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RESEARCH ARTICLE

A STUDY ON BACTERIAL PATHOGENS CAUSING NEONATAL SEPTICAEMIA IN NEONATAL INTENSIVE CARE UNIT IN A TERTIARY CARE HOSPITAL WITH THEIR ANTIBIOTIC SENSITIVITY PATTERN

Dr. Priyatharsini Velmurugan and Dr. Poosapati Ratna Kumari
2nd Year Postgraduate, Professor, Dept. of Microbiology, Siddhartha Medical College, Vijayawada.

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Abstract

Introduction:-

Neonatal sepsis is defined as a clinical syndrome characterized by signs and symptoms of infection with or without accompanying bacteremia in the first month of neonatal life. In developing countries, it is an important cause of neonatal morbidity and mortality. Day 0 to 28 days is considered as the most hazardous part of the neonatal life. Infections contribute to the majority of neonatal deaths worldwide. Prematurity, low birth weight, prolonged rupture of membranes are major risk factors predisposing the neonate to sepsis. The detection of microorganisms in the neonate's blood has a great diagnostic and prognostic significance. Etiological basis of infections in the neonatal period can only be established by recovering the organisms in the neonate's blood. Hence it is important to study the microbial aetiology and determine the antimicrobial susceptibility of the microbial isolates for effective management of the cases. It also helps to develop rational antibiotic policy for the NICU. So the present study was undertaken to know the bacteriological profile and antibiotic sensitivity pattern of neonatal septicaemia.

Methods:-

A total of 150 blood samples were received from Neonatal intensive care unit of old GGH VJA, from January 2020 to October 2020 to Department of microbiology. 2 ml of blood was sampled from the peripheral vein under aseptic conditions before antibiotic interventions and inoculated into brain heart infusion broth (BHI) and incubated for 24 hours. Subcultures were done on to fresh 5% sheep blood agar and Mac Conkey's agar. Isolated organisms were identified by cultural characters, morphology and standard biochemical tests. Antibiotic susceptibility testing was performed by Modified Kirby-Bauer disc diffusion method, and results were interpreted as per CLSI guidelines.

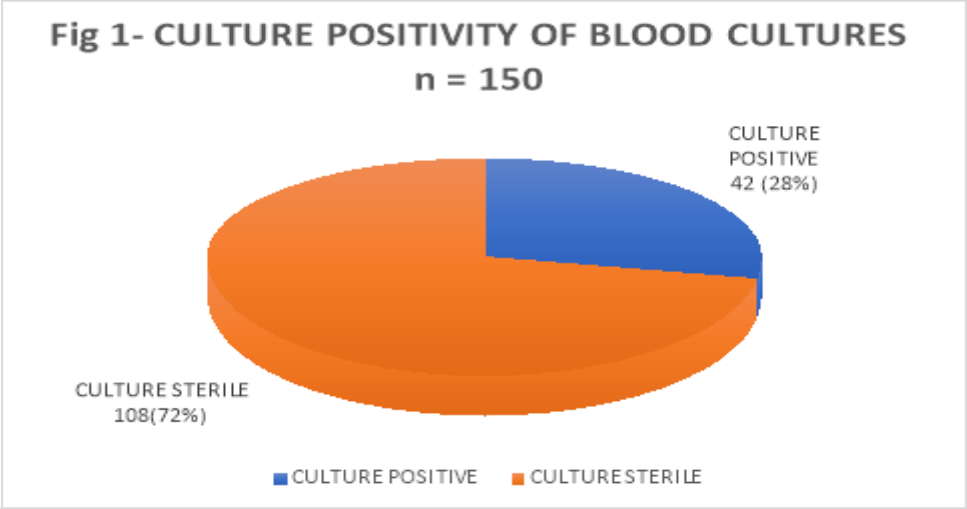
Results:-

Of the 150 blood samples processed, 42 (28%) were culture positive,108 (72%) were culture sterile.Klebsiella pneumoniae were 17 isolates (40.47%) was the most commonly isolated organism, followed by Staphylococcus aureus 10 isolates(23.8%), Escherichia coli 7 isolates(16.66%), Coagulase negative staphylococcus aureus 4 isolates (9.52%), Pseudomonas aeruginosa 2 isolates (4.76%) and Acinetobacter baumanii 2 isolates (4.76%). Gram negative organisms were sensitive to imipenem(91.7%), cefoperazone& sulbactam(82.4%), amikacin(78.1%), Piperacillin & Tazobactam(95.3%), gentamycin(90.5%), cefixime(80.3%) and resistant to Ceftriaxone(63.2%), Levofloxacin(27.7%) and Ceftazidime(15.8%).Gram-positive organisms were sensitive to linezolid(100%),vancomycin(100%), ciprofloxacin(85.1%), ceftazidime (97.3%)and resistant to penicillin(11%), doxycycline(17%), Amoxycillin(8%) and Erythromycin (5%).

Corresponding Author:- Dr. Poosapati Ratna Kumari M.D
Address:- Professor, Dept. of Microbiology, Siddhartha Medical College, Vijayawada.

Discussion:-

Blood cultures remain as an important mode of investigation in sepsis. Clinical symptoms along with positive blood cultures help in diagnosis and appropriate treatment of sepsis.The present study has culture positivity of 22% (28 samples) which corelates with Paulamidutta et al and Rao Pooja et al. with culture positivity of 21.79% and 21.68%. The studies of Hamida Van Staaden et al showed lower blood culture positivity of 9.0% and Deepeshwara Nepal et al.10.5% and JimbaJatsho 12.15%. Higher blood culture positivity was seen in Efeabolodje 61% , Khadija babikerabdelsalam 56% and Pradeep Verma et al. 45.2%.The present study showed that the isolates were gram negative organisms (67%) , gram positive organisms (33%) which coincides with the studies of Muhammed Abdul-Rahman et al. recorded (31%) and (23%),studies of EfeAbolodje et al. accounting for 32% of gram positive organisms and (29%) of gram negative organisms.The above study shows that Klebsiella pneumoniae (40.47%) was predominantly isolated among gram negative organisms which is in line with the study done by Hamida van Staaden et al. (42%), Pradeep Verma et al. (48.21%) and Sherko Muhammed Abdul-Rahman (25.92%).Among gram positive organisms, Staphylococcus aureus (23.8%) was predominantly isolated in this study which was also reported by Khadija BabikerAbdelsalam et al (34.8%), Deepeshwara Nepal et al and Sherko Muhammed Abdul-Rahman et al (22.2%).Gram negative organisms were sensitive to imipenem, cefoperazone& sulbactam, amikacin, Piperacillin & Tazobactam, gentamycin, cefixime which was line with studies of Paulami Dutta et al. and Rao Pooja and Nissi Priya et al. and resistant to Ceftriaxone, Levofloxacin and Ceftazidime which were in line with Pradeep verma et al.,Deepeshawara Nepal et al. and Khadija BabikerAbdelsalam et al.Gram-positive organisms were sensitive to linezolid, vancomycin, ciprofloxacin, ceftazidime which correlated with studies done by Pradeep Verma et al.and Kumar shambunath et al., and resistant to penicillin, doxycycline, Amoxycillin and Erythromycin in line with the studies done by Kiran kumarms et al. and Deepeshwara Nepal et al.



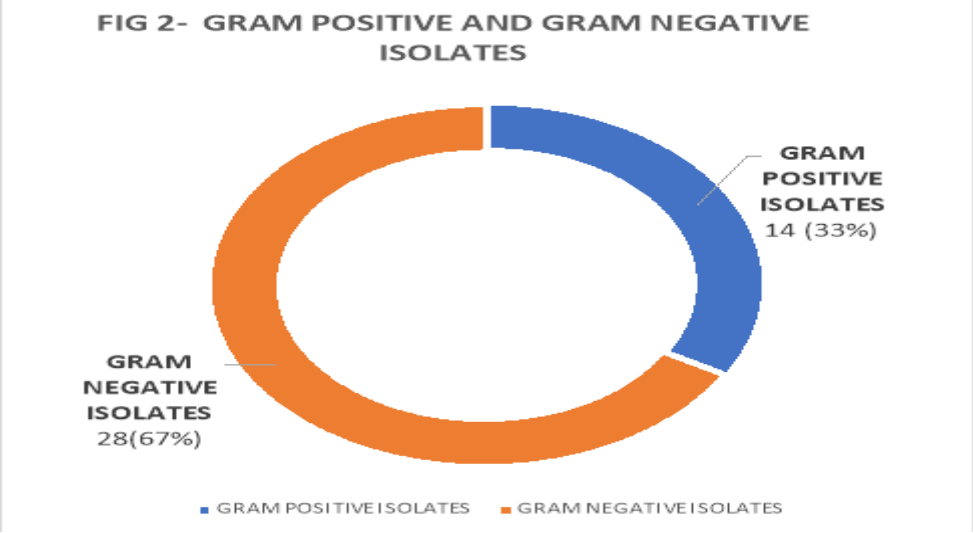


FIG 3 - ORGANISMS ISOLATED FROM NEONATAL BLOOD CULTURES

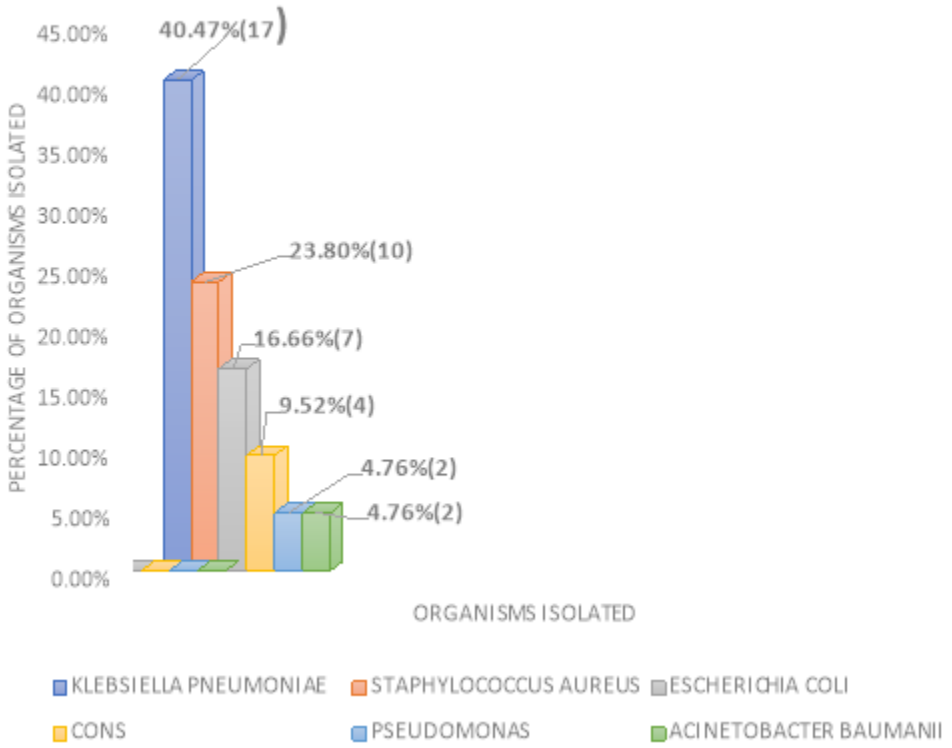
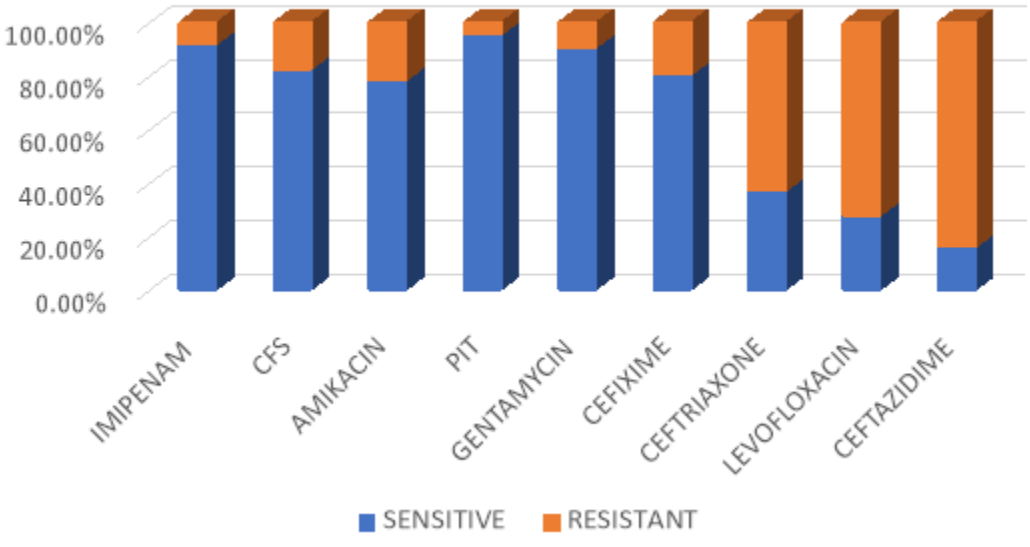
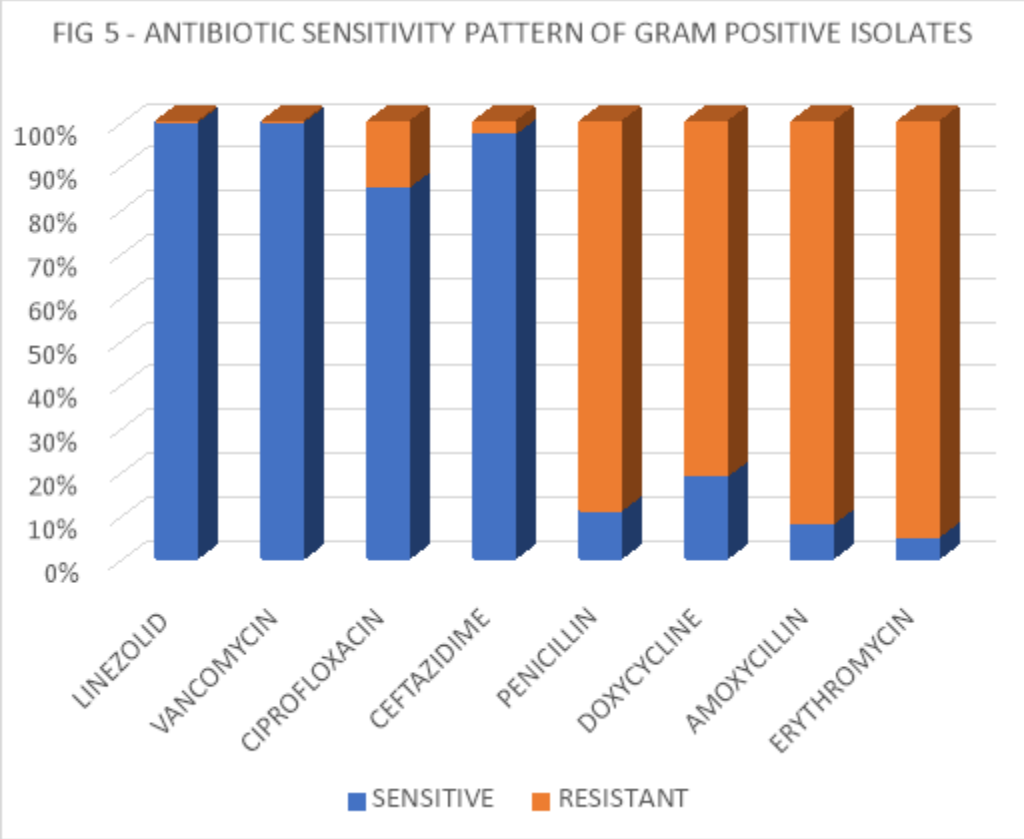


FIG 4 - ANTIBIOTIC SENSITIVITY PATTERN OF GRAM NEGATIVE ISOLATES





Conclusion:-

The microbial etiology of neonatal septicemia is diverse. Septicemia is most frequent and a severe disease which threatens survival, during first few weeks of life. The changing pattern and frequent emergence of resistant bacteria make the problem more difficult. For best results in infection management, nurseries should periodically review their bacterial sensitivity pattern and the antibiotic policy. Hence, NICU should understand the importance of a periodic study of the microbial bacterial spectrum and the resistance pattern of the microorganisms associated with neonatal infections, in order to design a specific empirical antibiotic regimen for the NICU. Effective hand washing, barrier nursing and strict aseptic measures are to be followed while taking care of neonates. Antibiotic stewardship policies should be followed to decrease the emergence of multi drug resistant organisms.

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