Utilizing Neutrophil Extended Parameters for the Screening of Early-Onset Neonatal Sepsis

By

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Abstract Background: Early-onset neonatal sepsis (EOS), occurring within the first 72 hours of life, is a significant cause of morbidity and mortality in newborns. Prompt diagnosis remains a challenge due to the nonspecific nature of clinical signs and the delayed results from standard diagnostic methods such as blood culture. Traditional hematological markers, including total neutrophil count and the immature-to-total neutrophil (I: T) ratio, have shown limited sensitivity and specificity in the early detection of EOS. This study investigates the diagnostic utility of both conventional and novel neutrophil indices, such as absolute neutrophil count (ANC), immature granulocyte (IG) count, I: T ratio, and the advanced scatter-based parameters Neut-Y (neutrophil reactivity index) and Neut-X (neutrophil granularity index), using automated hematology analyzers to improve the early identification of EOS.

Materials and Methods: This prospective study analyzed clinical data from 135 presumed sepsis neonates identified as having maternal and fetal risk factors for early-onset neonatal sepsis. Blood investigations, including full blood counts, differential counts using the Sysmex XE-series (Sysmex Corporation, Kobe, Japan), and blood cultures, were performed. Biochemical markers and neutrophil parameters were analyzed to distinguish sepsis cases from non-sepsis cases.

Results: ANC and neut-Y (neut-RI) were found to be significant biomarkers for early-onset neonatal sepsis ($p < 0.05$). These two parameters can be used to differentiate between sepsis and non-sepsis, with a cut-off value of ANC and neut-Y (neut-RI) as 8.46 x 10(3)/ul and 33.85ch, respectively.

Conclusion: ANC and neut-Y are promising tools for screening early-onset neonatal sepsis. The clinical history of risk factors supplemented with these two parameters will help to identify neonates who are at risk of sepsis and assist in further and prompt management.

Keywords

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Data availability statement

The datasets generated and analyzed during the current study are not publicly available due to patient confidentiality restrictions but are available from the corresponding author on reasonable request.

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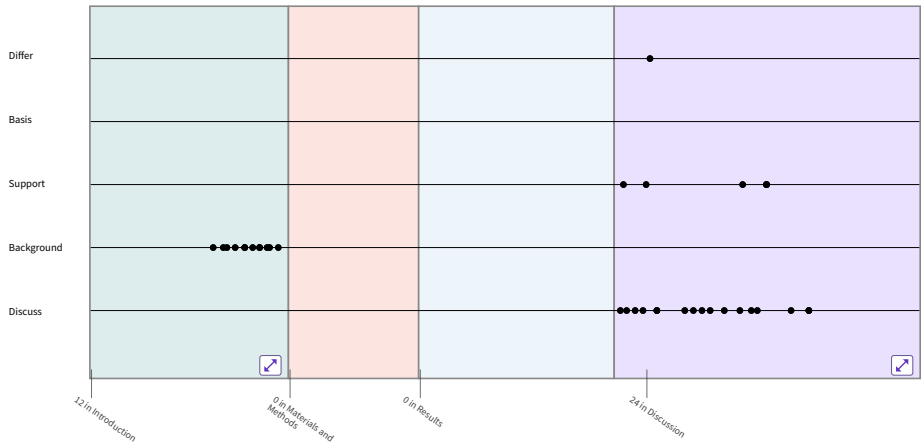

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