



## Original Research Article

# C-Reactive Protein: A Marker in Deciding Duration of Antibiotic Therapy in Neonatal Septicemia

Shrikant Kogekar, Nilesh Chavan\*, Khyati Jain, Prashant Peshettiwar,  
Madhurendra Singh Rajput and Priyanka Kumari Shahi

Index Medical College, Hospital and Research Center, Indore, India

\*Corresponding author

## ABSTRACT

### Keywords

C-Reactive Protein,  
Antibiotic Therapy,  
Neonatal Septicemia

Early diagnosis of sepsis in the neonate is one of the most difficult problems facing clinicians today. C- Reactive protein has been used as an acute phase reactant to diagnose and follow the course of infection in neonates. The present study was conducted in collaboration between Microbiology and Paediatrics, Index Medical College, Hospital & Research Center, Indore during Jan to May 2015. Fifty consecutive neonates upto 4 weeks of age with birth weight more than 1500 g and suspected septicemia were studied. This study showed out of 50 neonates, 25 weighed between 1500-2500 gms, 5 Weighed between 2001-2499 gms and 20 weighed more than 2500 gms. 60% of the total neonates were male ; 40% weighted preterm. 80% presented within 72 hours of life (early onset septicemia) and 20% after 72 hours. C- reactive protein a valuable marker for evaluate the duration of antibiotic therapy in neonates with septicemia.

## Introduction

Neonatal septicemia is a clinical syndrome of bacteraemia characterized by systemic signs and symptoms of infection in the first month of life. The incidence of neonatal sepsis varies between 11 to 24.5% per thousand live births in India.(Paul VK et al) its clinical manifestations vary from being specific to subtle, testing the vary skills of pediatrician. The inability to be certain of infection, coupled with non specific signs of the life threatening illness in neonates have resulted in widespread use of antibiotics, aggravating the problem of antibiotic resistance. There is increasing need for careful evaluation of indications and

duration of treatment, which in turn would shorten the length and cost of hospital stay and diminish the trauma and side effects of antibiotics.

C – reactive protein, the most commonly used biomarker, is synthesized within 6 hours of exposure to an infectious process and usually become abnormal within 24 h. it falls quickly after efficient of microbial stimulus, due to its short half life of 19 hours. (Vigushin D et al 1993) Thus CRP may be used as a parameter to identify the time period when antibiotics therapy can safely be discontinued in case of suspected

neonatal septicemia, which was the aim of the study.

### **Material and Methods**

The present study was conducted in collaboration between Microbiology and Paediatrics, Index Medical College, Hospital & Research Center, Indore during Jan to May 2015. Fifty consecutive neonates upto 4 weeks of age with birth weight more than 1500 g and suspected septicemia were studied prospectively. Septicemia was suspected with “sepsis score” which included followed signs and symptoms such as refusal for feed, abdominal distention, vomiting, lethargy, jaundice, poor cry, seizures, diarrhoea, apnea, tachypnea, poor capillary refill, hypo-themia, fever and umbilical discharge.

If baby had three or more than three if above signs or symptoms septicemia was suspected. Neonates who had undergone surgery and those with diagnosis of meningitis were excluded from the study because they require longer duration of treatment regimen, serum CRP, blood culture and sensitivity was done in all the cases along with other investigation such as hemogram, X-ray chest, swab for culture and sensitivity as when required.

CRP value was estimated by latex agglutination method with CRP Kit as per instruction in the manual provided by the company. The CRP value of more than 6 mg% was taken as abnormal. Serum CRP was estimated on cord blood/ within 24 hours of birth and again after 7 days of commencing of antibiotic therapy. Antibiotics were stopped when CRP levels return to normal (less than 6 mg%) and babies were discharged after 48 hours of investigation.

### **Results and Discussion**

In the present study out of 50 neonates, 25 weighed between 1500-2500 gms, 5 weighed between 2001-2499 gms and 20 weighed more than 2500 gms. 60% of the total neonates were male; 40% were preterm. 80% presented within 72 hours of life (early onset septicemia) and 20% after 72 hours (late onset septicemia). Incidence of blood culture positivity was 25%, out of which nil were gram positive and 100% were Gram negative. Amongst gram negative, *Klebsiella* was the commonest organism (56%) followed by *Citrobacter* (28%) and *Pseudomonas* (14%).

Bacterial infection stimulates the hepatocytes to produce CRP: a nonspecific immune response, which is a useful clinical marker for the individual host-pathogen interaction. Since the half life of CRP is less than 3 days, a rapid fall is seen with successful therapy, as demonstrated in the present study.

The most common symptoms, by which 60% of these patients presented were refusal for feed, followed by lethargy and respiratory distress which is similar to the observation by other workers. The incidence of blood culture positivity was 25% in the present study. CRP was positive in all culture positive cases. There was no relapse in any of the cases in which antibiotics were stopped following normalization of CRP, which is similar to the observation followed by Stephen et al. A similar study by Squire et al 1982 revealed that authors were able to stop antibiotics 66.5% of cases within 72 hours and could reduce the duration of treatment by 20% in suspected neonatal septicemia cases. In conclusion, newborn with suspected septicemia having raised CRP levels and positive blood culture need longer duration of antibiotic therapy (more than 7 days).

**Table.1** Shows presenting symptoms and signs

Sr. No.	Neonatal septicemia	Symptoms and signs (N=50)	
		N	(%)
1	Refusal for feed	30	60%
2	Lethargy	28	56%
3	Poor cry	30	60%
4	Diarrhoea	00	00%
5	Vomitting	02	04%
6.	Fever	02	04%
7.	Excessive Crying	00	00%

Sr. No.	Signs		
1	Jaundice	03	06%
2	Pyoderma/ Petechae	02	04%
3	Hypothermia	05	10%
4	Cyanosis	00	00%
5	Abdo. Distention	04	08%
6.	Seizures	04	08%
7.	Conjunctivies	00	00%
8.	Fever	02	04%
9.	Apnoea	08	16%
10.	Tachypnoea	20	40%
11.	Poor capillary Refill	20	40%

**Table.2** CRP was Postive in 80% of cases

CRP Value	Number	Duration of treatment	Blood Culture positivity
< 6 mg %	03	3days	Nil
>6 mg %	47	7-14 days	10

**References**

Paul VK, Singh M: Neonatal sepsis in Medical emergencies in children. 2<sup>nd</sup> edition. P.115-120.  
 Vigushin D, Pepys M> Metabolic and scintigraphic studies of radioiodinated human CRP in health and disease. Clin Invest. 1993, 1: 1351-1357.

Sabel KG, Wadsworth C. C- ractive protein in early diagnosis of neonatal septicemia. Acta paediatr scand 1979 Nov 68(6) 825-31.  
 Squire EN, Reich HM, Merestein GB: Critria for the discontinuation of antibiotics therapy during presumptive treatment of suspected neonatal infection. Pediatr infect Dis 1982; 1: 85-90.