VOLUME - 13, ISSUE - 02, FEBRUARY - 2024 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Microbiology

STUDY OF BACTERIAL ISOLATES IN NEONATAL SEPTICEMIA AT A TERTIARY CARE HOSPITAL UDAIPUR, RAJASTHAN

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ABSTRACT 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. Neonatal septicemia is an important cause of morbidity and mortality. The present study aimed to know the bacteriological profile of early and late onset neonatal septicemia in RNT Medical College, Udaipur. This study was conducted on 382 blood samples, diagnosed cases of neonatal septicemia admitted in various NICU wards. Direct microscopy and Gram staining of sample was performed and subsequently culture was done on Blood agar, Chrome agar and MacConkey agar and incubated at 37°C for 24 hrs. We observed that neonatal septicemia is a leading cause of morbidity in neonates in our country. Male infants are more commonly affected than female infants, The Coagulase Negative Staphylococcus species, Klebsiella pneumonia, Enterococcus species, Acinetobacter species, Escherichia coli, Staphylococcus aureus, Citrobacter species, Enterobacter species, Streptococcus species and Pseudomonas species are the organisms isolated by blood culture.

KEYWORDS : Neonatal septicaemia, Bacteremia, Gram staining.

INTRODUCTION

Neonatal septicemia is a clinical condition characterized by systemic signs and symptoms due to bacteremia within 28 days of the life. [1] Wordwide, more than 40% of under-five deaths occur in the neonatal period, resulting in 3.1million newborn deaths each year. Sepsis is more common in developing countries when compared with developed countries. Studies have recorded an incidence of neonatal sepsis between 11-24.5/1000 live births in some Asian countries. [2] The immature immune systems and poorly developed skin barrier of the neonates make them highly susceptible to infections. Despite the advances in neonatal care having reduced the complications and improved survival in neonates, sepsis is still contributing significantly to neonatal morbidity and mortality. [3] The risk factors for neonatal septicemia include premature rupture of membranes, prolonged rupture of membranes, prematurity, urinary tract infections, poor maternal nutrition, low birth weight, birth asphyxia and congenital anomalies. [4]

Neonatal sepsis can be divided into two sub-types depending upon whether the onset of symptoms is before 72 hours of life [early onset sepsis (EOS)] or later [late onset sepsis (LOS)]. Early-onset infections are caused by organisms prevalent in the maternal genital tract or in the delivery area. Late- onset septicemia is caused by the organisms thriving in the external environments of the home or the hospital. [5] The bacterial agents implicated in early-onset sepsis include group B streptococcus (GBS), Escherichia coli, Coagulase-Negative Staphylococcus, Haemophilus influenzae and Listeria monocytogenes. The organisms commonly associated with late-onset sepsis include Coagulase-Negative (CONS) Staphylococcus Aureus, Klebsiella pneumoniae, Escherichia coli, Enterobacter species, Pseudomonas aeruginosa and Acinetobacter species. [6]

Gram negative organisms (65-85%) were found to be more frequently responsible for septicemia than gram positive organisms (15%), as evidenced by Indian studies. [7] As the delay in the treatment of neonatal sepsis is associated with increased mortality, empirical therapy is the cornerstone in the management of neonatal sepsis. [8]

Hence, the present study aimed to know the bacteriological profile of onset of neonatal septicaemia in RNT Medical College, Udaipur.

MATERIAL AND METHODS

It was a cross-sectional study, carried out in in the Department of Microbiology, RNT Medical College and Hospital, Udaipur on total of 382 blood samples diagnosed cases of neonatal septicemia admitted in various NICU wards.

Inclusion criteria:

- All blood samples received from Pediatric Department with diagnosed of neonatal septicemia cases of neonatal septicemia infections of 0-28 days from the birth and both sexes, febrile illness in mother during or within two weeks of delivery more than 38°C, oral temperature.

Exclusion criteria:

- Cases of anaerobic bacterial and fungal isolates were excluded from the study.
- Age > 28 days.

After taking consent from neonate's guardian, complete history was taken and sample was collected using aseptic precautions and inoculated aseptically before starting antimicrobial therapy into blood culture bottle (brain heart infusion broth).

All collected data was entered in MS Excel and analysed by SPSS ver. 16 for qualitative data rate, ratio and percentage will be calculated and chi-square test will be applied for statistical inference). P value <0.05 will be considered as statistically significant.

RESULTS

Table 1

Blood Culture Positivity (N=382)

Clinical Suspected Cases	Culture confirmed	Culture Negative
382	212	170

The total 382 Clinical Suspected Cases number of culture positive cases was found to be 212 giving the culture positivity rate of 55.49%.

Table 2 Gender wise distribution of Culture confirmed cases of neonatal septicemia

Gender	No. of neonates	Percentages
Females	88	41.5%
Males	124	58.5%
Total	212	100%

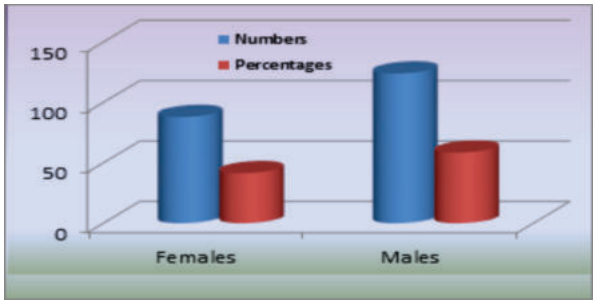

Figure 1

Table 3 Bacterial isolates in blood cultures (N=382)

Type of organism	Organism isolated	Percentage
No growth	170	44.5
CONS	74	19.4
Klebsiella Pneu	40	10.5
Enterococcus	23	6
Acinetobacter	20	5.2
E.coli	18	4.7
Staphy. Aureus	11	2.9
Citrobacter	10	2.6
Enterobacter	8	2.1
Streptococcus	5	1.3
Total	382	100

The 170 (44.5%) According to table 3 and figure 2, organism isolated were CONS, Klebsiella pneumoniae, Enterococcus species, Acinetobacter species and Eschericia coli 74,40,23,20, and 18 respectively with the percentage of 19.5, 10.5, 6,5.2 and 4.7. Staphylococcus aureus, Citrobacter species, Enterobacter species, Streptococcus species and pseudomonas species were found 11, 10 ,8,5 and 3 with the percentage of 2.9, 2.6, 2.1,1.3 and 0.8 respectively, organism isolated were of no growth.

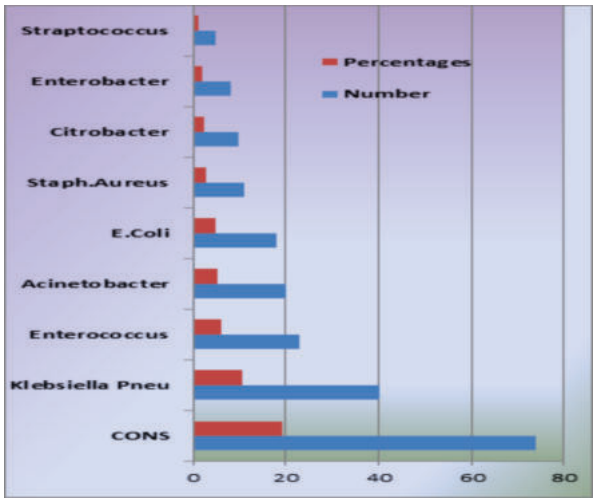

Figure 2 Bacterial isolates in blood cultures (N=382)

DISSCUSSION

On comparison with other studies, conducted by Dinesh Rajwaniya et al. (2018) [1] reported in Bedla, Rajasthan, on total 50 suspected cases of neonatal septicemia, 31(62%) were found to be culture positive. On comparison with other studies, in the study conducted by Varunika Vijayvergiathe et al. (2016) [9] reported in jaipur, Rajasthan. among total 65 suspected cases of neonatal septicemia,32(49.44%) were found to be culture positive.

Our study also correlate with other studies, conducted by Arpita Bhattacharya et al. (2021) [10] reported in Rajkot, Gujarat from a total of 326 (23.25%) positive cases, majority of the neonates 214(65.64%) were male and 112(34.36%) were female.

The reason for male preponderance is unknown, but this could be due to sex-dependent factors. The synthesis of gamma globulins is probably regulated by X–linked immune regulatory genes and as males are having only one X chromosome, they are more prone for neonatal septicemia than females.

In this study, organism most commonly isolated were CONS 74 (19.4%), Klebsiella pneumonia 40 (10.5%), Enterococcus species 23(6%), Acinetobacter species 20(5.2%), Escherichia coli 18(4.7%) Staphylococcus aureus 11(2.9%), Citrobacter species 10(2.6%), Enterobacter species 8(2.1%), Streptococcus species 5(1.3%) and Pseudomonas species 3(0.8%),which also relate with the study conducted by Dinesh Rajwaniya et al. (2018) [1] in Bedla, Udaipur, On comparison with study conducted by Arpita Bhattacharya et al. (2021) reported in Rajkot, Gujarat, CONS (32.21%) was found to be the predominant pathogen followed by Klebsiella (19.63%), Staphylococcus aureus (18.10%), E. coli (15.95%), Acinetobacter (12.27%) and Enterococcus spp. (1.84%).

CONCLUSION

Neonatal septicemia is a leading cause of morbidity in neonates in our country. Male infants are more commonly affected than female infants. Coagulase Negative Staphylococcus species, Klebsiella pneumonia, Enterococcus species, Acinetobacter species ,Escherichia coli, Staphylococcus aureus, Citrobacter species, Enterobacter species, Streptococcus species and Pseudomonas species are the organisms isolated by blood culture. The two most common gram positive cocci isolated are Coagulase Negative Staphylococcus species and Enterococcus species. The two most common gram negative bacilli isolated are klebsiella pneumonia and Acinetobacter species.

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