Description

Tachycardic CTG: A Sepsis Flag



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Summary

Sepsis remains a significant cause of maternal morbidity and mortality worldwide and is considered largely preventable. Pregnancy related physiological, immunological and anatomical changes can obscure early signs of deterioration leading to a delay in recognition and treatment. Fetal tachycardia may be an early indicator of maternal infection but is non-specific and should not be used in isolation. Early recognition and timely interventions are known to improve outcomes for women and birthing people, and baby.

Maternal sepsis continues to present a significant challenge

Introduction

Maternal sepsis is a time-critical obstetric emergency that requires prompt recognition and intervention to prevent serious maternal and fetal complications. Maternal sepsis continues to present a significant challenge due to early signs often being subtle, non-specific and easily masked by the normal physiological changes of pregnancy; timely treatment and recognition requires careful clinical judgement, supported by an understanding of pregnancy-specific physiology and awareness of maternal risk factors. This article explores the role of fetal tachycardia within the wider clinical assessment of women and birthing people with suspected sepsis, and the place of fetal tachycardia within a sepsis screening tool.

The burden of maternal sepsis

Despite advances in maternity care, sepsis remains a leading cause of maternal morbidity and mortality worldwide. Although maternal deaths from sepsis have declined in high-income countries, the burden remains substantial and is even greater in low- and middle-income settings.

Although pregnancy-related infection accounts for a relatively small proportion of maternal deaths in the UK (around 6% in 2021-23), most are considered to be preventable when recognised and treated promptly. Mortality represents only part of the clinical burden. For every maternal death attributed to sepsis, there are approximately 100 cases of severe maternal sepsis, classified as maternal near misses.[1] These women often experience prolonged hospital admission, critical care intervention and significant physical and psychological consequences. The MBRRACE-UK 2025[2] report identified delayed recognition and delayed treatment as recurring contributory factors in maternal deaths from sepsis, highlighting the importance of early identification and escalation.

Why pregnancy increases the risk of sepsis

Pregnancy is associated with profound physiological, immunological and anatomical adaptations, all of which influence both susceptibility to infection and the clinical presentation of sepsis.[3] Pregnancy is increasingly recognised as an immune-modulated state that allows maternal tolerance of the genetically distinct fetus while maintaining protection against infection. Consequently, pregnant women are more susceptible to certain viral and bacterial infections, including influenza, which may progress to sepsis. Physiological adaptations may obscure early recognition of deterioration.[4] For example, mild leukocytosis is common in normal pregnancy and should not be interpreted in isolation as evidence of infection.[5]

Similarly, standard Early Warning Scores and conventional sepsis screening tools are less reliable during pregnancy because many physiological observations fall outside the non-pregnant reference range. Without pregnancy-adjusted parameters, clinicians may underestimate illness severity, resulting in delayed escalation. Failure to recognise sepsis early allows infection to progress, leading to systemic inflammation, vasodilatation, hypotension, impaired uteroplacental perfusion, organ dysfunction and, ultimately, septic shock.[4,6]

Fetal tachycardia and maternal sepsis

An area of ongoing discussion has been the role of fetal tachycardia in recognising maternal sepsis. In 2016, the UK Sepsis Trust included non-reassuring cardiotocography (CTG), including fetal tachycardia, as an amber flag within its obstetric sepsis screening tool following advice from a panel of obstetric experts. However, as the UK Sepsis Trust collaborated with NICE to produce the 2024 guidelines, full alignment was required and the CTG flag was removed.

> Fetal tachycardia is non-specific and may occur for numerous reasons..

Following discussion with the clinical team at the UK Sepsis Trust, it was emphasised that fetal tachycardia should not be viewed as a diagnostic feature of maternal sepsis but rather as a clinical warning sign that warrants further assessment in the context of other maternal risk factors. Fetal tachycardia is non-specific and may occur for numerous reasons, including maternal pyrexia, dehydration, anxiety, medication, fetal hypoxia and intrauterine infection.

Several physiological mechanisms explain why fetal tachycardia commonly accompanies maternal sepsis. Maternal pyrexia increases fetal metabolic demand and sympathetic activity, resulting in an elevated baseline fetal heart rate. Maternal sepsis also triggers the release of inflammatory cytokines, which may influence placental function and

contribute to the fetal inflammatory response. In severe sepsis, maternal vasodilatation and hypotension can reduce uteroplacental perfusion, causing relative fetal hypoxaemia. Initially, the fetus compensates by increasing its heart rate in an attempt to maintain oxygen delivery. Where intra-amniotic infection, such as chorioamnionitis, is present, the fetus may mount its own inflammatory response, with persistent fetal tachycardia often representing one of the earliest signs of fetal compromise.

Importantly, management should remain focused on women and birthing people. In most cases, optimising maternal physiology also improves fetal wellbeing. Prompt recognition of maternal sepsis, rapid initiation of the Sepsis Six care bundle and restoration of maternal oxygenation, circulating volume and tissue perfusion frequently result in normalisation of the fetal heart rate. This reflects a key principle in obstetric emergency care: resuscitating the women and birthing people is the most effective initial treatment for the fetus.

Conclusion

While fetal tachycardia can be an early indicator of maternal infection, it is non-specific and must be considered with the wider clinical context. Early identification and prompt treatment of suspected maternal sepsis are vital in improving outcomes for women and birthing people and baby and reducing the risk of mortality and morbidity.

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