Maternal Sepsis: Why Pregnancy Masks Critical Vital Sign Patterns

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> Sepsis remains a leading cause of maternal morbidity and mortality, a stark reality that often goes unrecognised until it is too late. The challenge lies in the physiological adaptations of pregnancy, which fundamentally alter how a woman's body responds to infection and, to prevent maternal morbidity and mortality, how those responses manifest in vital signs. These changes can mislead clinicians, delaying the critical window for intervention.

KEY TAKEAWAYS

- The Pivot: Normal physiological changes in pregnancy, such as increased heart rate and decreased blood pressure, can mimic early sepsis or mask its progression.
- The Data: Early recognition of maternal sepsis relies on a heightened clinical suspicion and a deviation from an individual's baseline, rather than strict adherence to non-pregnant vital sign thresholds.
- The Action: Clinicians must integrate a comprehensive understanding of pregnancy physiology with a low threshold for sepsis screening in any pregnant or postpartum patient presenting with signs of infection.

Maternal sepsis, defined as life-threatening organ dysfunction caused by infection during pregnancy, childbirth, or the puerperium, presents a unique diagnostic challenge. The typical inflammatory response to infection is often blunted or altered in pregnant women, making the standard diagnostic criteria for sepsis less reliable. This physiological shift means that a pregnant patient can be critically ill while displaying vital signs that would be considered stable in a non-pregnant individual, or even within the 'normal' range for pregnancy.

The underlying issue is that pregnancy itself induces a state of physiological change that overlaps with early signs of sepsis. For example, a pregnant woman's heart rate naturally increases by 10 to 20 beats per minute, and her blood pressure typically decreases in the second trimester. These adaptations mean that a tachycardia or hypotension that would immediately flag sepsis in a non-pregnant patient might be dismissed as a normal pregnancy variation, delaying the initiation of life-saving treatment. The Oxford Handbook of Obstetrics and Gynaecology provides a comprehensive overview of these physiological shifts.

The Misleading Baseline

One of the most significant hurdles in recognising maternal sepsis is the altered baseline for vital signs. A pregnant woman's respiratory rate, for instance, may increase slightly due to elevated progesterone levels and increased oxygen demand, but a persistent tachypnoea, even if mild, should raise concern. The challenge is distinguishing between a normal physiological adaptation and an early pathological sign. This requires a clinician to not only know the normal ranges for pregnancy but also to consider the individual patient's baseline and any acute deviations from it.

Temperature regulation also shifts during pregnancy. While fever remains a clear indicator of infection, a pregnant woman may not always present with a high fever even in the presence of severe sepsis. Subfebrile temperatures or even hypothermia can be ominous signs, particularly in immunocompromised states or with overwhelming infection. The absence of a pronounced fever should never be used to rule out sepsis in a pregnant patient with other concerning symptoms.

The Subtle Cues of Deterioration

Beyond vital signs, other clinical indicators of sepsis can be subtle and easily overlooked. Altered mental status, a hallmark of severe sepsis, might be attributed to fatigue or discomfort common in pregnancy. Similarly, non-specific symptoms like malaise, nausea, or abdominal pain can be dismissed as typical pregnancy complaints. This diagnostic ambiguity highlights the need for a high index of suspicion and a thorough clinical assessment, especially when a pregnant patient reports feeling 'unwell' in a way that is new or worsening.

Lactic acidosis, a critical marker of tissue hypoperfusion in sepsis, can also be influenced by pregnancy. While elevated lactate levels are always concerning, the physiological changes of pregnancy can sometimes lead to mild elevations that are not directly indicative of sepsis. But any persistent or rising lactate level in a pregnant patient with suspected infection warrants aggressive investigation and management. The focus must be on trends and the overall clinical picture, rather than isolated measurements.

Organ Dysfunction in Pregnancy

The definition of sepsis includes organ dysfunction, and here too, pregnancy introduces complexities. Renal function, for example, is altered with an increased glomerular filtration rate and decreased serum creatinine. This means that a creatinine level that would be considered normal in a non-pregnant individual could indicate acute kidney injury in a pregnant patient. Similarly, liver enzyme levels can fluctuate, and thrombocytopenia can occur in conditions like pre-eclampsia, complicating the interpretation of these markers in the context of sepsis.

Early recognition of organ dysfunction requires a thorough understanding of these pregnancy-specific physiological changes. Clinicians must be vigilant for subtle signs of deterioration in any organ system, such as decreased urine output, changes in mental status, or unexplained coagulopathy. These signs, even if mild, should prompt immediate investigation for sepsis. Our previous coverage on Myasthenia Gravis in Pregnancy highlights other complex peripartum presentations.

The Role of Guidelines and Early Warning Scores

Existing guidelines for sepsis management, such as those from the Surviving Sepsis Campaign, provide a robust framework, but their application in pregnancy requires adaptation. Many early warning scores, designed for the general adult population, may not perform optimally in pregnant or postpartum women due to the altered physiological parameters. Modified obstetric early warning scores (MEOWS) have been developed to address this, incorporating pregnancy-specific thresholds for vital signs and other clinical indicators.

These MEOWS systems are designed to trigger a rapid response when a patient's vital signs deviate from pregnancy-adapted norms, or when there are other concerning clinical signs. Their implementation has been shown to improve early recognition and management of critical illness in obstetric populations. But even with these tools, clinical judgment remains paramount. A clinician's suspicion, combined with a comprehensive assessment, often precedes the formal activation of an early warning score.

The Postpartum Period: A Continued Risk

The risk of sepsis does not end with childbirth; the postpartum period is also a time of heightened vulnerability. Puerperal sepsis, often originating from genital tract infections, can rapidly progress. The physiological changes of pregnancy begin to reverse, but the body is still recovering from the stress of labour and delivery. This transition period can again obscure the signs of sepsis, as fatigue, pain, and normal postpartum bleeding can mask more serious issues.

Patients in the postpartum period, especially those with risk factors such as prolonged rupture of membranes, multiple vaginal examinations, or retained placental fragments, require careful monitoring. Education for patients and their families about warning signs is also critical, as many women will be discharged home within days of delivery. The importance of vigilance extends beyond the hospital walls, a point highlighted by broader discussions around maternal risks and healthcare access.

The Need for a High Index of Suspicion

The key to improving outcomes in maternal sepsis lies in maintaining a consistently high index of suspicion. Any pregnant or postpartum patient presenting with an infection, or even vague symptoms of feeling unwell, should be evaluated for sepsis. This means moving beyond rigid vital sign thresholds and embracing a more holistic assessment that considers the unique physiological context of pregnancy.

Prompt administration of broad-spectrum antibiotics, fluid resuscitation, and source control are cornerstones of sepsis management. But these interventions are only effective if sepsis is recognised in a timely manner. The subtle, misleading vital sign patterns in pregnancy demand that clinicians think critically, act decisively, and never underestimate the potential for rapid deterioration. For a quick reference on infectious diseases, the Oxford Handbook of Infectious Diseases and Microbiology can be invaluable.

> **CLINICAL IMPLICATIONS**
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> The persistent challenge of maternal sepsis highlights a significant gap in clinical training and awareness. Relying on standard adult sepsis criteria for pregnant women is a dangerous oversight, as the physiological adaptations of pregnancy fundamentally alter how infection manifests. Clinicians must internalise the concept that 'normal' vital signs in a pregnant patient can still signify impending disaster.
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> This demands a shift from reactive diagnosis to proactive vigilance. Every pregnant or postpartum patient presenting with any infectious symptom, however minor, warrants a thorough sepsis screen. The threshold for initiating investigations and empiric antibiotics should be considerably lower than in non-pregnant populations, accepting that some false positives are a necessary trade-off for catching true sepsis early.
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> For healthcare systems, this means ensuring that modified obstetric early warning scores are not just implemented, but actively used and understood by all staff involved in maternal care. Regular simulation training focused on maternal sepsis scenarios could help embed these diagnostic approaches. The cost of delayed diagnosis in maternal sepsis is measured in lives, a price too high to pay for a missed vital sign.

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