

CRP Can Be Used As an Early Maker of Neonatal Sepsis

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ABSTRACT

Objective: In this study our main goal is to evaluate the efficiency of CRP, which can be used as an early maker of neonatal sepsis.

Methodology: This Cross-sectional comparative study carried out in the neonatal unit of BSMMU during the period from November 2006 to February 2007. During the study total no of sample was 60 who were randomly collected from the neonatal ward. 30 newborns were taken as case and 30 were taken as control. Blood was collected in aseptic manner from the dorsum of the hand or antecubital vein. In three patients CSF was collected in between the L₄ and L₅.

Result: During the experiment Hypothermia was present in 60.0% and fever was present in 3.3% patient in case group. 43.3% patients had thrombocytopenia in cases compared to none in control. Also, 12 patients had growth of different microorganisms. Out of them Klebsiella 5(16.7%), E. coli was 4(13.3%), Pseudomonas 2(6.7%) and 1(3.3%) showed growth of streptococci.

Conclusion: From our study we can conclude that, in our

aspect more attention should be drawn towards the risk factors and physical examination of neonates. Support from the investigations specially CRP and blood culture are not sufficient to diagnose neonatal sepsis. Further is needed for better outcome.

Keywords: CRP, Neonatal Sepsis, Thrombocytopenia.

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INTRODUCTION

Neonatal sepsis is a clinical syndrome of systemic illness accompanied by bacteremia occurring in the 1st month of life.¹ Neonatal sepsis is best defined by one report where infection in newborn infant with a serious systemic illness in which non-infectious explanation for the abnormal pathophysiological scale are excluded or unlikely.¹ In Bangladesh, there have few published reports on neonatal sepsis. Recently a study of 54 cases was done in special care baby unit in Dhaka Shishu Hospital.² Poor socioeconomic condition, maternal infection, inappropriate management of labour and lack of care of the umbilical stump appear to be principal factor for the development of umbilical sepsis. Reluctant to feed, lethargy, apnoeic spell, jaundice, temperature instability, umbilical discharge were the main presenting features. E. coli was found in 39% cases, staphylococcus aureus in 20.73%. Pseudomonas in 14.8% and others in 25%.

Definite diagnosis of neonatal sepsis is based on the blood or CSF culture both of which take at least 48 hours and are often falsely negative. These result in the over treatment of large number of neonates who present with clinical suspicion of sepsis. CRP, hematological parameters and blood culture have good predictive value in the detection of neonatal sepsis. IL-6 is one of the markers of infection which appear earlier and remain elevated in the 1st 24 hours after which it declines. This initiates the formation of CRP which is elevated 24 to 48 hours after the onset of infection and persists up to the time until the infection is not resolved.³

Though blood culture is the gold standard and has higher sensitivity and specificity over the hematological value and cytokines but this highly microbiological parameter is not available in all over community health situation and it is time consuming

also. Therefore, hematological value and CRP can be evaluated for the early diagnosis of neonatal bacterial infection.

In this study our main goal is to evaluate the efficiency of CRP, which can be used as an early maker of neonatal sepsis.

OBJECTIVE

General Objective

- To evaluate the efficiency of CRP, which can be used as an early maker of neonatal sepsis.

Specific Objectives

- To detect thermic status of newborns
- To identify thrombocyte count of neonates

METHODOLOGY

Study Type

This was a case control study.

Study Place and Period

This study was carried out in the neonatal unit of BSMMU during the period from November 2006 to February 2007.

Sample Size & Data Collection

Total no of sample was 60 who were randomly collected from the neonatal ward.

Specimen Collection

30 newborns were taken as case and 30 were taken as control. Blood was collected in aseptic manner from the dorsum of the hand or anticubital vein. In three patients CSF was collected in between the L₄ and L₅.

Inclusion Criteria: Two or more of the following

Maternal Factors

- H/O PROM- >24 hrs.
- More than 3 vaginal examinations after the ROM.
- Foul smelling liquor.
- Intrapartum fever (Temp- $\geq 98.6^{\circ}F$).

Neonatal Factors

- Lethergy or poor feeding.
- Axillary temp $<36^{\circ}C$ or $>38^{\circ}C$
- Significant jaundice with serum billirubin >15 mg % in the absence of blood group incompatibility.
- Apnoea.
- Respiratory distress.
- Petechiae or bleeding.
- Total leukocytes count $<5000/cumm$.
- Total neutrophil count $<1500/cumm$.
- Band to neutrophil ratio >0.2 .

Control: Neonates without the above criteria

Exclusion Criteria

- Newborn less than 1000 gm
- Newborn with gross congenital anomaly.

Statistical Analysis: First data were edited to the validity and consistency of the data. After proper verification data were coded and entered into computer by using SPSS software programs. Descriptive analysis was done by percentage, mean and standard deviation. Association was observed by appropriate statistical test at 95% confidence interval eg. odds ratio, Chi-square, t-test.

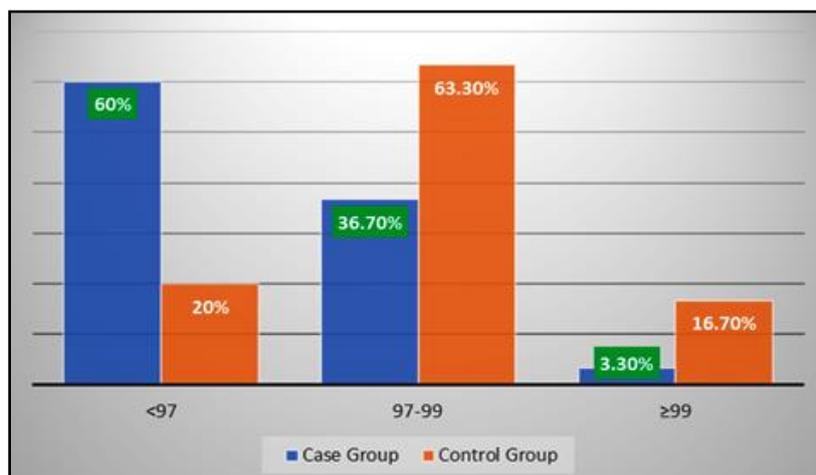


Figure 1: Thermic status of newborns (n=60).

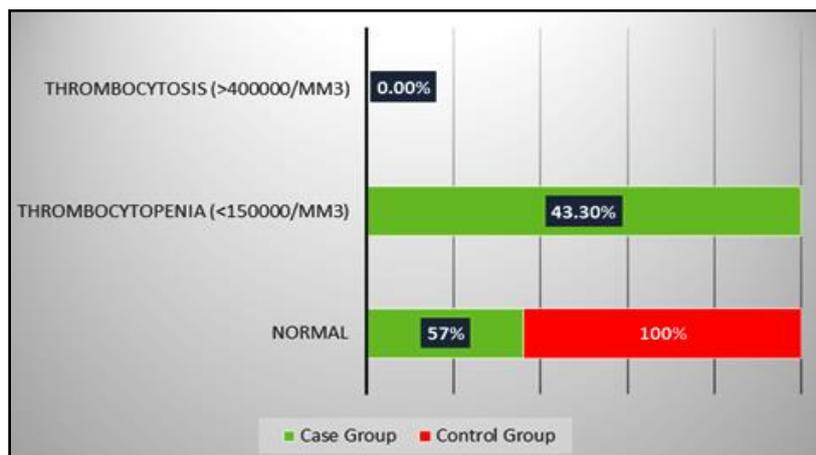


Figure 2: Thrombocyte count of neonates (n=60)

RESULTS

In table-1 shows gender distribution of the patients where male preponderance (56.7%) among the septic cases.

In table-2 shows gestational age of the neonates (n=60). In this table there is a greater number of preterm (63.3%) in cases compare to that of term (36.7%).

In figure-1 shows thermic status of newborns (n=60) where Hypothermia was present in 60.0% and fever was present in 3.3% patient in case group.

In figure-2 shows thrombocyte count of neonates (n=60) where 43.3% patients had thrombocytopenia in cases compared to none in control.

In table-3 shows distribution of the patients according to blood for C/S where 12 patients had growth of different microorganisms. Out of them Klebsiella 5(16.7%), E. coli was 4(13.3%), Pseudomonas 2(6.7%) and 1(3.3%) showed growth of streptococci.

In table-4 shows distribution of the patients according to C-reactive protein (n=60), where CRP is positive in 43.3% cases whereas control group also shows raised CRP levels in 23.3% patients.

Table 1: Gender distribution of neonates (n=60)

Gender	GROUP	
	Case	Control
Male	17(56.7%)	16(53.3%)
Female	13(43.3%)	14(46.7%)

Table 2: Gestational age of the neonates (n=60)

Gestational age	GROUP	
	Case	Control
<37 weeks	19(63.3%)	17(56.7%)
≥37 weeks	11(36.7%)	13(43.3%)

$$\chi^2 = 0.605; p = 1.000$$

Table 3: Distribution of the patients according to Blood for C/S (n=30)

Microorganism	N (%)
Klebsiella	5(16.7%)
E. coli	4(13.3%)
Pseudomonas	2(6.7%)
Others	1(3.3%)
No growth	18(60.0%)

Table 4: C-reactive protein (n=60)

	GROUP	
	Case	Control
Positive	13(43.3%)	7(23.3%)
Negative	17(56.7%)	23(76.7%)

$$\chi^2 = 0.085; p < 0.001 \text{ statistically significant}$$

DISCUSSION

PROM ≥24 hrs. has received the maximum attention of investigators and is an important risk factor, particularly in EONS. It increased the attack rate by more than 10-fold. In our study it was not significant probably due to increased emergency LUCS.^{4,5} Usually newborn baby with sepsis is associated with hypothermia. But fever whenever developed should be considered to be omnia sign of sepsis being other cause of hyperthermia should be excluded. The temperature of the infant with sepsis may also be normal.

Usually newborn baby with sepsis is associated with hypothermia. But fever whenever developed should be considered to be omnia sign of sepsis being other cause of hyperthermia should be excluded. The temperature of the infant with sepsis may also be normal.

One study found that out of 45 cases of suspected neonatal sepsis, CRP was raised in 57.8% and negative in 42.2%. In culture proven sepsis, 100% cases had raised CRP which is an important marker of sepsis.⁶

There are some study emphasizing serial C-reactive protein level in the diagnosis of neonatal infection. Another report showed serial CRP levels are useful in the diagnostic evaluation of neonates with suspected sepsis.⁷

Another article reported that, intrapartum risk factor for early onset sepsis can cause elevation of cord and neonatal CRP levels in the absence of infection. They found a CRP level <6 mg/L at 24 hrs. has a good negative predictive value for neonatal sepsis. But they showed serial CRP levels are not useful in diagnosing early onset sepsis.⁸

Another report said that, the usefulness of serial C-reactive protein measurement in managing neonatal infection. They revealed, in diagnosis of neonatal infection, the negative predictive values in term and preterm infants were 99% and 97.8% respectively although the sensitivities were 61.5% and 75% respectively.⁹

In our study we found that neonates with septicemia (Based on clinical findings) had not raised CRP levels in all cases. There were 30 septic cases but CRP was positive only on 13(43.3%) cases. Remaining 17(56.7%) cases was CRP negative. Moreover, in the control group (without sepsis) CRP was positive in 7 cases (23.3%).

CONCLUSION

From our study we can conclude that, in our aspect more attention should be drawn towards the risk factors and physical examination of neonates. Support from the investigations specially CRP and blood culture are not sufficient to diagnose neonatal sepsis. Further is needed for better outcome.

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