



“A STUDY ON CLINICAL PROFILE OF CULTURE POSITIVE BACTERIAL SEPSIS IN NEWBORNS ADMITTED IN NICU OF A TERTIARY CARE HOSPITAL”

Paediatrics

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ABSTRACT

Background: The Neonatal Mortality Rate (NMR) fell from 52 per 1000 live births in 1990 to 22 per 1000 live births in 2019, albeit at a slower rate than the infant and under-five mortality rates¹. Neonatal bacterial sepsis is one of the most common causes of NMR². Septicaemia, pneumonia, meningitis, arthritis, osteomyelitis, and urinary tract infection are all examples of neonatal infections³. Clinical presentation suggests and supports diagnosis of neonatal septicaemia in early stage of the disease. Sepsis in neonates is a preventable cause of mortality. Maximum number of deaths in any NICU is due to sepsis. Based on the clinical features, early diagnosis and intervention can reduce both morbidity and mortality in newborns. So the present study is undertaken. **Aim:** To study the clinical profile and different aspects of outcome in neonatal sepsis. **Methods:** 115 neonates admitted in tertiary care hospital with clinical features of neonatal sepsis, meeting the eligibility criteria were taken as study sample. Clinical profile was recorded, patients were followed and outcome was recorded. **Results:** Most common clinical manifestations were metabolic abnormalities (35.7%), Acidosis (35.7%) followed by hypoxia (32.2%), Apnea (32.2%) and shock (32.2%). 76.5% cases were screened positive for sepsis. 85.2% of the participants were recovered and discharged. **Conclusion:** Neonatal septicaemia is a preventable cause of morbidity and mortality. The clinical manifestations are nonspecific and vague. So it is important to make the diagnosis early and to start the treatment as soon as possible to prevent serious morbidity and mortality

KEYWORDS

Clinical profile, Culture positive, Bacterial sepsis, Newborns

INTRODUCTION:

The neonatal mortality rate (NMR) in India is 22 per 1000 live births, according to the 2019 census.¹ The frequency of neonatal sepsis is roughly 30 per 1000 live births. Newborn sepsis is the leading cause of neonatal mortality and morbidity in underdeveloped nations, accounting for 31% of all neonatal fatalities in India.⁴

Sepsis is classified into two main sub-types according to the time of onset of symptoms.⁵

- Early Onset Sepsis: onset during the first 72 hours of life
- Late-Onset Sepsis: onset >72 hours of life

EONS is caused by organisms most commonly seen in the genital tract or the labour room. Ascending infection transplacental and hematogenous spread are important mechanisms of EONS.⁶

Risk Factors⁷:

1. Very low birth weight neonate or preterm baby.
2. Febrile illness in mother during or within two weeks of delivery.
3. Foul-smelling and/ meconium-stained liquor.
4. PROM >18 hours.
5. Single unclean or more than three vaginal examinations during labour.
6. Birth Asphyxia and difficult resuscitation.
7. Prolonged labour (>24 hours both stages) and difficulty delivery with instrumentation.
8. Pathological evidence of umbilical cord infection or presence of polymorphs (>5/hpf) in the gastric aspirate.

In our country, the cases are due to gram negative organisms, especially E.coli, Klebsiella, enterobacter species. When at least 3 or 5 of the following risk factors if present, the baby is considered to be infected and should be treated with appropriate antibiotics. The presence of foul smelling liquor alone warrants the initiation of antibiotic therapy.

Lons-

Late-onset sepsis usually appears after 72 hours of life, with the majority of symptoms appearing by the end of the first week or the beginning of the second. Neonates usually present with septicaemia, pneumonia or meningitis.⁸

Factors that lead to the risk of nosocomial sepsis include cross-

infection, low birth weight, prematurity, invasive procedures, parenteral fluid therapy, ventilation, and use of stock solutions. Factors that may increase risk of community-acquired late-onset sepsis include poor hygiene, poor cord care and bottle feeding and prelateal feeds.

Clinical data which suggest and support diagnosis of neonatal septicaemia in early stages include a detailed history of risk factors like poor maternal hygiene, no antenatal check-ups, repeated p/v examinations, foul-smelling liquor, PROM, history of prolonged or difficult labour, instrumental delivery, unsterile cord clamping techniques, requiring resuscitation after birth, LBW and preterm babies

Gram negative bacteria such as klebsiella pneumoniae, enterobacter, E.coli, pseudomonas aeruginosa, Alcaligenes fecalis, Salmonella typhimurium, Proteus species, Citrobacter and serratia, account for about two thirds of LONS, while gram positive bacteria such as CONS and COPS account for the rest.

Initial clinical features of infection in newborns include fever, temperature instability, poor feeding, abdominal distension, vomiting, apnea, tachypnea, retractions, oliguria, pallor, mottling, cold, clammy skin, irritability, lethargy, tremors, jaundice, splenomegaly etc.

Aim & Objectives:

To study the clinical profile and different aspects of outcome in neonatal sepsis

Patients And Methods:

The present study was conducted in NICU of tertiary care hospital on neonates admitted with clinical features of neonatal sepsis. The duration of the study was for 1 year i.e. from Jan 2022 to Jan 2023.

Eligibility Criteria

Inclusion criteria:

- Neonates born in the hospital; and those born outside and admitted in NICU
- Neonates presenting with clinical features of neonatal sepsis.

Exclusion criteria:

- Babies who received antibiotics before culture.
- Newborns with major congenital abnormalities.

115 neonates were admitted in NICU with clinical features of neonatal sepsis, meeting the eligibility criteria were taken as study sample. For all the selected cases, sepsis screen, blood culture, urine culture and CSF culture were sent and analysed.

The selection of cases and methods of sample collection for blood culture should be done under strict aseptic conditions. The media is warmed to room temperature prior to inoculation. The skin over the vein is prepared as for a surgical procedure. It is cleaned with 70% alcohol and betadine. With sterile gloves adequate quantity of blood is collected using a sterile dry syringe and inoculated into blood culture media.

Similarly, area is prepared like a surgical procedure and a lumbar puncture and CSF collection should be performed under rigorous aseptic circumstances.

For urine culture, under strict aseptic precautions, area has to be cleaned, catheter places or suprapubic aspiration or clean catch done and sample collected and sent for investigations.

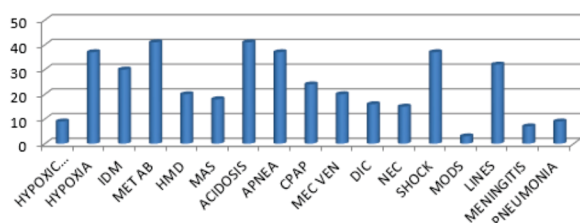
Investigations are sepsis screen (TLC, ANC, micro ESR, CRP and I/T ratio), blood culture, CSF culture and urine culture.

Statistical Analysis:

Data was collected, compiled and entered in Microsoft Excel. Data has been analysed using SPSS version 20.0. Results were explained in form of graphs and tables. Descriptive statistics have been done for all data: Mean and standard deviation (SD) for quantitative variables (continuous data) and frequency counts for qualitative variables (categorical data).

OBSERVATION & RESULTS:

Clinical manifestations



Graph 1: Frequency distribution of study participant based on risk factor

Most common clinical manifestations in 115 neonates were metabolic abnormalities (35.7%), Acidosis (35.7%) followed by hypoxia (32.2%), Apnea (32.2%) and shock (32%).

Table 1: Sepsis screen result in study participants

SEPSIS SCREEN	Frequency	Percent
Positive	88	76.5
Negative	27	23.5
Total	115	100.0

Out of 115 neonates, 76.5% cases were screened positive for sepsis. 23.5% cases were screened negative.

Table 2: Microorganisms in Blood culture

BLOOD C/S	Frequency	Percent
CONS	8	7.0
Corynebacterium	1	0.9
E.coli	21	18.3
Enterococcus	6	5.2
Klebsiella	6	5.2
Klebsiella.oxytoca	24	20.9
Klebsiella.pneumoniae	17	14.8
Pseudomonas	14	12.2
Staph. aureus	7	6.1
Streptococcus	11	9.6
Total	115	100.0

As per blood culture report, Klebsiella.oxytoca was seen in 20.9% cases. E. coli was observed in 18.3% cases. Klebsiella pneumoniae was found in 14.8% cases.

Table 3: Microorganisms in CSF culture

CSF C/S	Frequency	Percent
Not done	113	98.3
E.coli	1	0.9
Sterile	1	0.9
Total	115	100.0

Out of 115 neonates, CSF culture was done in 2 cases. In one it was sterile and in one case, E. coli was observed.

Table 4: Microorganisms in Urine culture

Urine c/s	Frequency	Percent
Not done	113	98.3
Fungal hyphae	1	0.9
Nil	1	0.9
Total	115	100.0

Out of 115 neonates, Urine analysis was done in two cases. In one case, nothing was observed and in another case, fungal hyphae was observed.

DISCUSSION:

In the current study, most common clinical manifestations were metabolic abnormalities (35.7%), Acidosis (35.7%) followed by hypoxia (32.2%), Apnea (32.2%) and shock (32.2%).

In the current study, 76.5% cases were screened positive for sepsis. 23.5% cases were screened negative. Contrasting to these findings, in studies by Shrestha P et al.,⁹ Priyamvada Roy et al.,¹⁰ Sarangi KK et al.,¹¹ Zhou et al.,¹² 20%, 28%, 32.8%, 32% respectively were screened culture positive and 80%, 72%, 67.2%, 68% respectively were screened culture negative.

As per blood culture report in the current study, Klebsiella oxytoca was seen in 20.9% cases. E. coli was observed in 18.3% cases. Klebsiella pneumoniae was found in 14.8% cases. According to Shrestha P et al., (2009), the most common infections are Staphylococcus aureus (S aureus) and coagulase negative staphylococcus (CONS). Klebsiella species (11.6 percent) and Enterobacter species (9.7%) are the most common gram-negative pathogens that cause newborn sepsis.

In current study CSF culture was done in 2 cases. In one it was sterile and in one case, E. coli was observed.

In current study Urine analysis was done in two cases. In one case, nothing was observed and in another case, fungal hyphae were observed.

85.2% of the participants were recovered and discharged in the present study. 14.8% of the cases were discharged with sequelae and there were no deaths.

CONCLUSION:

Neonatal septicaemia is a preventable cause of morbidity and mortality. The clinical manifestations are nonspecific and vague. So it is important to make the diagnosis early and to start the treatment as soon as possible to prevent serious morbidity and mortality.

Aim of this research is to study the clinical profile in neonates with culture positive sepsis and different aspects of outcome seen in them.

Most common clinical manifestations were metabolic abnormalities, acidosis, hypoxia, apnea and shock. Most commonly cultured microorganisms were Klebsiella oxytoca, E. coli, Klebsiella pneumoniae. Most of the neonates have got recovered and discharged.

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