

Co-relation between Sepsis Score and Blood Culture Report in Neonatal Septicaemia

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Summary:

Objective: To determine the clinical profile and to correlate the sepsis score with blood culture reports in neonatal septicaemia. **Methods:** Over a period of 6 months (1st week of June to 1st week of December'2005) 50 consecutive newborns with suspected septicaemia were enrolled for the study. It was a prospective study and septicaemia was suspected on the basis of clinical presentation like reluctance to feed, lethargy, fever, abdominal distension etc. Sepsis scoring was done for all of them immediately after enrollment into the study. Investigations like CBC, CRP and blood culture were sent for all the enrolled cases. Then the sepsis scores were compared with their blood culture reports to find out any correlation between them. The data analysis was done by SPSS software. **Results:** Among the 50 studied babies 31 were male and rest were female. Most of them were delivered by vaginal delivery (74%) but no significant difference was observed among home and institutional delivery. During delivery 24 babies experienced some

problems of which 83.3% had perinatal asphyxia. About 59% of the studied babies were not exclusively breastfed. Majority of them (62%) presented with reluctance to feed and 54% were preterm low birth weight. Fever and respiratory distress were present in 19 (38%) and 18 (36%) cases respectively. Forty two percent studied babies had positive sepsis score 5 and above. Regarding correlation of blood culture and sepsis score, 70% culture positive cases had sepsis score 5 and above whereas 35% of culture negative cases had the same score. Sensitivity and specificity of sepsis score was 70 and 65 respectively with CI interval 95%. **Conclusion:** Sepsis score can be considered as an useful tool in the diagnosis of neonatal septicaemia specially where there is lack of investigational facilities. Before using this tool further evaluation is needed involving large sample size.

Key words: Neonatal septicaemia, sepsis score, blood culture.

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Introduction

Neonatal sepsis is one of the major health problems throughout the world. Infections are a frequent and important cause of morbidity and mortality in newborn period'. As many as 2% of foetus are infected in utero and upto 10% of infants are infected in first month of life'. Data suggests that among four main causes of neonatal death, infection topped the list². Every year an estimated 30 million newborns acquire infection and 1-2 million of these die³.

Neonatal sepsis (also called septicaemia) is defined as a clinical syndrome characterized by signs of systemic infection and documented by a positive blood culture in the first four weeks of life^{1,4-7}. Newborns of whole world specially those of third world countries are most vulnerable group for this illness. It is crucial to protect the newborns from infection as far as it is possible. In a poor country like ours, it is the responsibility of paediatricians (besides neonatologists) to address this serious neonatal health problems.

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In developing countries the organisms causing neonatal sepsis and meningitis are different. A Bangladeshi study showed that there is considerable change in bacteriae causing neonatal sepsis and meningitis in 5 years period.(1998-2003)⁸. In that study Klebsiella pneumoniae remained the leading pathogen comprising 23% in 1998 and 23.4% in 2003 in causing neonatal sepsis. S aureus was 17% and 6% respectively and Acinetobacter 6.7% and 20.4% respectively.

A number of prepartum and intrapartum obstetric complications are associated with increased

incidence of neonatal sepsis. Examples are: premature onset of labour (<37 weeks of gestation)^{7,9}, premature or prolonged rupture of membrane (>24 hours)^{7,9,10}, prolonged labour and excessive manipulation during labour^{9,10}, intrapartum maternal fever^{7,9}. Pre-term and low birth weight infants are at particular high risk of infection⁹. To diagnose a newborn with neonatal sepsis a careful maternal obstetric history regarding perinatal events should be taken to identify any risk factors. Sepsis score is an useful method for early and rapid diagnosis of neonatal sepsis. It can be considered as screening test for neonatal sepsis. This is specially useful in our context where there is limited facilities for investigations. This score was developed by Tollner U in 1982¹¹. It has been recommended for easy application in our situation¹².

Methodology

Type of the study: Descriptive study.

Place of the study: Neonatal care unit of ICMH.

Duration of the study: 6 months (1st week of June to 1st week of December'2005).

Sample size and sampling: Fifty (50) consecutive newborns by purposive sampling.

Inclusion criteria: suspected septicaemia on the basis of clinical presentation like reluctance to feed, lethargy, fever, abdominal distension.

Exclusion criteria: Perinatal asphyxia with features of HIE.

Sepsis score developed by Tollner U was used. Sepsis score data acquisition form includes 12 clinical and haematological parameters. Each component has some score e.g., *skin colouration* (Normal= 0, moderate change= 2, considerable change= 4), *microcirculation* (Normal=0, impaired=2, considerably impaired =3), *thrombocytopenia* (No= 0, yes= 2). Each component has been clearly explained in the form. **The interpretation of the score:** score 0-4.5 = no sepsis; score ≥ 5 = observation range and suspicion of sepsis.

Sepsis score ≥ 5 was considered as positive sepsis score in the present study. **Study procedure:** Sepsis scoring was done for all the studied babies immediately after enrollment into the study.

Investigations like CBC (Complete blood count), CRP(C-reactive protein) and blood culture were sent for all the enrolled cases. Then the sepsis scores were compared with their blood culture reports to find out any correlation between them.

The data analysis: was done by SPSS software.

Results

Among the 50 studied babies 31 were male and rest were female. Most of them were delivered by vaginal delivery (74%) but no significant difference was observed among home and institutional delivery (Table I-III). During delivery 24 babies experienced some problems, of which 83.3% had perinatal asphyxia (Table IV). About 59% of the studied babies were not exclusively breastfed (Table V). Majority of them (62%) presented with reluctance to feed and 54% were preterm low birth weight. Fever and respiratory distress were present in 19 (38%) and 18 (36%) cases respectively (Table VI). Blood culture was positive in 10 (20%) and a quite good number of patients 21 (42%) had positive sepsis score ie., 5 and above (Table VII). Regarding correlation of blood culture and sepsis score , 70% culture positive cases had sepsis score 5 and above which was statistically significant. Among the culture negative cases only 35% had sepsis score 5 and above (Table VII). Sensitivity and specificity of sepsis score was 70 and 65 respectively with CI interval 95%.

Table I

Sex distributions of studied babies (N= 50)

Sex	Number	Percent(%)
Male	31	62
Female	19	38

Table II

Mode of delivery (N= 50)

Mode	Number	Percent (%)
Vaginal	37	74
Caesarian	13	26

P value=<.001

Table III

<i>Place of delivery (N=50)</i>		
Place	Number	Percent (%)
Home	27	54
Hospital	23	46

P value=<0.54

Table IV

<i>Problem during delivery (N=24)</i>		
Problems	Number	Percent (%)
Perinatal asphyxia	20	83.3
Birth injury	04	16.6

Table V

<i>Feeding pattern of studied babies (N=49)</i>		
Feeding	No	Percent (%)
Exclusive breastfeeding	20	40.8
Artificial feeding	3	6.1
Mixed feeding	6	12.2
Breastfeeding after pre-lacteal feeding	20	40.8

Discussion

Neonatal sepsis is one of the killer diseases of newborns. Specially when it occurs in the first week of life it can be a devastating neonatal problem. Male infants are more prone to develop infection^{5,9}. In the present study 62% was male among the suspected neonatal sepsis babies. The resistance to infection in females is probably related to presence of mutant immunoregulatory genes located on the X chromosome^{13,14}. Prolonged labour and excessive manipulation during labour may increase the incidence of neonatal sepsis^{9,10}. Mode of delivery was pervaginal in 74% septic babies of present study and sepsis may be due to excessive manipulation during labour.

The frequent occurrence of foetal hypoxia and acidosis further impedes host defence mechanisms in small infants⁹ which may be true for the present study, where among 24 septic babies 83% had perinatal asphyxia.

If a previously healthy baby refuses to feed or reluctant to finish food, infection should be suspected.^{7,12,15}. Reluctance to feed was the most common symptom in the present study, then was the prematurity and respiratory distress which may be the most common symptom of neonatal sepsis^{7,9}.

Though neonatal sepsis (also called septicaemia) is characterized by signs of systemic infection and documented by a positive blood culture^{1,4-7} that is not true in 100% cases. Culture positivity may vary from less than 20% upto 70%. In some developing countries blood culture was positive in 30.8%¹⁶ and 42%¹⁷ respectively in otherwise proved neonatal sepsis which was 20% in the present study.

Sepsis score is an useful tool for early and rapid diagnosis of neonatal sepsis. It can be considered as screening test for neonatal sepsis. Recently a seven item weighted clinical score has been developed to diagnose late onset neonatal sepsis¹⁸. Culture positivity has been correlated with the sepsis score in the present study. Among the culture positive cases 70% had higher sepsis score i.e., 5 and above which was statistically significant. The sensitivity and specificity of sepsis score for the present study was 70 and 65 (with CI-95%) respectively which is quite good and acceptable for our country.

Conclusion

It can be concluded from the present study that sepsis score can be used as a tool in the diagnosis of neonatal septicaemia specially where there is lack of investigational facilities. But it needs further evaluation involving large sample size.

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