

Incidence of Antibiotics Susceptibility Pattern in Neonates Suffering From Septicemia in a Tertiary Care Teaching Hospital

Dinesh Rajwaniya

Assistant Professor, Department of Paediatrics,
Pacific Medical College and Hospital, Bedla, Udaipur, Rajasthan, India.

ABSTRACT

Introduction: Septicemia is characterized by variable systemic physiologic changes triggered by infection. This provides a challenge to clinicians who manage critically ill neonates and children. Among neonates, sepsis is the most common admitting diagnosis.

Methodology: Fifty neonatal cases with septicemia were involved in this study. This study was carried out in the Department of Paediatrics, Pacific Medical College and Hospital, Bedla, Udaipur.

Results: In the present study we found that, *Klebsiella* spp. (52%) most prevalent among all gram negative bacteria and *Staph. aureus* (50%) prevalent among all gram positive bacteria followed by other.

Conclusion: It can be concluded that for the selection of appropriate antibiotic therapy, it is necessary to check antibiotic sensitivity patterns in periodic intervals. In the view of discussion, the usage of antibiotic in the hospital must be

reviewed according to standard antibiotic policy. The prompt use of antibiotics is certainly to save new born from septicemia.

Keywords: Antibiotics Susceptibility Pattern, Neonates, Septicemia.

*Correspondence to:

Dr. Dinesh Rajwaniya,
18, Bhikshu Nagar (Samta Nagar),
Bedla, Udaipur, Rajasthan, India.

Article History:

Received: 13-10-2018, Revised: 05-11-2018, Accepted: 24-11-2018

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2018.4.6.031	

INTRODUCTION

The generalized bacterial infection documented by positive blood culture in first four weeks of life is known as neonatal septicemia. It is the main cause of mortality and morbidity. Around 30-50% neonatal deaths in developing countries are due to neonatal septicemia.¹ In India, the main reason of neonatal mortality is related to septicemia and the emergence of drug resistance. Over the last few years, the isolated organisms have developed increased drug resistance.^{2,3}

Mostly in preterm low birth weight babies, neonatal sepsis is a major cause of morbidity and mortality.^{4,5} It has been reported in year 2010 that the mortality rate of neonatal in India was 33 per 1000 live births that is a great burden to society.⁶ Neonatal sepsis can be classified as early onset neonatal sepsis (EONS) within 72 hours of birth while late onset neonatal sepsis (LONS) after 72 hours of birth. Neonatal sepsis changes over times and varies from region to region due to the changing pattern of antibiotic use and changes in life style.^{7,8} Septicemia is characterized by variable systemic physiologic changes triggered by infection. This provides a challenge to clinicians who manage critically ill neonates and children. Among neonates, sepsis is the most common admitting diagnosis.⁹ It requires appropriate antibiotic therapy to minimize the risk of severe morbidity and mortality and reduce the emergence of multi-drug resistant organism in ICU's.

The isolation of bacterial agent from blood culture is the best method for diagnosis of septicemia.¹⁰ In the neonatal and pediatric age group, infections can only be diagnosed on the basis of etiological agent recovered from blood. Though, a negative blood culture does not rule out the possibility of neonatal sepsis.¹¹ The commonness of bacterial profile of blood cultures and their susceptibility patterns provide direction to start empirical treatment which is the cornerstone in the treatment of sepsis.

The present study was aimed at determining the bacteriological profile and their antimicrobial susceptibility patterns in neonatal septicemia cases.

MATERIALS & METHODS

Study Population

Fifty neonatal cases with septicemia were involved in this study.

Study Area

This study was carried out in the Department of Paediatrics, Pacific Medical College and Hospital, Bedla, Udaipur

Study Duration

The duration of study was six months.

Data Collection

The sample was collected from all neonates less than 4 weeks who presented with clinical history suggestive of neonatal

septicemia were included in this study. Blood samples were collected by aseptic vein puncture and inoculated into a blood culture bottle containing 20 ml of Brain Heart Infusion broth and sent to microbiology laboratory for culture & sensitivity.

Data Analysis

Data were analyzed by using Microsoft excel.

Table 1: Positive blood culture among all cases

Blood culture	n	%
Positive	31	62%
Negative	19	38%
TOTAL	50	100%

Table 2: Isolated organisms among all positive blood culture cases

Isolated organisms	n	%
Gram positive bacteria	6	19.3%
Gram negative bacteria	25	80.7%
Total	31	100%

Table 3: Isolates found among gram negative bacteria

Gram negative bacteria	n	%
<i>Klebsiella spp.</i>	13	52%
<i>E. coli</i>	4	16%
<i>Acinetobacter</i>	4	16%
<i>Pseudomonas spp</i>	1	4%
<i>Proteus spp.</i>	1	4%
<i>Enterobacter</i>	2	8%
Total	25	100%

Table 4: Isolates found among gram positive bacteria

Gram positive bacteria	n	%
<i>Enterococcus</i>	1	3.8%
<i>S. aureus</i>	3	50%
CONS	2	33.2%
Total	6	100%

Table 5: Sensitivity among gram negative bacteria

Antibiotics	Sensitive	Resistant
CAZ	8(32%)	17(68%)
AK	6(24%)	19(76%)
GEN	8(32%)	17(68%)
AT	4(16%)	21(84%)
COT	8(32%)	17(68%)
IPM	20(80%)	5(20%)
MRP	18(72%)	7(28%)
PIT	16(64%)	9(36%)
PI	10(40%)	15(60%)
CTX	4(16%)	21(84%)

Table 6: Sensitivity among gram positive bacteria

Antibiotics	Sensitive	Resistant
P	2(33%)	4(33.7%)
CD	3(50%)	3(50%)
E	2(33%)	4(33.7%)
LZ	6(100%)	0(0%)
VA	5(83.4%)	1(16.7%)
GEN	4(66.7%)	2(33%)

OBSERVATION & RESULTS

In the present study, total fifty neonatal septicemia cases were involved. Among the 50 cases 62% were positive & 38% were negative for blood culture. In all blood culture positive cases 19.3% showed infection of gram positive & 80.7% gram negative bacteria.

In the present study we found that, *Klebsiella spp.* (52%) most prevalent among all gram negative bacteria and *Staph. aureus* (50%) prevalent among all gram positive bacteria followed by other.

In this study Gram Positive bacteria are sensitive to vancomycin, clindamycin, linezolid, while resistant to penicillin and erythromycin. The present study also observed that Gram Negative bacteria are sensitive to imipenem, meropenem, while resistant to aminoglycoside, quinolone, cephalosporins.

DISCUSSION

It is well known that antibiotic sensitivity pattern of micro – organisms are always varying. Bhakoo et al had found gentamycin sensitivity in 80% cases of *Klebsiella sepsis* but now a days, due to development of resistance to gentamycin, it is of no use.¹² Previously, penicillin was effective for gram positive organisms. But today they are generally not so effective for such microorganisms.

Shaw CK et al study observed that for *Klebsiella spp.*, *Pseudomonas spp.*, *Acinetobacter spp.*, *E.coli*, *Enterobacter spp.*, imipenem is 100% sensitive that is compared with present study.¹³ Neelam Kaistha et al found in one of their study that maximum resistance was seen in amoxycillin/ampicillin and third generation cephalosporins among gram-negative organisms.¹⁴ It has been also found that amikacin, cefoperazone/sulbactam and imipenem were good alternative drugs. All strains were sensitive to Vancomycin among gram-positive organisms. According to El-Jadba AHE et al the most effective antibiotic for Gram negative isolates was meropenem, whereas for Gram positive isolates was vancomycin.¹⁵

In this study Gram Positive bacteria are sensitive to vancomycin, clindamycin, linezolid, while resistant to penicillin and erythromycin. The present study also observed that Gram Negative bacteria are sensitive to imipenem, meropenem, while resistant to aminoglycoside, quinolone, cephalosporins. In early onset sepsis, *klebsiella* was the most common organism in our study. After *Klebsiella* the most common organisms were *acinetobacter* & *Stap. aures*. Movahedian AH showed that gram-positive organisms constituted the majority of early onset sepsis which is in contrast with our study. The reason might be due to predominance of Group B *Streptococcus* (GBS) in developed countries.

CONCLUSION

For neonatal septicemia, there is changing pattern of bacterial isolates, like first gram positive organisms are responsible for most of the cases. Now days, gram negative organisms are replacing gram positive organisms. Due to the emergence of multi-drug resistant organism, antibiotic susceptibility pattern has also been changed along with gram negative organism. In the present study, most of the gram negative and positive organisms are ESBL producer and MRSA respectively. Now a day, VISA, VRSA, as well as resistance against high level gentamicin, VRE &

macrolide resistant are more common among gram positive organisms. So it is required to be cautious in the selection of antibiotic therapy. This shows the flexible nature of antibiotic susceptibility patterns in time and location both. Thus, it is advisable to evaluate the sensitivity-resistance pattern of isolates regularly for a rational use of antibiotics.

REFERENCES

1. Agarwal R, Sarkar N, Deorary AK, Paul VK. Sepsis in newborn. *Indian J Pediatr* 2001; 68: 1143-47.
2. Ang OY, Ezike E, Asmar BI. Antibacterial resistance. *Indian J Pediatr*. 2004; 71: 229-39.
3. Joshi SJ, Ghole VS, Niphadkar KB. Neonatal gram negative bacteremia. *Indian Pediatr*. 2000; 67: 27-32.
4. Stoll BJ, Hansen N. Infections in VLBW Infants: Studies From The NICHD Neonatal Research Network. *Semin Perinatol*. 2003; 27: 293-301.
5. Stoll BJ, Hansen NI, Adams-Chapman I, Fanaroff AA, Hintz SR, Vohr B et al. Neurodevelopmental and growth impairment among extremely low-birthweight infants with neonatal infections. *JAMA*. 2004; 292:2357-65.
6. Ghai OP. *Ghai Essential Pediatrics: Introduction to paediatrics*. 8th edition. Delhi-92; CBS Publ: 2013. P.2.
7. Bang AT, Bang RA, Bactule SB, Reddy HM, Deshmukh MD. Effect of home-based neonatal care and management of sepsis on neonatal mortality: field trial in rural India. *Lancet*. 1999; 354:1955-61.
8. Stoll BJ. The global impact of neonatal infection. *Clin Perinatol*. 1997;24:1-21.
9. Mane AK, Nagdeo NV, Thombare VR. Study of neonatal septicemia in a tertiary care hospital in rural Nagpur. *Journal of Recent Advances in Applied Sciences* 2010; 25:19- 24.
10. Nwadioha SI, Nwokedi EOP, Kashibu E, Odimayo MS, Okwori EE. A review of bacterial isolates in blood cultures of children with suspected septicaemia in a Nigerian tertiary hospital. *African Journal of Microbiology Research* 2010; 4(4):222-25.
11. Agnihotri N, Kaistha N, Gupta V. Antimicrobial susceptibility of isolates from neonatal septicemia. *Jpn J Infect. Dis.* 2004; 57:273-75.
12. Bhakoo ON, Agarwal KC, Narang A, Bhattacharjee S: Prognosis and treatment of neonatal septicemia. A clinico-bacterial study of 100 cases. *Indian Pediatr*. 1974, 11: 519-28.
13. Shaw CK, Shaw P. *Thapalial Kathmandu University Medical Journal* (2007), Vol. 5, No. 2, Issue 18, 153-60.
14. Neelam Kaistha, Manjula Mehta, Nidhi Singla, Ritu Garg, Jagdish Chander *J Infect Dev Ctries* 2010; 4(1):055-057.
15. El-Jadba AHE, El-Yazji MS. Neonatal Septicemia in Gaza City Hospitals. *Pak J Med Sci* 2009; 25(2):226-31.

Source of Support: Nil. **Conflict of Interest:** None Declared.

Copyright: © the author(s) and publisher. IJMRP is an official publication of Ibn Sina Academy of Medieval Medicine & Sciences, registered in 2001 under Indian Trusts Act, 1882. This is an open access article distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Dinesh Rajwaniya. Incidence of Antibiotics Susceptibility Pattern in Neonates Suffering From Septicemia in a Tertiary Care Teaching Hospital. *Int J Med Res Prof*. 2018 Nov; 4(6):148-50. DOI:10.21276/ijmrp.2018.4.6.031