Maternal sepsis

George F Winter discusses the risks of maternal sepsis, and explores the latest evidence of interventions to help reduce it

Maternal sepsis is described as 'a life-threatening condition defined as organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion or post-partum period' (Powell et al, 2023), with some 75 000 pregnant women globally dying annually from sepsis and most deaths occurring in low-income countries. Knight and Tuffnell (2018) highlighted the long-running UK and Ireland Confidential Enquiry into Maternal Deaths and Morbidity, who recommended that the keys to the diagnosis and management of sepsis are:

- Timely recognition
- Fast administration of intravenous antibiotics
- Quick, expert involvement, with senior review essential.

However, as Shah et al (2024) pointed out, while morbidity and mortality from sepsis in pregnancy worldwide have fallen (age-standardised infection rates were 800 per 100 000 pregnancies in 1990, and 550 per 100 000 pregnancies in 2019), in 2019 there were over 20 million cases of maternal sepsis and other maternal infections worldwide, and WHO reports the global prevalence of maternal sepsis as 4.4%.

In the UK, 'significant risk factors include ethnicity and deprivation. Black and other ethnic minority groups are at an almost 2-fold increased risk' (Shah et al, 2024). Furthermore, the results of prospective UK studies suggest that labour and the puerperium carry an almost two to three-fold higher risk of maternal sepsis compared to the antenatal period, and there is a possibility that peripartum and postnatal interventions, such as caesarean section and instrumental birth, plus intrauterine or vaginal tamponade for obstetric haemorrhage, increase infection risk. These interventions 'have been the target of efforts to reduce infection rates by changes in obstetric care and optimised use of antibiotic prophylaxis' (Shah et al, 2024).

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Labour and the perperium carry a higher risk of maternal sepsis than the antenatal period, with over 20 million cases of maternal sepsis and other infections reported annually worldwide

What interventions might help reduce maternal sepsis?

In a UK study, Bolger et al (2017) examined the impact of a maternal sepsis training package on maternity staff's compliance with their hospital trust's maternal sepsis guideline, as documented in maternity notes over a 12-month period. An audit of staff compliance rates found 'there was no statistically significant increase in compliance with the guideline from quarter 1 through to quarter 4… this audit suggests the training has not had a significant impact on practice' (Bolger et al, 2017). The authors commented that 'the findings of this audit are not easy to accept, especially given that training such as the maternal sepsis training package took a great deal of time, energy and finance to achieve' (Bolger et al, 2017).

Taking a microbiological approach, Powell et al (2023) acknowledged the difficulty for clinicians to determine the source of maternal infection, noting that chorioamnionitis – acute inflammation of the chorion and amnion (fetal membrane layers) – and endometritis are the two most prevalent maternal infections (24% and 23%, respectively), with endometritis considered a postpartum infection of the uterine lining/cavity typically caused by polymicrobial infection. However, 'microbiological evidence can be difficult

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to obtain as microbiological cultures of the uterine cavity are often contaminated by vaginal flora, which may hinder detection of infecting agents and appropriate choice of antimicrobial agent for treatment' (Powell et al, 2023).

Although blood cultures are the gold standard for diagnosing sepsis, they may be negative in 28–49% of septic patients; 'organism identification only occurs in 50% of maternal sepsis cases, and diagnosis can be hampered by physiological pregnancy-related changes' (Powell et al, 2023). Rapid identification of a causative pathogen allows appropriate antibiotic treatment, thereby improving survival rates, patient outcomes, reducing hospital length of stay and expense Powell et al (2023). Further, Powell et al (2023) observed that while placental swab cultures have been reported as useful in guiding antimicrobial therapy in the neonate, this approach has provided less evidence in relation to maternal outcomes. Over a 5.5-year study period, Powell et al (2023) compared the microbiology results of samples (blood, high vaginal swabs, urine, throat swabs, placenta swabs) collected as part of 845 (3.7%) maternal 'septic screens' out of 23 080 births at the University Maternity Hospital Limerick, Ireland. Of the 845 septic screens, 51% (430/845) had a placental swab collected, and of the five microbiology samples tested, placental swabs yielded the highest number of potential pathogens (37%, 165/430). The authors found that although high vaginal swabs also detected a high number of potential pathogens, they were more susceptible to contamination by vaginal flora. However, 'placental swabs are easy to collect, process and are reproducible if completed using a standardised method… while contamination may affect culture results, our study shows that placental swab cultures may be clinically useful to detect significant isolates, particularly enterobacterales' (Powell et al, 2023).

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While the overall UK prevalence of sepsis-related maternal deaths remains low, Shah et al (2024) explained that 'sepsis is still one of the leading causes of direct death in this population'. Shah et al (2024) observed that, inter alia, initiatives like the Maternity Early Warning Score and Sepsis Six symptom cards provided by the UK Sepsis Trust (2024) can help 'effectively predict morbidity in maternity patients and reduce inpatient mortality, respectively'. With innovations such as that described by Powell et al (2023), one could hope that the threat of maternal sepsis might further diminish. **BJM**

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