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RESEARCH ARTICLE

BACTERIOLOGICAL PROFILE AND ANTIBIOTIC SENSITIVITY PATTERN OF NEONATAL SEPTICAEMIA USING AUTOMATED BLOOD CULTURE AND VITEK-2 SYSTEMS IN A TERTIARY CARE HOSPITAL, BENGALURU

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ABSTRACT

Background: Neonatal sepsis refers to systemic infection of the newborn. It is characterized by nonspecific symptoms, and documented by positive blood culture. An estimated 1.6 million deaths occur due to neonatal infections worldwide, 40% of them being limited to developing countries. The incidence of neonatal sepsis in our country is around 30 per 1000 live births. These children are more likely to have neuro developmental side effects. Therefore it is important to diagnose and treat the condition as early as possible. **Objective:** The aim of the present study is to determine the microbiological profile of neonates with sepsis and to determine their antibiotic susceptibility pattern using automated systems-BacT/ALERT and Vitek 2 systems. **Materials and Methods:** This study is a Retrospective study conducted between December 2017 and February 2018 at NICU, Vani Vilas hospital, BMC&RI, Bengaluru. All admitted neonates with clinical signs and symptoms of sepsis at the time of admission or who developed sepsis during their hospital stay were included in the study. Blood samples were collected aseptically from neonates suspected with neonatal sepsis. Samples were inoculated into pediatric automated blood culture bottle "pediatric" (yellow, 30 ml, BacT/ALERT PF). Cultures with positive results were streaked on blood and Mac Conkey agar. Identification and antibiotic sensitivity were done using Vitek-2 systems. **Results:** In this study blood samples were collected from 253 neonates admitted to NICU ofVanivilas hospital, 72 samples were found to be culture positive. The most common organism isolated from both Early onset sepsis(EOS) and Late onset sepsis(LOS) was *Klebsiellapneumoniae*57% and 53% respectively. Most of the *Klebsiella* organisms were sensitive to Piperacillin-tazobactum, Amikacin and Imepenem. The next most common organism isolated was *Staphylococcus aureus* in EOS and *Enterococcus* species in LOS. The most important risk factors found were preterm and low birth weight, with respiratory distress being the most frequent presentation. **Conclusion:** Appropriate identification of sepsis source, prompt antibiotic prescription and aggressive management can effectively prevent adverse events following neonatal sepsis. There is requirement of simple and sustainable intervention to reduce the burden of multidrug resistant pathogens causing sepsis. The implementation of hand washing, barrier nursing and antibiotic stewardship policies is need of time.

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INTRODUCTION

Neonatal sepsis refers to systemic infection of the newborn. It is characterized by nonspecific symptoms, and documented by positive blood culture. The knowledge of common bacterial agents causing septicemia and their antibiogram is useful in deciding empirical antimicrobial therapy. The pattern of organisms causing sepsis differs from place to place and can change in the same place over a period of time (Renuka Anegundi, 2017).

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Early-onset neonatal sepsis(EOS) refers to the presence of a confirmed infection in the blood of patients younger than 72 hours of life, and late-onset neonatal sepsis (LOS)refers to the onset of such infection between 72 hours and 90 days old (Reyes, 2015). An estimated 1.6 million deaths occur due to neonatal infections worldwide, 40% of them being limited to developing countries. The incidence of neonatal sepsis in our country is around 30 per 1000 live births (Chacko *et al*., 2005). Infants surviving neonatal sepsis can have significant neurologic sequelae as a consequence of central nervous system involvement, septic shock or hypoxemia secondary to severe parenchymal lung disease. Early treatment with appropriate antibiotics would minimise the risk of severe

morbidity and mortality besides reducing the emergence of multidrug resistant organisms in intensive care units by rational antibiotic use (Viswanathan *et al*., 2012). Routine use of broad spectrum antibiotics alters the microbial flora resulting in emergence of resistant organisms and fungal infections (Vinodkumar *et al*., 2008). Therefore it is important to diagnose and treat the condition as early as possible. The spectrum of microbial etiology of neonatal sepsis varies from region to region and even varies in different hospitals of the same region.

Objectives of the study

- To identify the microbiological profile and antibiotic sensitivity pattern of neonatal septicemia using automated blood culture systems.
- To assess various factors contributing to neonatal sepsis

MATERIALS AND METHODS

This study is a Retrospective study conducted between December 2017 and February 2018 at NICU, Vani Vilas hospital, BMC&RI, Bengaluru. Ethical clearance for the study was obtained from the institutional ethical committee. All admitted neonates with clinical signs and symptoms of sepsis at the time of admission or who developed sepsis during their hospital stay were included in the study. Blood samples were collected aseptically from neonates suspected with neonatal sepsis. Samples were inoculated into paediatric automated blood culture bottle "paediatric" (yellow, 30 ml, BacT/ALERT PF).

Cultures which flagged positive in the automated blood culture system were streaked on Blood and Mac Conkey agar plates. Identification and antibiotic sensitivity was done using Vitek-2 systems (CLSI, 2016).

RESULTS

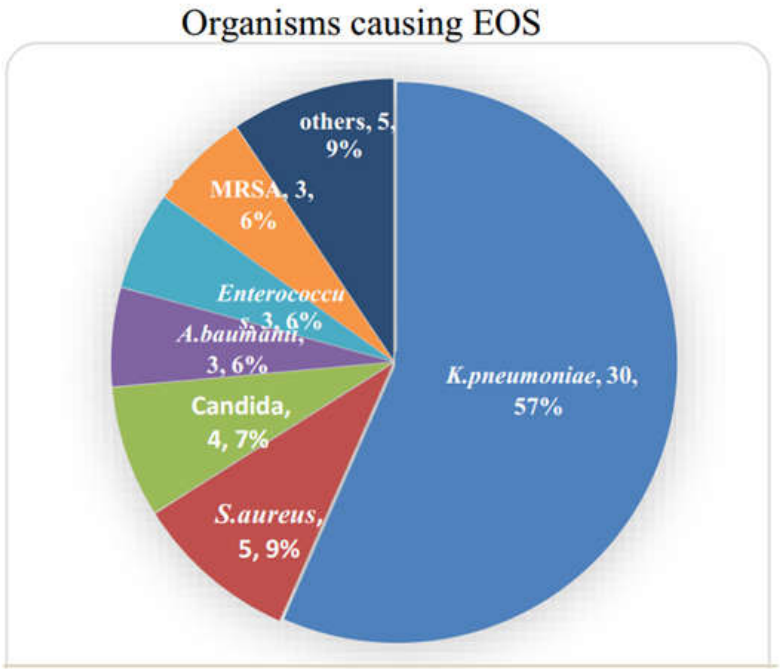
In this study blood samples were collected from 253 neonates admitted to NICU of Vani Vilas hospital. 72(28%) blood samples were found to be culture positive. Out of 253 neonates, 156(62%) were male and 97(38%) were female babies. Early onset sepsis (EOS) was suspected in 190 neonates and Late onset sepsis (LOS) in 97 neonates. 53(28%) blood samples yielded positive cultures in EOS and 19(30%) in LOS. The most common organism isolated from both Early onset sepsis (EOS) and Late onset sepsis (LOS) was *Klebsiellapneumoniae* which was 57% and 53% respectively.

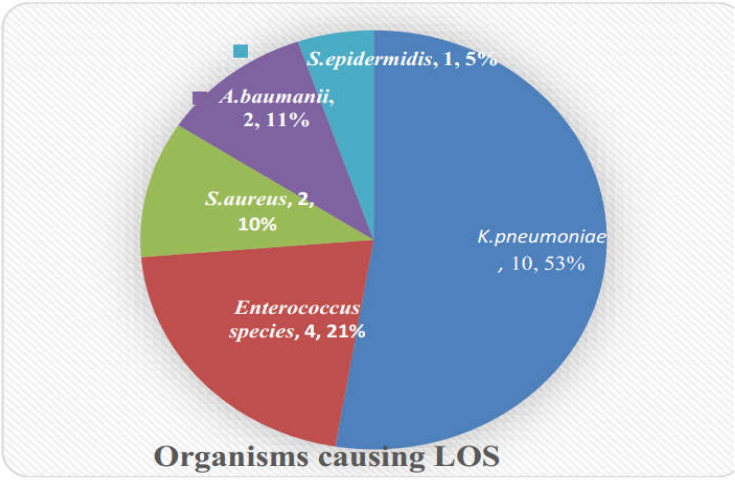
Most of the *Klebsiella* organisms were sensitive to Amikacin, Piperacillin-tazobactum, and Imepenem. The next most common organism isolated was *Staphylococcus aureus* in EOS and *Enterococcus* species in LOS. The most important risk factors found were preterm and low birth weight, with respiratory distress being the most frequent presentation.

DISCUSSION

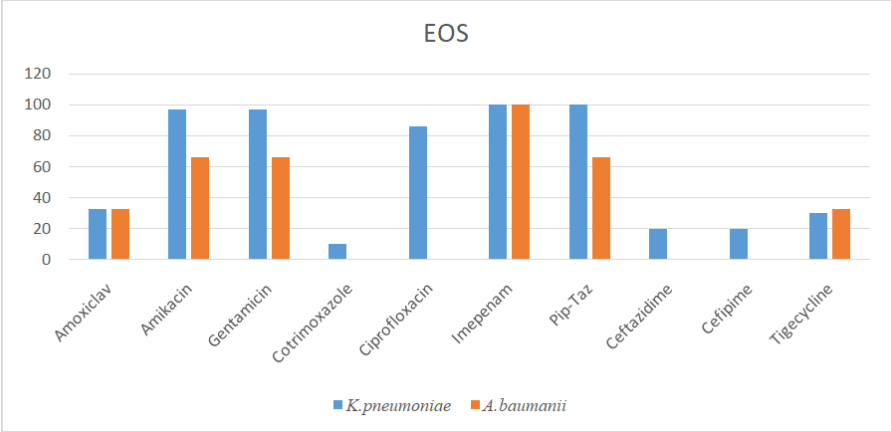
In this study blood culture positivity was 28%. Culture positivity in EOS and LOS was 28% and 19.58% respectively. This is lower than in the studies of Renuka Anegundi *et al and* Chacko B *et al* where the culture positivity was 46.8% and 55.4%. *Klebsiellapneumoniae* was the most common organism isolated in our study similar to the study of Vishwanath R *et al*.

Sl No	Studies	Percentage of Isolates	Most Common Organism
1.	Renuka Anegundi *et al. (2017)*	46.8%	MR CONS, *K.pneumoniae*
2.	Chacko *et al. (2005)*	41.7%	*P.aeroginosa*
3.	Viswanathan *et al. (2012)*	46.3%	*K.pneumoniae*
4.	Present study	28%	*K.pneumoniae*





AST of organisms causing EOS



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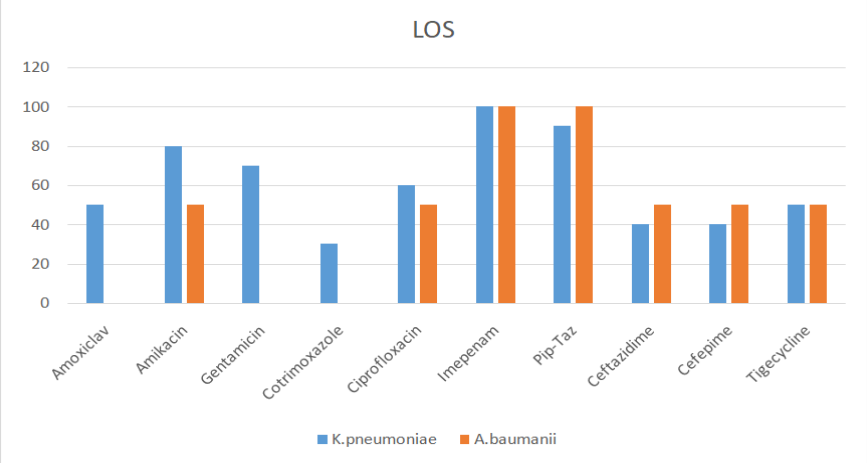

Risk Factors Contributing To Early and Late Onset Neonatal Septicemia

RISK FACTORS	EOS	LOS
Preterm	68%	74.3%
Low Birth Weight	62.04%	68%
Respiratory Distress	65%	54.2%
Meconium Stained Amniotic Fluid	34.2%	10%
Premature Rupture Of Membranes	6.7%	-
Birth Asphyxia	23.2%	12.8%
Teenage Pregnancy	2%	-
Pre- Eclampsia	1.2%	-
Multiple Gestation	2.6%	1.2%
Congenital Anomaly	-	0.64%

The study by Viswanathan *et al.,* (2008) also showed 6.6% of emerging carbapenem resistance among gram negative isolates. In the same study, Gram-negative organisms showed 100% resistance to ampicillin, cefotaxime, and gentamicin. According to Vinodkumar *et al.,* (2008), majority of gram negative organisms showed resistance to one or more antibiotics. In our study majority of the isolates were sensitive to imepenam and Piperacillin-tazobactum.

Conclusion

Appropriate identification of sepsis source, prompt antibiotic prescription and aggressive management can effectively prevent adverse events following neonatal sepsis. There is requirement of simple and sustainable intervention to reduce the burden of multidrug resistant pathogens causing sepsis. The implementation of hand washing, barrier nursing and antibiotic stewardship policies is need of time.

REFERENCES

Agnihotri N., Kaistha N., Gupta V. 2004. Antimicrobial susceptibility of isolates from neonatal septicemia. *Jpn J Infect Dis.,* Dec;57(6):273–5.

Bhat Y. R., Lewis LES., KE. V. 2011. Bacterial isolates of early-onset neonatal sepsis and their antibiotic susceptibility pattern between 1998 and 2004: an audit from a center in India. *Ital J Pediatr.,* 11;37:32.

Chacko B, and Sohi I. 2005. Early Onset Neonatal Sepsis. *Indian J.Paediatrics,* 72: 23-26.

CLSI 2016. Performance Standards for Antimicrobial Disk Susceptibility Tests; Twenty first information Supplement. CLSI document M100-S22. Pennsylvania, USA: Clinical and Laboratory Standards Institute.

Renuka Anegundi, Raghavendra D. Kulkarni, Vidyavathi B. Chitharagi, G.S. Ajantha, C. Shubhadaand AmiVaraiya. 2017. Bacteriological Profile and Clinical Outcome in Cases of Neonatal Sepsis. *Int. J. Curr. Microbiol. App. Sci.,* 6(4): 2206-2214.

Reyes J. C. *et al*., 2015. Etiology and antimicrobial resistance patterns in early and late neonatal sepsis in a Neonatal Intensive Care Unit. *Arch Argent Pediatr.,* 113(4):317-323.

Tallur SS., Kasturi AV., Nadgir SD., Krishna BVS. 2000. Clinico-bacteriological study of neonatal septicemia in Hubli. *Indian J Pediatr.,* ar;67(3):169–74.

Vinodkumar, C.S., Y.F. Neelagund, S. Kalsurmath, S. Banapurmath, N.K. Kalappannavar and K.G. Basavarajappa. 2008. Perinatal risk factors and microbial profile of neonatal septicemia: A multicentred study. *Obstet. Gynecol. India,* 58(1):32-40.

Viswanathan, R., A.K. Singh, C. Ghosh, S. Dasgupta, S. Mukherjee, S. Basu. 2012. Profile of Neonatal Septicaemia at a District-level Sick Newborn Care Unit. *J. Health Popul. Nutr.,*30 (1): 41-48.

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