ORIGINAL RESEARCH

64. Early Clues, Early Cure: Evaluating the Utility of the Hematological Scoring System in the Early Diagnosis of Neonatal Sepsis.

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Background: Neonatal sepsis is a clinical syndrome characterised by signs of circulatory compromise due to microbial invasion of the bloodstream in the first month of life. It is a leading cause of neonatal mortality and is a global health concern. Early identification is crucial. The "gold-standard"- blood culture - has low sensitivity and is time-consuming. In resource-limited settings, these factors frequently lead to empirical antibiotic use, contributing to antimicrobial resistance.

Rodwell et al. introduced a Hematological Scoring System (HSS) as an adjunctive tool for early diagnosis of neonatal sepsis using various hematological parameters. This observational diagnostic accuracy study aims to establish the reliability of HSS as a diagnostic marker, with potential for global use in the early identification of neonatal sepsis.

Methods: This study is set in a tertiary care centre in Kerala, India. 60 neonates admitted to the NICU were included.

The Hematological Scoring proposed by Rodwell et al is given in the table. Sepsis likelihood was interpreted as follows: ≤2 (less likely), 3–5 (probable), and >5 (very likely).
Sensitivity, Specificity, PPV and NPV of each HSS parameter as well as CRP was assessed using IBM SPSS Statistics, ver. 30.

Results: The study included 60 cases divided into three groups.

1. Definite sepsis (5/60): Blood culture is positive for sepsis.
2. Probable sepsis (25/60): Blood culture is negative but signs or elevated CRP suggestive of infection.
3. No sepsis (30/60): Negative blood culture, normal CRP levels and absence of any signs of infection.

The most common organisms isolated from the definite sepsis group were Staphylococcus Aureus and Acinetobacter Baumanni.

Performance of the hematological parameters were analysed by two different approaches:

1. Definite sepsis group vs. No definite sepsis group (Probable sepsis and No sepsis).
2. Definite and Probable sepsis groups vs. No sepsis group.

In both the approaches, total neutrophil count was the most sensitive parameter with the highest NPV, while I:M ratio was the most specific with the highest PPV.

Total leukocyte count, Total neutrophil count, Immature neutrophil count, I:M Ratio and Platelet Count were found to be statistically significant ($p < 0.05$). Furthermore, a significant association was found between CRP levels and HSS scores.

Conclusion: The HSS is a simple, feasible and cost-effective tool which can be utilised for the early diagnosis of neonatal sepsis. It can also aid in preventing antibiotic resistance as a result of exposing infants to unnecessary antibiotics. On a broader scale, the HSS can contribute to lowering neonatal mortality rates.

Table: The Hematological Scoring System proposed by Rodwell et al.

Parameters	Value	HSS
Total leucocyte count	≤5,000/µL ≥25,000/µL (at birth) ≥30,000/µL (12-24hrs) ≥21,000/µL (day 2 onwards)	1
	Normal	0
Total neutrophil count	No neutrophils	2
	Increased/Decreased	1
	Normal	0
Immature neutrophils	Increased	1
	Not increased	0
Immature-to-total neutrophil ratio	>0.2	1
	<0.2	0
Immature-to-mature neutrophil ratio	>0.3	1
	<0.3	0
Degenerative changes	Present	1
	Absent	0
Platelet count	<150000/µL	1
	>150000/µL	0

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