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Neonatal sepsis: Changing bacteriological profile, a study in tertiary care NICU in Bihar

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Abstract
BACKGROUND*:bacteriological profiling is very important as sepsis remains one of major cause of mortality in NICU in Bihar. Changing pattern of bacterial infection and emergence of resistant strains in NICU has posed great challenge before treating paediatricians. This study will look into prevalent strains in NICU and will help in reducing sepsis related mortality and morbidity.* ***MATERIAL AND METHODS****: It was across sectional study conducted in NICU of NMCH from November 2017 to April 2018. All patient admitted in NICU during this period with diagnosis of sepsis were included in this study. Blood cultures were sent and report analysed.****RESULT****:Out of 365 samples 140 (38%) were positive and showed growth. 60% (n=85) were male and female were 40% (n=57). Mean age of admission was 4.2 day. Inborn was 10% (n=14)outborn was 90% (n=127). Premature was 30% (n=42). Low birth weight accounted for 60% (n=84) cases of culture positive sepsis. Most common organism isolated was Staph. aureus(39%) out of which MRSA was36% of total Staph aureus. ESBL accounted for 58% OF gram negative isolates which included Klebsiella(42%), E.coli(33%), NFGO(10%), Enterobacter(14%). All Acinetobacter isolated were MDR.****Conclusion****:There is shift in prevalence of gram positive organism in NICU. NFGO and Acinetobacterbaumanii which dwell in NICU and spread by cross infection needs to be checked. Urgent and strict action plan is needed at every level of care giving to check the spread of resistant organism.*

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I. Introduction

Neonatal septicemia refers to generalized bacterial infection documented by a positive blood culture in the first 4 wk of life. It remains the major cause of mortality and morbidity accounting for 30–50 % neonatal deaths in developing countries.1Neonatal septicaemia is one of leading cause of neonatal mortality in India. Understanding the bacteriological profile in neonates suffering from sepsis not only prevents irrational use of antibiotics but at the same time reduces mortality, morbidity as well as cost of treatment. Organism most commonly associated with early onset sepsis in neonates include Group B *Streptococcus*, *Escherichia coli*, coagulase negative *Staphylococcus* (CONS), *H. influenzae* and *Listeria*.3 Late onset sepsis is commonly caused by *S. aureus*, *E. coli*, coagulase negative *S. aureus*, *Klebsiella*, *Pseudomonas*, *Acinetobacter* and anaerobes.3
Increased prevalence of ESBL, MRSA, has been found in recent times in tertiary care facilities which has not only made management of sepsis more challenging but is also a cause of concern as very limited antibiotics are available to treat such cases.

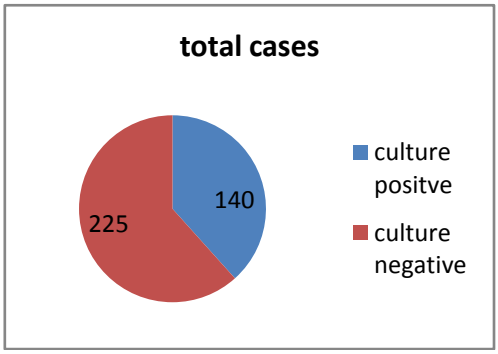
II. Materials and methods:

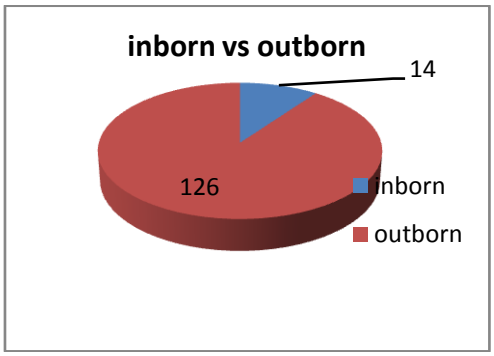
It was across sectional studyconducted in NICU of NMCH from November 2017 to April 2018. All patient admitted in NICU during this period with diagnosis of sepsis were included in this study. 2 ml of blood was collected from all neonates with full aseptic and antiseptic measures and was sent for blood culture. Neonates were classified into various groups according to risk factorssuch as LBW, Meconium aspiration, birth asphyxia, prematurity, mechanical ventilation. Total of 365 samples were included in this study. Blood culture bottle were transported immediately to lab and were processed accordingly.

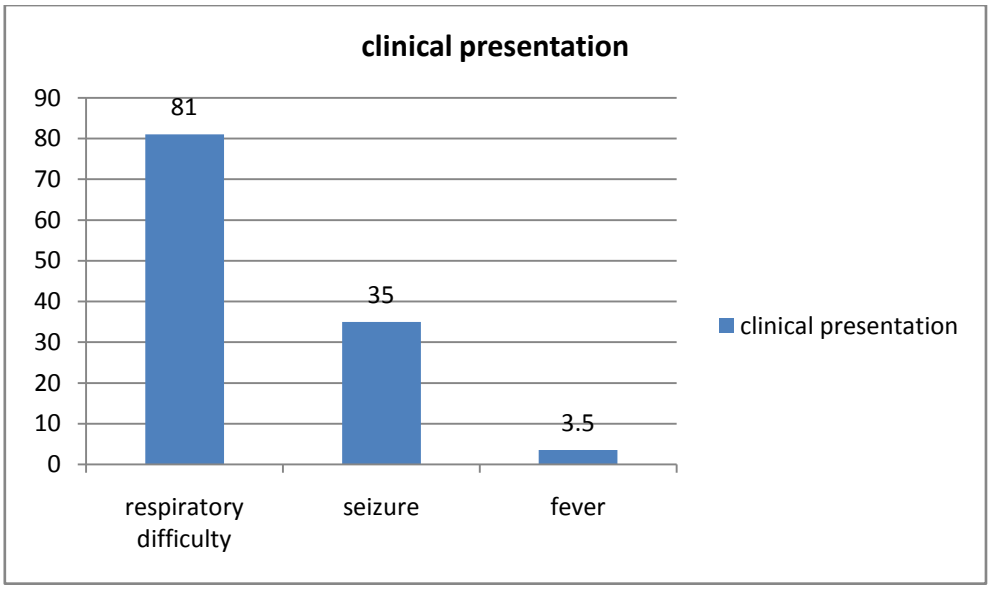
III. Result

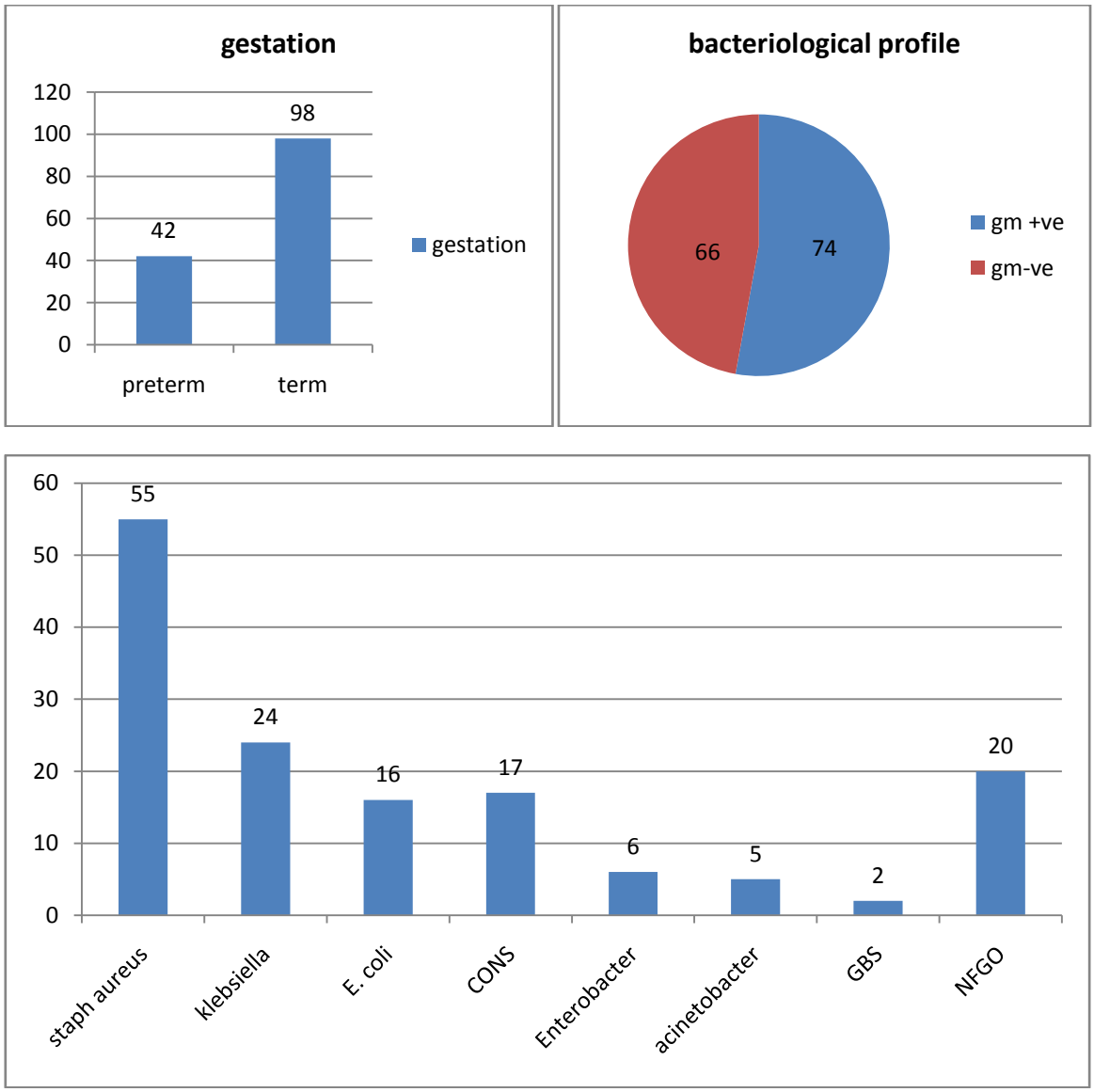
Out of 365 samples 140 (38%) were positive and showed growth. 60% (n=85) were male and female were 40%(n=57). Mean age of admission was 4.2 day. Inborn was 10%(n=14) outborn was 90%(n=127). Premature was30%(n=42). Low birth weight accounted for 60%(n=84) cases of culture positive sepsis.

Most common clinical presentation was respiratory difficulty 58%(n=81), followed by seizure 25%(n=35)followed by fever15% (n=21).
Of 140 samples which were positive gram positive were 53%(n=74) gram negative were47%(n=66).
Organism wise tally was as below:
Staph aureus- 55(39%)
Klebsiella-24(17%)
E coli-16(11.5%)
CONS-17(12.14%)
Enterobacter-6 (4.2%)
Acinetobacter baumanii-5 (3.5%)
GBS-2(1.42%)
NFGO-20 (14.2%)
Amongst *Staph.aureus* isolated cases 70% were neonates who were being treated in some other facility beforehand for a day or two and were referred to our centre afterwards. MRSA isolates accounted for 36% of total *S aureus* isolates. ESBL accounted for 58% OF gram negative isolates which included *Klebsiella*(42%), *E.coli*(33%), NFGO(10%),*Enterobacter*(14%). All *Acinetobacter* isolated were MDR.









IV. Discussion

Septicaemia remains one of primary disease leading to neonatal mortality. One of most important factor deciding the outcome in such case is prompt use of appropriate antibiotics delay in initiating proper antibiotic therapy can lead to accelerated downhill course during stay in NICU.

Bacteriological profile in NICU keeps changing with time and region. In this study it was found that resistant strain is not so uncommon in NICU especially if the facility is treating outborn and referred cases. Bacteriological profile has changed worldwide from gram negative to predominant gram positive isolation.4

Especially in preterm and LBW neonates longer stay in NICU along with increased intervention expose them to organism which are difficult to treat and manage.

Bacteriological profile in our study shows more gram +ve isolates as compared to gram –ve. This is in concordancewith study carried out by Ballot *et al2*, Kaufman and Fairchild7 and Hoogen*et al8*.

Increasing gram positive infection may be attributed to spread by horizontal transmission from healthcare workers in NICU. All gram positive isolates were sensitive to vancomycin. This finding is similar to study as conducted by Hoogan*et al8*. MRSA was 36% of all *Staph.aureus* which is high as compared to study done by Kaistha*et al9*.

Gram negative showed high resistance to cephalosporin which is comparible to study carried by Agnihotri*et al*5 and Bhat*et al*6. ESBL were 58% of total gram negative isolates, this may be a reflection of indiscriminate use of higher antibiotics in peripheral hospitals.

V. Conclusion

This study was conducted to search for recent pattern of infection prevalent in our region and after analysis of result we want to stress upon fact that judicious use of antibiotics in primary centres and peripheral hospitals along with hyginemaintainance is key factor. Apart from itthere is shift in prevelance of gram positive organism in NICU. NFGO and *Acinetobacterbaumanii* which dwell in NICU and spread by cross infection needs to be checked. Urgent and strict action plan is needed at every level of caregiving to check the spread of resistant organism.

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