obstetrics: No solo heroes

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Professor Marian Knight, maternal reporting lead at MBRRACE-UK, stated last month [1], "The UK maternal death rate has returned to levels that we have not seen for the past 20 years. The 2023 MBRRACE-UK maternal confidential enquiry report identified clear examples of maternity systems under pressure…". The maternal death rate in the UK was 13.4 per 100,000 pregnancies in 2020–22. This is substantially higher than 8.79 per 100,000 in the preceding 3-year period and remains higher after excluding COVID-19-related deaths.

A similar rise is evident in the United States [2]. Severe maternal morbidity—defined as unexpected birth outcomes that result in significant consequences to a woman's health—has doubled between 1993 and 2014. Preventability of maternal deaths and severe outcomes highlights the need for awareness and timely intervention in high-risk and critical care obstetric patients.

Globally, obstetric intensive care unit (ICU) admission rates vary, with maternal mortality ratios approximately 14 times higher in low-income countries [3]. An estimated 1–3% of obstetric patients need ICU admission, making this a critical resource in any hospital.

Most ICU admissions are postpartum (63–92%), [4] and many patients do not need major life-saving interventions but more intensive monitoring than can be managed in birth suites or postnatal wards. The average length of stays in a UK study were 2.0 days for antenatal patients and 1.1 days for those admitted after delivery. The maternal death rate after ICU admission is 3.3% for high-income settings and as high as 14% in developing countries.

A challenging aspect of timely care in critical care obstetrics is anticipating critical deterioration. Early-warning tools have strengths and limitations. Adaptation of physiological screening parameters to reflect the physiological changes of pregnancy, the Modified Early Warning Score (MEWS) and the Modified Obstetric Early Warning Score (MEOWS) have demonstrated effectiveness in predicting maternal morbidity, with a reported sensitivity of 86% and specificity of 85% [3]. Nonetheless, applying these criteria in the obstetric setting has found a reduction in specificity for detecting maternal decompensation.

The OB-CMI tool includes a list of comorbidities, each allocated an odds ratio for developing end-organ dysfunction [5]. The numerical sum of these provides a value that represents the overall odds ratio for severe peripartum maternal outcomes. Its routine use has the potential to identify women for targeted surveillance to prevent severe morbidity and mortality in the obstetric population.

In a prospective study, artificial intelligence linked to electronic medical records stratified gravidas into high- and low-risk cohorts for adverse outcomes [3]. Further validation of the use of 'big data' to predict clinical deterioration is required.

Sepsis and acute respiratory distress syndrome (ARDS) are frequent reasons for ICU admission. Treatment for sepsis depends upon timely identification, fluid resuscitation and antibiotic treatment within the first hour. Mortality increases hourly in untreated patients with sepsis or septic shock [4]. *E. coli* and group A and group B *Streptococcus* are the most frequently identified organisms in obstetric patients. One study in the US [3] found that half of cases of maternal septicaemia occurred after discharge from the hospital, highlighting the need for increased awareness during the puerperium. Serum lactate can be used to diagnose and guide therapy; among critical care obstetric patients, lactate clearance greater than 60% is associated with 100% survival [6]. Conversely, all non-survivors had a persistent rise in lactate levels from baseline.

ARDS is a pulmonary response to various insults, characterised by diffuse inflammation, increased fluid level in the lung due to increased third-space vascular leak and impaired oxygen-transfer capability. Pregnancy increases the risk of developing ARDS and needing mechanical ventilation. Infections such as influenza, pyelonephritis and pre-eclampsia spectrum disorder [4] are the most common associations.

Communication between the obstetrician-gynaecologist and critical care service is crucial. Forward planning is not always possible, except for cases such as placenta accreta spectrum disorder. The local ICU model will define the obstetrician's role in patient care. This may be as the primary specialist (open model), or the ICU team may take over responsibility (closed model). A typical hybrid requires daily rounds, frequent communication, and response to calls [4]. For antenatal patients, risk-benefit considerations may change through the disease process and decisions about the timing of delivery need to be made through collaboration, including an obstetrician, critical care specialist, neonatologist and the patient or family.

Decisions about mode and place of delivery can be tricky and require

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multidisciplinary consultation. For a pre-viable fetus, planned delivery in the ICU might be the best option. However, instrumental delivery or even caesarean section is complex in this environment. Individual decision-making is required, balancing maternal condition, monitoring requirements, staff skill set, and space.

Is medical training preparing specialists for these challenges? Edwards et al. [7] recently reviewed critical care training curricula and experiences across various countries, including the UK, New Zealand, Australia, South Africa, Italy and Sweden. Despite the recognition for expertise in caring for critically unwell obstetric patients, this subject is poorly covered in anaesthesia, obstetrics and intensive care medicine training programs. No clinician in these specialties alone can provide optimum care, underscoring the need for multi-professional team involvement.

The relentless rise in the rate of severe maternal comorbidities and challenges with providing care to a medically complex obstetric population is a burden that requires focused action. This must include appropriately resourced facilities and pathways to access them, uptake of validated screening tools and training obstetricians and critical care staff in complementary skills. The landscape is ripe for innovation at the bedside, organisational and specialist training levels.

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