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Editorial

Neonatal sepsis: Addressing the burden through early and accurate diagnosis

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Neonatal sepsis remains a significant global health challenge, especially in low- and middle-income countries (LMICs), where healthcare infrastructure and resources are often limited. Despite advancements in neonatal care, sepsis continues to be a leading cause of mortality and long-term morbidity in newborns, particularly in the first 28 days of life. The World Health Organization (WHO) estimates that nearly 3 million newborns worldwide suffer from sepsis annually, resulting in hundreds of thousands of preventable deaths.[1] The burden is even more staggering when one considers the neurodevelopmental impairments that survivors may endure, including cerebral palsy, developmental delays, and hearing or vision loss. With the rise of multidrug-resistant organisms and the indiscriminate use of available antibiotics, the likelihood of treatment failure and poor patient outcomes has significantly increased.[2,3]

One of the greatest hurdles in combating neonatal sepsis is the difficulty in diagnosing it early. Neonates often present with non-specific symptoms, such as lethargy, poor feeding, or respiratory distress, which can be easily mistaken for other conditions. The subtle and variable clinical presentation makes it hard for clinicians to promptly distinguish sepsis from other neonatal complications. Adding to the challenge is the rapid progression of the infection—delays in diagnosis can lead to irreversible damage or death within hours.[4]

Traditionally, the diagnosis of neonatal sepsis relies on blood cultures, which are considered the gold standard. However, this method has significant limitations: it is time-consuming (taking 24 to 72 hours), has low sensitivity due to small blood volumes, poor negative predictive value and is often complicated by contamination.[5] As a result, clinicians are frequently forced to initiate empirical antibiotic therapy based on clinical suspicion alone. While this may save lives, it also contributes to the growing problem of antimicrobial resistance, which threatens future generations.

Given the high mortality associated with delayed treatment, there is a pressing need for the development and implementation of rapid diagnostic tools that can provide results within the crucial early hours of suspicion. Advances in molecular diagnostics hold promise in this regard. Techniques such as polymerase chain reaction (PCR), next-generation sequencing (NGS), and the use of specific biomarkers like procalcitonin and C-reactive protein (CRP) are emerging as viable alternatives to traditional culture methods.[6,7] These tools offer the potential to detect pathogens more quickly and accurately, allowing for targeted therapy and reducing unnecessary antibiotic use.

Point-of-care (POC) diagnostic tests that can be used in resource-limited settings are particularly important. Simple, reliable, and cost-effective solutions are required to address

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the burden of neonatal sepsis in regions where access to sophisticated laboratories is limited. In resource-limited settings, rapid diagnosis can be facilitated by utilizing these simple laboratory tests, namely micro-ESR, CRP, and band cell count. Micro-ESR is a simple, inexpensive, and rapid screening test for neonatal sepsis that correlates well with CRP levels, which can be easily done even in resource-limited setups with minimal infrastructure.[8] Several ongoing research projects aim to develop such tools, and the global healthcare community must continue to invest in these efforts.

While technological innovations are key, strengthening clinical surveillance systems and improving healthcare provider training are equally important in addressing neonatal sepsis. Early recognition of sepsis by frontline healthcare workers, particularly in resource-limited settings leading to early intervention or referral to higher centre, can significantly improve outcomes.

Moreover, with the rise of multidrug-resistant organisms and the overuse of available antibiotics, the likelihood of treatment failure and poor outcomes has significantly increased, particularly in neonatal sepsis. This underscores the critical importance of antimicrobial stewardship, which plays a key role in optimizing antibiotic use, minimizing resistance, and improving clinical outcomes in vulnerable neonatal populations. Effective stewardship helps ensure that the right antibiotics are used at the right time, preserving their efficacy for future patients while reducing the risk of harmful resistance. This requires ongoing education on the signs of sepsis, promoting the use of evidence-based treatment protocols, and enhancing infection control practices to prevent nosocomial infections. The compulsory hand washing , separation of infected infants from the non-infective cases and aseptic precautions before any procedure are important.[9]

Neonatal sepsis presents a significant and urgent global health burden, particularly in regions where healthcare resources are constrained. Rapid, early diagnosis is critical to improving survival rates and reducing long-term complications. Innovations in diagnostics, combined with enhanced clinical training and global investment, are essential in reducing the devastating impact of neonatal sepsis. Without concerted efforts to prioritize these developments, the high mortality and morbidity associated with neonatal sepsis will continue to claim the lives of our most vulnerable patients. A swift and collaborative action is the need of the hour to ensure that every newborn has a fighting chance against this silent yet deadly threat.

Conflict of Interest

None.

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