|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 4, Issue 8; August: 2020; Page No. 31-33

CLINICAL AND BACTERIOLOGICAL PROFILE IN NEONATAL SEPTICEMIA AND ANTIBIOTIC SUSCEPTIBILITY PATTERN IN A RURAL TERTIARY CARE HOSPITAL

Dr. Krishna Pada Dutta[1], Dr. Nitin Gyaras Puria[2]
[1]Professor, Department of Pediatrics, KD Medical College, Hospital and Research Centre, Mathura (U.P.)
[2]Assistant Professor, Department of Pediatrics, KD Medical College, Hospital and Research Centre, Mathura (U.P.)

Article Info: Received 21 June 2020; Accepted 31 July 2020
DOI: https://doi.org/10.32553/ijmbs.v4i8.1334
Corresponding author: Dr. Nitin Gyaras Puria
Conflict of interest: No conflict of interest.

Abstract

Background: Neonatal sepsis is an important cause of morbidity & mortality among NICU graduates. The etiology of neonatal septicemia has variations depending upon various customs and practices in the perinatal and neonatal period and geographical area. Therefore, knowledge of microbial profile and antimicrobial susceptibility is very important for management of neonatal sepsis. The aim of our study is to determine the bacteriological profile of neonatal septicemia and the antimicrobial sensitivity pattern.

Methods: This prospective study was conducted in the NICU of Department of Pediatrics, KD Medical College, Hospital and Research Centre Mathura (U.P.) among 100 neonates from july 2019 to December 2019. Two ml of venous blood was taken from each neonate & cultured by automated BacT/Alert & VITEK2 method for rapid isolation & sensitivity test. A structured proforma was used to gather information for baseline features like age, gender, birth weight, gestational age, mode of delivery of the neonate and age of onset of illness.

Result: In the present study, both Gram-negative & Gram-positive organisms are responsible for neonatal sepsis. *Klebsiella pneumoniae* was found to be the predominant pathogen followed by *Staphylococcus aureus.* Most organisms are multi-drug resistant.

Conclusion: Cefotaxim, amikacin, meropenam and vancomycin were found useful in treating neonatal septicemia and hence incorporated in our institutional antibiotic policy for use in NICU. Authors recommend an effective infection-control programme, regular antibiotic sensitivity surveillance, encouragement of rational antibiotic use. It will reduce nosocomial infections and development of bacterial resistance.

Keywords: Neonatal sepsis, antimicrobial susceptibility, Klebsiella, antibiotic susceptibility surveillance.

Introduction

Neonatal sepsis is the commonest cause of neonatal mortality; it is responsible for about 28-49% of the total neonatal deaths in developing countries.[1]Neonatal sepsis is defined as a clinical syndrome characterized by systemic signs and symptoms of bacteraemia during the first 28 days of life.[2]

It is defined as early onset (first 72 hours of life) and late onset (beyond 72 hours of life) sepsis. This classification has clinical significance, as early onset neonatal sepsis is generally acquired from pathogens of maternal genital tract, whereas late onset sepsis has its origin either from the community or from hospital. About 60% of the infections in South Asia occur in the first 72 hours of life.[3]

Multidrug antibiotic resistance is an emerging problem in NICU's particularly in developing countries. The choice for the empirical therapy should be based upon recent flora and their sensitivity pattern. Knowledge of microbial flora and their antimicrobial susceptibility would help decide the best empirical treatment plan for neonatal sepsis. Antibiotics should be re-viewed once the results of the cultures and sensitivity are available.[4]

Material and Methods:

This prospective study was conducted in the NICU of Department of Pediatrics, KD Medical College, Hospital and Research Centre Mathura (U.P.) among 100 neonates from July 2019 to December 2019. Two ml of venous blood was taken from each neonate & cultured by automated BacT/Alert & VITEK2 method for rapid isolation & sensitivity test. A structured proforma was used to gather information for baseline features like age, gender, birth weight, gestational age, mode of delivery of the neonate and age of onset of illness.

Detailed histories including history regarding maternal risk factors were taken in this study. Thorough physical examinations were conducted with special emphasis on features suggestive of neonatal sepsis.[5]

Neonatal sepsis was suspected from the clinical presentation of one or more of the symptoms like respiratory distress (tachypnea, grunting, chest

retractions,), refusal of feeds, lethargy, fever, neonatal seizures, absent cry, vomiting, neonatal Jaundice, hypothermia, cyanosis, apnea, and excessive crying, etc. For all clinical suspected cases of neonatal septicaemia, laboratory screening for sepsis was done with C-reactive protein (CRP). All clinically suspected neonatal sepsis cases with CRP positive result were sent for blood cultures and antibiotic susceptibility testing. Samples for blood culture were obtained before the commencement of antibiotics under strict asepsis, and were sent to the microbiological laboratory.[6]

Results:

Gram negative organisms were more common (72%) than gram positive (28%). Klebsiella pneumonia was the most common pathogen (54%) followed by E.coli (17%) in both early and late onset septicemia. The most common gram positive organism was staphylococcus aureus (29%). All the three common isolates showed 100% resistance to ampicillin and very poor sensitivity to gentamicin. Gram-negative isolates were highly sensitive to amikacin and meropenem, where as gram-positive isolates were highly sensitive to amikacin and vancomycin. Imipenam and linezolid are highly sensitive but they are kept as reserved drugs for severe drug resistant infections.

Discussion:

Neonatal septicemia, one of the leading cause of neonatal death is a life threatening emergency.[7,8] For the effective management of neonatal septicemia cases, study of the bacteriological profile with their antibiotic pattern plays a significant role.[9] The gold standard of diagnosis of nenatal sepsis is blood culture for the isolation of the etiological agent responsible for sepsis.[10]

Easy availability and widespread use of broad-spectrum antibiotics in the presumptive treatment of infections prevail in India. Blood culture facilities are not often available in most of the settings in rural areas. In such scenarios, clinicians have to depend on empirical antibiotic regimens.

The high prevalence of resistance to Ampicillin makes it out of use in neonatal sepsis even in rural hospitals. The increasing resistance of Gram-negative organisms to extended-spectrum cephalosporins and carbapenems makes the choice of antibiotics difficult. Due consideration needs to be given to antistaphylococcal antibiotics in view of its high prevalence in both early-onset and late-onset neonatal sepsis.[11]

A change in resistance pattern has also been noted in the present study. The surge of MRSA has been noted carefully in the last one decade.[12]

Antimicrobial sensitivity pattern differs in different places, in different studies, as well as at different time in the same hospital. Indiscriminate use of antibiotics leads to emergence of resistant strains of pathogens. High resistance observed in this study may be primarily due to excessive and irrational use of these antibiotics at primary health facilities from where neonates are referred to our tertiary centers.[13]

Routine bacterial surveillance and the study of their resistance patterns must be an essential component of neonatal care. Knowledge of these patterns is essential when local policies on the uses of antibiotics are being devised.[14]

Spread of these resistance strains leads to physical, financial and emotional burden to patients as well as community. There should be Antimicrobial usage guidelines based on local antimicrobial resistance data to reduce further development of resistance.[15]

Conclusion:

This study emphasises that empirical therapy for suspected neonatal septicaemia should cover both Gram-negative and Gram-positive organisms particularly Klebsiella pneumoniae and Staphylococcus aureus which were more prevalent in this region. There is also need for regular periodic surveillance of the causative organisms of neonatal sepsis as well as their antibiotic susceptibility patterns to curtail the inappropriate use of antibiotics and emergence of resistant strains and review the hospital antibiotic policy from time to time.

There is a need to implement Antimicrobial stewardship programmes to rationalise antibiotic usage to reduce neonatal mortality due to sepsis. Early detection of sepsis and judicial use of antibiotics are useful to decrease neonatal mortality and the emergence of multidrug resistant bacteria.

In this study, maximum sensitivity (93%) was observed in imipenem and linezolid (91%). Sensitivity to imipenem and linezolid was much higher than that to other antibiotics and the difference was statistically significant ($P < 0.05$), but these two drugs should not be used indiscriminately antibiotics has also been reported.

References:

1. 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: page 1955-1961.
2. Mahmood A, Karamat KA, Butt T. Neonatal sepsis: High antibiotic resistance of the bacterial pathogens in a neonatal intensive care unit in Karachi. J Pak Med Assoc. 2002;52:page 348-50.
3. Stoll BJ, Hansen NI, Sánchez PJ, et al, Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network. Early onset neonatal sepsis: the burden of group B Streptococcal and E. coli disease continues. Pediatrics 2011;127: page 817- 26.

4. International Journal of Research in Medical Sciences Dalal P et al. Int J Res Med Sci. 2017 Apr;5(4):page 1541-1545 www.msjonline.org pISSN 2320-6071

5. Verma P et al. Int J Contemp Pediatr. 2015 Aug;2(3):page 176-180

6. Kurma, et al. Neonatal Sepsis: Clinical Spectrum, Bacteriological Profile and Antibiotic Sensitivity Patterns.ISSN (Online): 2393-915X; (Print): 2454-7379 | ICV: 98.46 | Volume 6 | Issue 6 | June 2019,page 2669-2671.

7. Kuruvilla KA, Pillai S,Jesudason M, Jana AK. Bacterial of Sepsis in a Neonatal Unit inSouth India . Indian Pediatrics. 1998;35:page 851-858.

8. Singh P, Oberoi L, Mehta S, Pannu MS, Kumar N, Neki NS. Bacteriological Profle and Antibiogram of Community Acquired Neonatal Sepsis in a Tertiary Care Hospital; A Prospective Study. Annals of International Medical & Dental Research. 2017;3.3:PE2.page 4-8.

9. Sanjay D Rathod, Palak V Bhatia, Parimal H Patel, Jayshri D Pethani, Lata R Patel, Bimal Chauhan, bacteriological analysis and resistance pattern among various culture isolates from neonatal septicemia at tertiary care hospital of ahmedabad, national journal of medical research print ISSN: 2249 4995|eISSN: 2277 8810.page 466-469

10. Indian Journal of Basic and Applied Medical Research; June 2017: Vol.-6, Issue- 3, Page 393-401, Bacteriological profile of blood stream infections at a Rural tertiary care teaching hospital of Western Uttar Pradesh Vijay Prakash Singha , Abhishek Mehtab,Department of Microbiology, K.D. Medical College, Hospital & Research Center , 24 Km. milestone, NH#2,AKBARPUR, Distt. Mathura, Uttar Pradesh, India -281406.page 393-401

11. Bacteriological profile of neonatal sepsis in a secondary care hospital in rural Tamil Nadu, Southern India;Journal of Family Medicine and Primary Care. Year : 2017 | Volume : 6 | Issue : 4 | Page : 735-738Jesinth Mohan.

12. Indian Network for Surveillance of Antimicrobial Resistance (INSAR) Group, India. Methicillin resistant Staphylococcus aureus (MRSA) in India: Prevalence and susceptibility pattern. Indian J Med Res 2013;137:363-369.

13. BANGLADESH J CHILD HEALTH 2019; VOL 43 (1) : 35-40, quazi rakibul islam, mohammod shahidullah, md. Zakirul islam, md. Al-amin mridha, shahidaakter, Bacterial Profile of Neonatal Septicemia and Antibiotic Susceptibility Pattern of the Isolates in Tertiary Care Hospital, Dhaka, Bangladesh. Page 35-40

14. International Journal of Recent Trends in Science And Technology, ISSN 2277-2812 E-ISSN 2249-8109, Volume 10, Issue 3, 2014 pp 451-455 Copyright © 2014, Statperson Publications, International Journal of Recent Trends in Science And Technology, ISSN 2277-2812 E-ISSN 2249-8109, Volume 10, Issue 3 2014 The Bacterial Profile and Antibiogram of Neonatal Septicaemia in a Tertiary Care Hospital D. E. Premalatha1*, Mallikarjun Koppad2, L. H. Halesh3, K.C. Siddesh4, N. Prakash. Page 451-455.

15. Neonatal Sepsis: Clinical Spectrum, Bacteriological Profile and Antibiotic Sensitivity Patterns in Neonatal Intensive Care Unit in a Tertiary Care Hospital Veereswara Rao Kurma, MS Raju, Triveni Manchu, Kalyani Manchu. Page F1-F4.