Valley International Journals
Open Access Journal

International Journal Of Medical Science And Clinical Inventions
Volume 2 issue 08 2015 page no. 1306-1311 ISSN: 2348-991X
Available Online At: http://valleyinternational.net/index.php/our-jou/ijmsci

Predictability Of Sepsis On The Basis Of Clinical Features

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Abstrct:

INTRODUCTION

Neonatal sepsis is a clinical syndrome characterized by systemic signs of infection and accompanied by bacteremia in the first month of life. Neonatal sepsis is among the three most common illness in the newborn and is second most common cause of mortality among preterm and low birth weight babies.

AIMS AND OBJECTIVES

PRIMARY-

1) To predict the sepsis on the basis of clinical features.

2) To assess variability of sepsis among preterm and term babies admitted in NICU.

SECONDARY-

3) To study agent causing sepsis and antibiotic sensitivity pattern of isolates.

MATERIAL AND METHODS

The Present Descriptive prospective study was conducted in Neonatal intensive care unit, Department of paediatrics, Subharti Medical College, Meerut from june 2014 to june 2015 on 150 neonates (term and preterm) admitted with feature suggestive of sepsis. All neonates included in our study were examined in detail with sepsis screening including blood culture as gold standard and other relevant investigation were carried out.

OBSERVATION AND RESULTS

A total of 150 neonates were registered for the study out of which sepsis was noted to be higher in males 94(62.67%) as compared to females 56 (37.33%). The male to female ratio was 1.6:1. 35(23.33%) of babies with sepsis were very low birth weight babies, (46.66%) of babies were low birth weight and 45 (30%) of babies had weight >2500grams. 111(74%) babies with sepsis were born by vaginal route while 39(26%) were delivered by caesarean section with almost 3:1. Early onset sepsis was present in 61 (40%) and 89(60%) had late onset sepsis.

DOI: 10.18535/ijmsci/v2i9.03

INTRODUCTION

Neonatal sepsis is a clinical syndrome characterized by systemic signs of infection and accompanied by bacteremia in the first month of life. When pathogenic bacteria gain access into the blood stream, they may cause overwhelming infection without much localization termed as septicemia or may get predominantly localized to the lungs resulting in pneumonia or the meninges causing meningitis. Early onset and late onset sepsis is defined on the basis of presentation within 72 hours or after 72 hours of life respectively. Neonatal sepsis is among the three most common illness in the newborn and is second most common cause of mortality among preterm and low birth weight babies.[1] According to World Health Organisation estimates there are 5 million deaths of newborn each year,98% of deaths occurring in developing countries[1,2],which is estimated to be 1.6 million deaths annually and is responsible for 30 to 50% of total neonatal deaths each year in developing countries[3].

Neonatal sepsis is defined by National Neonatology Forum of India[1] as :-

1. Proven sepsis – The baby presents with clinical picture of sepsis, isolation of pathogen from blood, cerebrospinal fluid, urine or other body fluids or autopsy evidence of sepsis.
2. Probable sepsis- Newborn with clinical picture suggestive of sepsis with one or more of the following criteria-
   a) Evidence of predisposing factors i.e maternal fever, foul smelling liquor with prolong rupture of membranes > 12 hours or gastric polymorph > 6/hpf.
   b) Positive septic screen (2 out of 4 parameters)- Total leucocyte count (TLC) <5000 , Immature to total neutrophil (I/T ratio) > .2 , C – reactive protein(>.6mg/dl) by latex Nephrometry, Micro ESR > 15mm in 1 hr.
   c) Radiological evidence of pneumonia.
3. Clinical sepsis : Course of diseases is suggestive of sepsis but the septic screening is negative for sepsis and blood culture is sterile.

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The study was conducted in Neonatal intensive care unit, Department of paediatrics, Subharti Medical College, Meerut on 150 neonates (term and preterm) admitted with feature suggestive of sepsis.

PERIOD OF STUDY : JUNE 14 TO JUNE 15

DESIGN OF STUDY : DESCRIPTIVE PROSPECTIVE STUDY.

All neonates included in our study were examined in detail with sepsis screening including blood culture as gold standard and other relevant investigation were carried out as and when required.

INCLUSION CRITERIA:

Neonates admitted with one of the following clinical features consistent with sepsis-

1) GENERAL FEATURES-
   - Fever
   - Refusal to feed
   - Lethargy
   - Bleeding from any site
   - Hypothermia
   - Skin rashes
   - CFT delay

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2) RESPIRATORY SYSTEM
   - Fast breathing (RR>60)
   - Apnea
   - Cynosis
   - Chest indrawing
   - Crepitation

3) CENTRAL NERVOUS SYSTEM
   - Seizures
   - Bulging fontanelle

4) GASTROINTESTINAL SYSTEM
   - Diarrhoea
   - Vomiting
   - Jaundice
   - Hepatomegaly

EXCLUSIVE CRITERIA:-

- Tracheo-esophageal fistula
- Anorectal malformation
- Intestinal obstruction
- Neural Tube defects
- Congenital Heart disease
- Dysmorphism

DATA COLLECTION

1- Age at presentation
2- Sex
3- Gestation age by LMP and by USG
4- Mode of delivery
5- Place of delivery
6- Person conducting delivery
7- Presence of risk factor for sepsis as PROM, UTI in mother, maternal fever, foul smelling discharge per vagina and diarrhoea in mother.
8- APGAR SCORE
9- Presenting complaint with duration

EXAMINATION

Detailed clinical examination was done in each case at the time of admission and recorded.

1. Weight by using electronic weighing machine
2. Head circumference
3. Chest circumference
4. Gestation age of baby was assessed by using expanded new BALLARD SCORE (1991) for assessment of neonatal gestation.
5. Axillary temperature was recorded using a digital thermometer
6. Perfusion was assessed by capillary filling time.
7. Oxygenation was measured by pulse oxymeter.
8. Blood glucose was measured using dextrose strip.

Septic Screening –

NOTE- septic screen was done before the initiation of antibiotic therapy.

1. Complete blood count
2. General blood picture for band and toxic granules
3. Micro ESR
4. C-Reactive protein
5. Blood culture (BACTEC method)
6. Lumber puncture if indicated
7. Urine for fungal hyphae
8. Chest X-ray
9. Other investigation as and when required

These babies were labelled as probable sepsis, and cases with positive culture were labelled as proven sepsis.

The results will be analyzed by two way anova without replication.

OBSERVATION AND RESULTS

Table – 1 : Basic information

No. of admission in NICU	470
No. of babies in the group a) Intramural	150 55

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b) Extramural	95
Total Blood culture positive	90

As evident from table – 1 , Blood culture positivity was (60%) in 90/150 neonates. Out of 150 newborns in the study group 55 (36.66%) were intramural as against 95(63.33%) extramural i.e almost in ratio of 2:1.

Table – 2 : Distribution of babies according to type of sepsis

TYPES	NUMBER(%)
EARLY ONSET SEPSIS	61(40%)
LATE ONSET SEPSIS	89(60%)
TOTAL	150(100%)

As evident in table-2, early onset sepsis constituted 61 (40%) of total cases of sepsis, late onset sepsis 89(60%).

Late onset sepsis included children who were hospitalised and later admitted to our hospital.

Table – 3 : Variability of sepsis in Preterm and Term Babies.

NUMBER	**Blood culture positive**	**100%**
Total Babies 150	90	60% (90/150)
Preterm Babies 80	52	65% (52/80)
Term babies 70	38	54% (38/70)

Figure 1 Common Clinical features of Probable Sepses in Preterm (80) and Term (70).

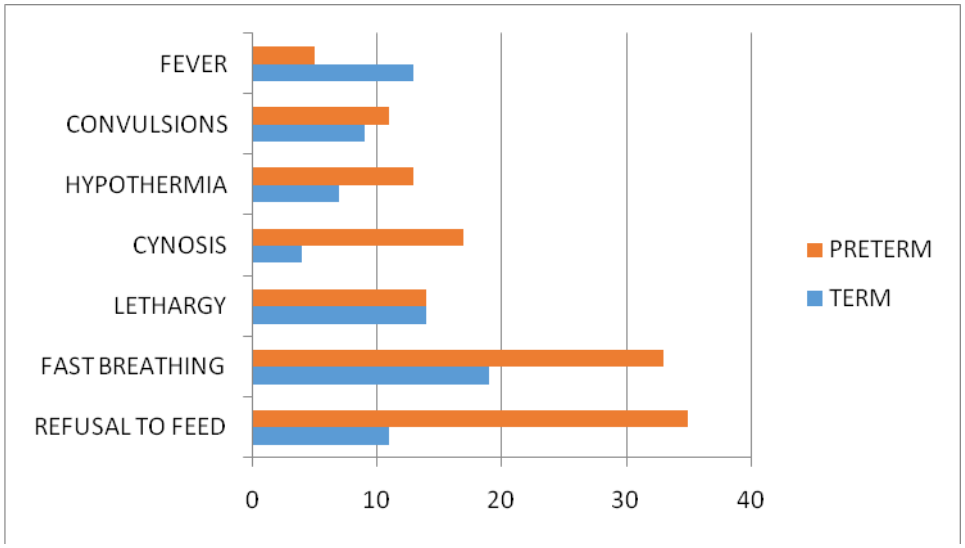

Table 3. Relationship of organism isolated in Proven sepsis.

ORGANISM	**NUMBER**	**PERCENTAGE**

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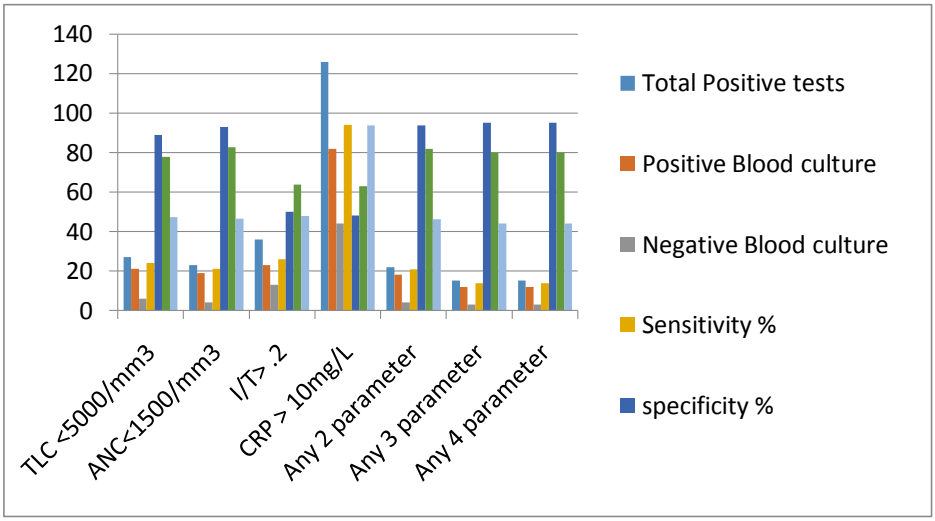
GRAM NEGATIVE	**59**	**65.55**
E.COLI	26	28.88
K.PNEUMONIA	21	23.33
PSEUDOMANAS	7	7.77
ACINETOBACTER	5	5.55
GRAM POSITIVE	14	15.55
S.AUREUS	7	7.77
CONS	4	4.44
ENTEROCOCCI	3	3.33
FUNGUS	**17**	**18.88**
CANDIDA	17	18.88
TOTAL	90	100

Figure 2 : Evaluation of septic screen parameter using blood culture as gold standard.



The above table -13 shows that among the septic screen parameter CRP>10 mg/L had the highest sensitivity, highly specificity was seen when 3 septic screen parameters were club together. Positive predictive value was highest for ANC <1500 and negative predictive value was highest for CRP> 10 mg/L.

DISCUSSION

The present study was undertaken with the aim of ascertaining the predictability of sepsis on the basis of clinical features in preterm and term neonates, the agent causing neonatal sepsis and antibiotic sensitivity pattern of the isolates. A total of 150 neonates were registered for the study out of which sepsis was noted to be higher in males 94(62.67%) as compared to females 56 (37.33%). The male to female ratio was 1.6:1. 35(23.33%) of babies with sepsis were very low birth weight babies, (46.66%) of babies were low birth weight and 45 (30%) of babies had weight >2500grams. 111(74%) babies with sepsis were born by vaginal route while 39(26%) were delivered by caesarean section with almost 3:1. Early onset sepsis was present in 61 (40%) and 89(60%) had late onset sepsis. The risk factor for early onset sepsis were PROM >18 hrs 44(72.13%), perinatal asphyxia 42(68.85%), maternal fever 21 (34.42%), UTI in mother 16(26.22%), foul smell discharge p/v 11 (18.03%) and diarrhoea 4(6.55%). The risk factor

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for late onset sepsis included top feeds 27(31.76%) and 16(18.82%) and history of prior hospitalization.59(65.55%) babies had gram negative sepsis and 14(15.55%) had gram positive sepsis. Fungal was responsible for 17(18.88%) of cases of neonatal sepsis all were late onset.

CONCLUSION

Neonatal sepsis continues to be one of commonest cause of neonatal morbidity and mortality as sepsis was present in 31% of intensive care unit admission. Sepsis tends to be more in low birth weight and preterm babies thus they compromise a cohort of babies that should be under strict surveillance so as to pick up the earliest signs of sepsis. The presenting features of sepsis in neonates are non specific and subtle thus lead to delay in diagnosis and treatment.

LIMITATIONS OF THE STUDY

1. The age of presentation of the babies were different.
2. The study population in our study was mainly from rural or semi urban background which may be different in other studies.
3. The day of presentation may be different in each newborn and may also vary from study to study altering the clinical presentations.
4. There may be recall bias by the mother.

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