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## **Analytical study of septicemia and its outcome in neonates**

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### **Abstract**

The present study is conducted in S. Nijalingappa Medical College during study period of one and a half years from January 2011 to June 2012, neonates admitted to NICU with suspected sepsis were included in the study and neonates who had gross congenital anomalies were excluded. A total of 94 neonates below the age of 28 days with clinical suspicion of neonatal septicemia were included in this study. It was observed that- male babies were more affected by than female babies. Early onset septicemia was more common than late onset septicemia. Preterm babies were more affected by septicemia than full term babies. Early-onset septicemia was presented in 43 cases 58.8% with normal birth weight  $\geq 2000$  gm. Common clinical manifestations of neonatal septicemia were refusal of feeds. (56%), temperature abnormality (46%), sclerema (44%), jaundice (42%), pallor (36%) not doing well (24%), rash (20%) and convulsions (16%). Case fatality rate was 17%.

**Keywords:** Neonates, Septicemia, Low Birth Weight, Sclerema

### **1.Introduction**

Systemic bacterial infection during the first month of life has remained a major cause of infant morbidity and mortality despite the development of broad spectrum antimicrobial agents and technological advancements in life supportive therapy.

The early diagnosis of neonatal septicemia still poses great difficulties. Early clinical symptomatology of neonatal septicemia is mimicked by lot of other disorders affecting the newborn. It is a major cause of morbidity and mortality and it accounts for half of all the neonatal deaths in this country. The overall incidence of neonatal sepsis varies between 1-8 cases/1000 live births. Neonatal sepsis can be divided into two subtypes depending upon whether the onset of symptoms is during the first 72 hours of life or later. Although the term early onset sepsis had been used to refer to neonatal infections occurring as late as one week of age, it should be restricted to those infections with a perinatal pathogenesis, the usual onset of which occur within 72 hours. Early - onset sepsis is caused by organisms prevalent in genital

tract or in the labour room. Ascending infection, transplacental hematogenous spreads are important mechanisms of early onset sepsis. To prevent serious morbidity and mortality caused by untreated or lately treated neonatal septicemia; it is important that the diagnosis is made early and the treatment started as easily as possible. Hence this study was aimed to study clinical profile and outcome of neonatal septicemia.

### **2. Materials and Methods**

This study was conducted in S. Nijalingappa Medical College during study period of one and a half years from January 2011 to June 2012. Neonates admitted to NICU with suspected sepsis were included in the study. Neonates who had gross congenital anomalies were excluded from the study. In all neonates the blood sample was collected from peripheral vein with all aseptic precautions, prior to administration of any antibiotic therapy. 0.5 ml of blood was collected in 5 ml of glucose broth. This sample was immediately sent to Microbiology Department three subcultures were observed after

24, 48 and 120 hrs. If no growth was observed after five days culture was reported as negative. If growth was observed material was further analysed for specific organisms.

### 3. Results

94 neonates below the age of 28 days with clinical suspicion of neonatal septicemia were included in this study. Male babies were more affected by neonatal septicemia than female babies. Early onset septicemia was more common than late onset septicemia. Septicemia was more common in normal birth weight new newborns i.e >2000 gm. Preterm babies were more affected by septicemia than full term babies. Early-onset septicemia was presented in 43 cases 58.8% with normal birth weight  $\geq$  2000 gm. Common clinical manifestations of neonatal septicemia were refusal of feeds. (56%), temperature abnormality (46%), sclerema (44%), jaundice (42%), pallor (36%) not doing well (24%), rash (20%) and convulsions (16%). Case fatality rate was 17%. Mortality was higher in preterm babies. Mortality was higher in early onset septicemia.

**Table no. 1: Distribution of cases according to sex.**

Sex	Male	Female	Total
No. of cases	41	53	94

**Table no. 2: Distribution of cases according to age of onset of septicemia.**

Age of onset	$\leq$ 7days	> 7 days	Total
No. of cases	76	18	94

**Table no. 3: Distribution of cases according to birth-weight.**

Birth-weight	$\leq$ 2000 gm	> 2000 gm	Total
No. of Cases	44	50	94

**Table no. 4: Distribution of cases according to gestational age**

Maturity (Gestational age)	Preterm (<37wks)	Full term (> 37wks)	Total
No. of cases	30	64	94

**Table no. 5: Relation of age of onset of septicemia with maturity.**

Age of onset	Maturity		Total
	Preterm	Term	
$\leq$ 7 days	23(76%)	53(82.8%)	76
> 7 days	7(24%)	11(17.2%)	18
Total	30	64	94

**Table no. 6: Relation of age of onset with birth weight.**

Age of onset	Birth weight		Total
	$\leq$ 2000 gms	> 2000 gm	
$\leq$ 7 days	33(75%)	43(86%)	76
> 7 days	11(25%)	7(14%)	18
Total	44	50	94

**Table no. 7: Clinical features in neonatal septicemia**

Clinical Feature	Frequency	%
Refusal of feeds	28	56%
Temperature abnormality	23	46%
Sclerema	22	44%
Jaundice	21	42%
Pallor	18	36%
Not doing well	12	24%
Rash	10	20%
Convulsion	8	16%
Tachypnea	7	14%
Vomiting	6	12%
Abdominal distension	10	20%
Irritability	4	8%
Pustules	3	6%
Full Fontanelle	2	4%
Diarrhoea	2	4%

**Table no. 8: Outcome of cases**

Out come	Deaths	Survivals	Total
No of cases	16	78	94

**Table no. 9: Distribution of mortality according to maturity.**

Maturity	Outcome		Total
	Death	Survivals	
Preterm	10(62.5%)	20(25.6%)	30
Full-term	6(37.5%)	58(74.4%)	64
Total	16	78	94

**Table no. 10: Distribution of mortality according to age of onset of septicemia.**

Age of onset	Outcome		Total
	Deaths	Survivals	
$\leq$ 7 days	11 (68.7%)	65(83.3%)	76
> 7 days	5 (21.3%)	13(16.7%)	18
Total	16	78	94

### 4. Discussion

94 neonates below the age of 28 days with clinical suspicion of neonatal septicemia were included in this study.

Table 1 shows distribution of cases according to sex 53 male babies(56.4%) and 41 female babies (43.6%) were affected by neonatal septicemia. Nelson stated that males have an approximately two fold higher incidence of sepsis than females.[1] Gupta *et al*[2] observed male predominance (64.7%) in neonatal septicemia. Somu *et al*[3] observed that males were affected more than females. Sinha *et al* observed that the male to female ratio was 52:30 in 1.73:1.[4] Placzek *et al*[5] in their study found 41 males and 24 females out of 65 cases of neonatal septicemia. The male to female ratio was 1.70: 1.

In this study early onset septicemia is  $\leq$  7 days was present in 76 cases (80.8%) and- onset septicemia is > 7 days was present in 18 cases (19.1%). So early-onset septicemia was more common than late-onset septicemia. Our findings are consistent with other studies. Piyush Gupta *et al*[2]. found that 76.4 % of cases occurred in  $\leq$  7 days i.e, early onset type. Vesikari *et al*[6] reported early onset in most of the patients with neonatal sepsis. In 410

cases studied onset  $\leq 7$  days was found in 370 cases.

Table No. 3 shows distribution of cases according to birth weight low birth weight i.e.,  $\leq 2000$ gm was present in 44 cases (68%). Sucilathangam *et al*[7] observed that out of 50 babies 28 babies had normal birth weight. However various other following authors observed that onset of sepsis is more common in low birth weight babies. Nelson[1] and stated that the low birth-weight was the single most important factor in neonatal septicemia. There was 3-10 fold higher incidence of septicemia in these infants than in normal birth-weight infants.

Table No. 4 shows distribution of cases according gestational age. 30 preterm babies (64%) & 64(68%) full term babies were affected. Mulyani Ari *et al*[8] in their study observed that out of 99 neonates suspicious of sepsis 77 neonates were term babies. However, Gupta *et al*[2] found that preterm babies were more affected than full-term babies by neonatal sepsis.

Commonly observed clinical manifestations in this study were refusal to feeds (56%) temperature abnormality (47%), sclerema (45%), jaundice (41%) Pallor (36%), not doing well (24%), rash (21%) and convulsions (17%). Khatua *et al*[9] observed that refusal of feeds, lethargy, diarrhea, temperature abnormality, abdominal distension, jaundice and vomiting were most common presenting features. Mishra *et al*[10] observed that common clinical presentations were jaundice, lethargy, refusal of feeds, vomiting and respiratory distress. All these studies show that clinical features of neonatal septicemia are non specific and may be clinically indistinguishable from those occurring in non-infectious conditions during neonatal period.

In this study it was observed that death occurred in 10 (62.5%) preterms and 6(37.5%) full term. Thus in this study mortality was higher in preterm babies. Our observations are consistent with other studies. Khatua *et al*[9] observed that mortality was 65.5% in preterm babies. Mishra *et al*[10] and Placzek *et al*[5] observed the high fatality in preterm infants. High incidence and increased fatality rate of septicemia in the premature infants and newborns has been ascribed to poor baby defenses against bacterial infections during this age period. This study shows the distribution of mortality according to age of onset of septicemia. It shows that 11 cases (68.7%) with early onset septicemia died, while 5 cases (21.3%) with late onset septicemia died. So in our study mortality was higher in early onset septicemia. These observations are consistent with other studies.

Mathur *et al*[11] observed mortality of

64.5% when the onset of illness was early. High mortality in association with early-onset septicemia was reported by Bhakroo *et al*. [12]

Neonatal septicemia is a major cause of morbidity and mortality in newborn infants. The clinical manifestations are non-specific and vague. So it is important to make the diagnosis early and to start the treatment as early as possible to prevent serious morbidity and mortality caused by untreated or lately treated septicemia. This study concluded that male, term and normal birth-weight neonates are more prone for septicemia. Early-onset septicemia is more common than late-onset septicemia. Clinical features of neonatal septicemia are nonspecific and vague and may be clinically indistinguishable from those occurring in noninfectious condition during neonatal period. Mortality is higher in preterm and low birth-weight babies.

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