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# Study of Bacterological Profile of Neonatal Sepsis in a Tertiary Care Hospital: Prevalent Microorganism And Their Susceptibility Patterns

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***Introduction:*** *Neonatal sepsis is the most common infection encountered in Neonatal Intensive Care Unit (NICU) and forms the basis for the most of the studies conducted in NICU. The Proper management of these cases in NICU requires a through knowlwdge of the prevailing causativeorganisms and their antibiotic sensitivity/resistance patterns which decide the empiric therapy and may guide the neonatologist.*
***Material and Method:*** *All clinically suspected cases of Neonatal sepsis admitted to NICU from Jan 2016-Dec 2016 were included in the study. The data were analysed statistically.*
***Study type****-Prospective descriptional Study*
***Place of Study*** *–Hi-Tech Medical College and Hospital,Bhubaneswar*
***Result:*** *A total of 840 blood cultures were taken from clinically suspected cases of neonatal sepsis. Out of these only 16.78% showed bacterial growth. The 83.68% were delivered by normal vaginal delivery and 16.31% were delivered by caesarean section.49 neonates were born preterm.81 were term.88.65% were early onset of sepsis and 11.34% were late onset of sepsis. Gram negative bacteria were present in 119 cases and gram positive bacteria in 22 cases. The most common organism was klebsiella species 49.64% followed by E.coli. most common gram positive organism was staphylococcus aureus in 7.09% followed by coagulase negative isolates were sensitive to amikacin and meropenem.*
***Conclusion:*** *Careful selection of antimicrobials helps in early recovery,reduced stay in neonatal intensive care unit and reduced risk for emergence of multidrug resistant organism in NICU. The causative diverse microbial flora and their ever changing antibiotic susceptibility patterns warrant for continuous monitoring.*

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## I. Introduction

Neonatal sepsis is the most common infection encountered in Neonatal Intensive Care Unit (NICU) and forms the basis for the most of the studies conducted in NICU. The Proper management of these cases in NICU requires a through knowledge of the prevailing causative organisms and their antibiotic sensitivity/resistance patterns which decide the empiric therapy and may guide the neonatologist.Septicemia is the significant cause of morbidity and mortality in the neonates and is responsible for 30-50% of total neonatal deaths each year in developing countries. It is estimated that up to 20% of neonates develop sepsis and approximately 1% die of sepsis related causes. It is an important cause of morbidity and mortality among neonates. World Health Organization has estimated that 1.6 million deaths occur globally every year due to neonatal infections and 40% of all neonatal deaths occur in developing countries (WHO report 2006). In India, the incidence of blood culture proven sepsis was reported as 8.5 per 1,000 live births for the year 2002– 2003 by the National Neonatal Perinatal Database (NNPD report 2002-03). Early diagnosis and appropriate therapy of septicemia is of utmost importance to prevent morbidity and mortality. The present study was undertaken to determine the bacteriological profile and their antimicrobial susceptibility pattern of prevalent pathogens isolated from the blood of septicemic neonates from Neonatal Intensive Care Unit (NICU).

Septicemia in neonates refers to generalized bacterial infection documented by positive blood culture in the first four weeks of life and is one of the four leading causes of neonatal mortality and morbidity in India. Neonatal sepsis is a clinical syndrome characterized by systemic signs of infection and accompanied by bacteremia in the 1st month of life. Neonatal septicemia continues to be a major problem for neonates in neonatal intensive care units around the world.

Neonatal mortality rate is one of the indicators for measuring the health status of a nation. There could be various reasons for neonatal mortality but septicemia continues to be a major cause of neonatal mortality and morbidity worldwide. Incidence varies from country to country, but it is much higher in developing countries than in developed nations.According to World Health Organization (WHO) estimates, there are about 5 million neonatal deaths a year, with 98% occurring in developing countries.

Neonatal sepsis is broadly divided into two types according to age of onset: Early-onset sepsis (<72 hrs) and late-onset sepsis (≥72 hrs-28 days). Early-onset sepsis is acquired during fetal life, delivery, or at the nursery. Neonatal sepsis is caused by a variety of Gram-positive as well as Gram-negative bacteria, and sometimes yeasts. The spectrum of organisms that causes neonatal sepsis changes over times and varies from region to region. This is due to the changing pattern of antibiotic use and changes in lifestyle.

Periodic evaluation of organisms responsible for neonatal sepsis is essential for the appropriate management of neonates. Prompt diagnosis and effective treatment is necessary to prevent deaths and complications due to septicemia.

Physical signs and symptoms are useful in identifying infants and children with septicemia. These clinical characteristics can be good predictors for positive blood culture but they have limited specificity and sensitivity (Tumbarello et al., 2007; Weber et al., The uncertainty surrounding the clinical approach to treatment of neonatal septicemia can be minimized by periodic epidemiological surveys of etiological agents and their antibiotic susceptibility patterns leading to recognition of the most frequently encountered pathogens in a particular neonatal setting.

The rational and correct use of antibiotics requires understanding of common pathogens and their drug sensitivity pattern in the regions. Due to constantly evolving antimicrobial resistant patterns there is the need for constant antimicrobial sensitivity surveillance. This will help clinicians provide safe and effective empirical therapies, develop rational prescription programs and make policy decisions and finally assess the effectiveness of all (Karki et al., 2010). As antibiotic sensitivity pattern to common pathogen has been changing day by day, so it has been necessary to study about bacteriological analysis and antibiotic sensitivity pattern. Determination of antibiotic sensitivity patterns in periodic intervals is mandatory in each region for choosing appropriate antibiotic therapy.

## II. Material And Method

All clinically suspected cases of Neonatal sepsis admitted to NICU from Jan 2016-Dec 2016 were included in the study. The data were analysed statistically.

**Study type**-Prospective descriptional Study

**Place of Study** –Hi-Tech Medical College and Hospital,Bhubaneswar

## III. Result

A total of 840 blood cultures were taken from clinically suspected cases of neonatal sepsis. Out of these only 16.78% showed bacterial growth. The 83.68% were delivered by normal vaginal delivery and 16.31% were delivered by caesarean section.51% neonates were born preterm, 49% were term. 88.66% were early onset of sepsis and 11.34% were late onset of sepsis. Gram negative bacteria were present in 119 cases and gram positive bacteria in 22 cases. The most common organism was klebsiella species 49.64% followed by E.coli. most common gram positive organism was staphylococcus aureus in 7.09% followed by coagulase negative isolates were sensitive to amikacin and meropenem.

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| Normal vaginal delivery | 83.68 |
| Caesarean section | 16.78 |

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|---|---|
| Preterm | 51 |
| Term | 49 |

| | |
|---|---|
| Early onset of sepsis | 88.66 |
| Late onset of sepsis | 11.34 |

| | |
|---|---|
| Gram negative bacteria | 119 |
| Gram positive bacteria | 22 |

## IV. Conclusion

Careful selection of antimicrobials helps in early recovery,reduced stay in neonatal intensive care unit and reduced risk for emergence of multidrug resistant organism in NICU. The causative diverse microbial flora and their ever changing antibiotic susceptibility patterns warrant for continuous monitoring.Also, an antibiotic policy should be formulated in the hospital. Depending on the antibiotic sensitivity pattern of the isolates, antibiotics should be used. Furthermore, we advise that health education be provided to the public on the dangers of indiscriminate use of antibiotics, which is currently considered to be a menace in our society and which has been responsible for the ineffectiveness .

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