(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Evaluation of bacterial profile of neonatal septicaemia

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ABSTRACT:

Background: The most frequent reason for neonatal deaths in the NICU is sepsis. The present study was conducted to evaluate bacterial profile of neonatal septicaemia. **Materials & Methods:** 80 cases of neonatal septicaemia of both genders were selected. Antibiotic sensitivity was tested for Gentamicin, Amikacin, Ciprofloxacin, Sparfloxacin, Erythromycin and Cephalexin. **Results:** Out of 80 patients, males were 38 and females were 42. Out of 80 cases, 44 showed positive blood culture. Staphylococcus Aureuswas seen in 24, Coagulase negative Staphylococcus Aureusin 6 cases, Pseudomonas Aureus in 3, Micrococci in 5, Enterococci in 4 and Flavobacterium in 2 cases. The difference was significant (P< 0.05). Staphylococcus Aureus showed maximum antibiotic susceptibility against cephalexin (75%), Amikacin against cephalexin in 80%, P. aureus against cephalexin in 90%, micrococci against cephalexin in 87%, enterococci against ciprofloxacin in 95% and Flavobacterium against cephalexin in 90% cases. The difference was significant (P< 0.05). **Conclusion:** Staphylococcus Aureus was the most common cause for late onset neonatal sepsis in NICU. Most of the organisms showed sensitivity to Cephalexin.

Keywords: Neonatal septicemia, NICU, blood cultures

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This article may be cited as: Kumar P. Evaluation of bacterial profile of neonatal septicaemia. J Adv Med Dent Scie Res 2017;5(2):242-244.

INTRODUCTION

The most frequent reason for neonatal deaths in the NICU is sepsis. Neonatal septicemia, which is defined as a disease affecting infants younger than one month of age, is a significant cause of morbidity and mortality among neonates in India, with an estimated incidence of about 4% in intramural live birthswho are clinically ill, and who have positive blood cultures.[1,2]

The identification of the aetiology is crucial because it can lead to changes in the management strategy. The most common bacteria responsible for neonatal sepsis include group B Streptococcus (GBS), a common bacterium found in the vagina or lower gastrointestinal tract of women that can be transmitted to the baby during delivery.[3] Escherichia coli (E. coli) bacterium that can be present in the mother's birth canal and cause infections in newborns.Other Bacteria such as Staphylococcus aureus, Enterococcus species, and various Gram-negative bacteria can also cause neonatal sepsis.[4]In addition to minimizing the risk of severe morbidity and mortality, the appropriate use of antibiotics for the management of neonatal septicemia would minimize the emergence of multidrug resistant organisms through rational antibiotic use.[5] Therefore, newborn blood cultures and sensitivity testing are important tools in the diagnosis of neonatal sepsis and in the establishment of early antibiotic treatment. The implementation of prompt treatment is crucial for ensuring the best possible outcome in neonates with sepsis, who frequently arrive at medical facilities late and in a critical condition.[6]The present study was conducted to evaluate bacterial profile of neonatal septicaemia.

MATERIALS & METHODS

The present study was conducted on 80 cases of neonatal septicaemiaof both genders. All parents were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Blood samples were collected. Approximately 2cc of blood was drawn and inoculated into Brain Heart Infusion broth and it was incubated at 370C for 24 hrs. Subcultures were made on both blood agar and MacConkey's agar after 24 hours and 48 hours.Antibiotic sensitivity was tested for the following antibiotics: Gentamicin, Amikacin, Ciprofloxacin, Sparfloxacin, Erythromycin and Cephalexin.

Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 80		
Gender	**Males**	**Females**
Number	38	42

Table I shows that out of 80 patients, males were 38 and females were 42.

Table II Organisms found in NICU

Variables	Number	P value
Staphylococcus Aureus	24	0.05
Coagulase negative Staphylococcus Aureus	6	
Pseudomonas Aureus	3	
Micrococci	5	
Enterococci	4	
Flavobacterium	2	

Table II shows out of 80 cases, 44 showed positive blood culture. Staphylococcus Aureus was seen in 24, Coagulase negative Staphylococcus Aureusin 6 cases, Pseudomonas Aureusin 3, Micrococci in 5, Enterococci in 4 and Flavobacteriumin 2 cases. The difference was significant (P< 0.05).

Graph I Organisms found in NICU

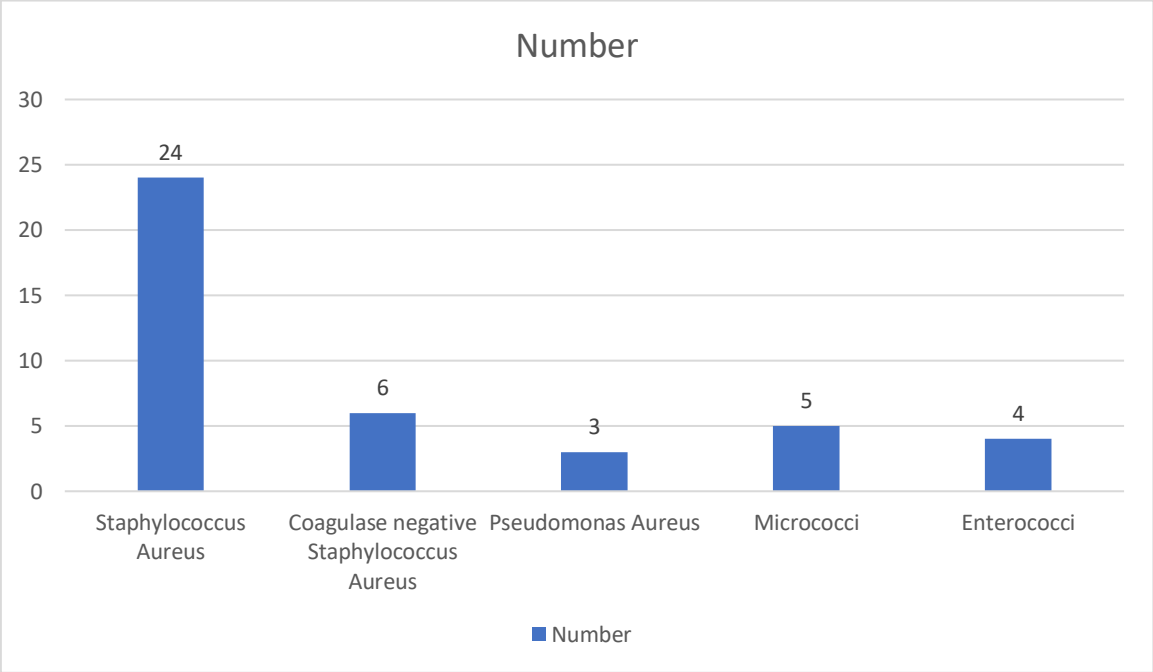

Table III Antibiotic sensitivity

Antibiotics	Staphylococcus Aureus	Coagulase negative Staphylococcus Aureus	P. Aureus	Micrococci	Enterococci	Flavobacterium
Gentamicin	40%	58%	72%	34%	51%	74%
Amikacin	55%	63%	65%	48%	48%	53%
Sparfloxacin	32%	49%	58%	65%	63%	70%
Ciprofloxacin	18%	52%	61%	70%	95%	80%
Erythromycin	66%	78%	81%	64%	74%	75%
Cephalexin	75%	80%	90%	87%	88%	90%

Table III shows that Staphylococcus Aureus showed maximum antibiotic susceptibility against cephalexin (75%), Amikacin against cephalexin in 80%, P. aureus against cephalexin in 90%, micrococci against cephalexin in 87%, enterococci against ciprofloxacin in 95% and Flavobacterium against cephalexin in 90% cases. The difference was significant (P< 0.05).

DISCUSSION

The prognosis for neonatal sepsis depends on factors such as the baby's gestational age, overall health, how quickly the infection is diagnosed, and the choice and effectiveness of treatment. With early diagnosis and appropriate treatment, many babies recover fully.[7,8] However, severe cases can lead to complications such as organ damage, developmental delays, or even death.[9]Prevention strategies, including prenatal care, screening for maternal infections, and administering antibiotics during labor when indicated, are essential in reducing the risk of neonatal sepsis.[10,11]The present study was conducted to evaluate bacterial profile of neonatal septicaemia.

We found thatout of 80 patients, males were 38 and females were 42. Edwin et al[12] found that of the 100

newborns, 32 (32%) showed positive blood culture reports. Out of the 32 positive blood cultures, 19 (59.4%) showed positivity for Coagulase negative Staphylococcus, 7 (21.9%) showed positivity for Staphylococcus aureus, 3 (9.4%) showed positivity for Pseudomonas aeruginosa, 1 (3.1%) showed positivity for Enterococci, 1 (3.1%) showed positivity for Micrococci and 1 (3.1%) showed positivity for Flavobacteria. Overall, most of the neonatal sepsis was caused by Coagulase negative staphylococcus. The sensitivity pattern of the first line of antibiotics was as follows; out of the 19 Coagulase negative staphylococcus strains, 13 (68.42%) showed sensitivity to amikacin and ciprofloxacin, 15 (78.95%) to sparfloxacin, 9 (47.37%) to erythromycin, 10 (52.63%) to azithromycin, 12 (63.16%) to gentamicin and cephalexin and 5 (26.32%) to penicillin. Out of the 7 Staphylococcus aureus strains, 6 (85.71%) showed sensitivity to amikacin, 5 (71.43%) to erythromycin, 4 (57.14%) to sparfloxacin and ciprofloxacin, 3 (42.86%) to azithromycin and cephalexin and 1(14.29%) to penicillin and gentamicin. Out of the 3 Pseudomonas aeruginosa strains, 2 (66.7%) were sensitive to ciprofloxacin and amikacin and 1 (33.3%) was sensitive to sparfloxacin, azithromycin and gentamicin. Enterococci showed sensitivity to sparfloxacin, cephalexin, and ciprofloxacin. Flavobacteria showed sensitivity to gentamicin, erythromycin, ciprofloxacin, sparfloxacin and amikacin.

We found that out of 80 cases, 44 showed showed positive blood culture. Staphylococcus Aureus was seen in 24, Coagulase negative Staphylococcus Aureus in 6 cases, Pseudomonas Aureus in 3, Micrococci in 5, Enterococci in 4 and Flavobacterium in 2 cases. We found that Staphylococcus Aureus showed maximum antibiotic susceptibility against cephalexin (75%), Amikacin against cephalexin in 80%, P. aureus against cephalexin in 90%, micrococci against cephalexin in 87%, enterococci against ciprofloxacin in 95% and Flavobacterium against cephalexin in 90% cases. Desinor et al[13] found that of 42 newborns with sepsis and/or meningitis. Besides the clinical signs, a positive blood culture and/or a positive culture of cerebrospinal fluid was present in each case. Gram-negative bacteria were most commonly found as a cause of early onset sepsis, with Enterobacter aerogenes as the most common agent. There were no such difference between Gram-negative and Gram-positive in late onset sepsis. Group B Streptococcus was associated with neonatal meningitis (44 per cent of cases) which was more related to Gram-positive bacteria (66 per cent). Risk factors were vaginal discharge and dysuria in mothers, and low Apgar score in newborns. Thirty-three per cent of the pathogens found, among them Klebsiella pneumoniae, were resistant 'in vitro' to ampicillin and gentamycin. All were susceptible to amikacin. Enterobacter aerogenes is an important pathogen in the etiology of early onset sepsis in the newborn at the State University Hospital of Haiti, while Group B Streptococcus is the leading cause of meningitis in that age group.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that Staphylococcus Aureus was the most common cause for late onset neonatal sepsis in NICU. Most of the organisms showed sensitivity to Cephalexin.

REFERENCES

1. Bosch Mestres J, Palou Charlez A, Serra Azuara L, et al. Streptococcus agalactiae early-onset neonatal sepsis. A 10-year study (1985–1994). Ann Esp Pediatr 1997; 46: 272–76.
2. Isaacs D, Royle JA. Intrapartum antibiotics and early onset neonatal sepsis caused by Group B Streptococcus and by other organisms in Australia. Pediatr Infect Dis J 1999; 18: 524–28.
3. Nathoo KJ, Mason PR, Gwanzura L, Kowo H, Mubaiwa L. Severe Klebsiella infection as a cause of mortality in neonates in Harare, Zimbabwe; evidence from postmortem blood cultures. Pediatr Infect Dis J 1993; 12: 840–44.
4. Greenberg D, Shinwell ES, Yagupsky P, et al. A prospective study of neonatal sepsis and meningitis in Southern Israel. Pediatr Infect Dis J 1997; 16: 768–73.
5. Moreno MT, Vargas S, Poveda R, Saez-LLorens X. Neonatal sepsis and meningitis in a developing Latin American country. Pediatr Infect Dis J 1994; 13: 516–20.
6. Robillard PY, Nabeth P, Hulsey TC, Sergent MP, Perianin J, Janky E. Neonatal bacterial septicemia in a tropical area. Four- year experience in Guadeloupe. Acta Paediatr 1993; 82: 687–89.
7. Santos Thuler LC, Jenicek M, Turgeon JP, et al. Impact of a false positive blood culture result on the management of febrile children. Pediatr Infect Dis J 1997; 16: 846–51.
8. MacGregor RR, Beaty HN. Evaluation of positive blood cultures: guidelines for early differentiation of contaminated from valid positive cultures. Arch Intern Med 1972; 130: 84–7.
9. Beck-Sague CM, Azimi P, Fonseca SN, Baltimore RS. Bloodstream infections in neonatal intensive care patients: result of a multicenter study. Pediatr Infect Dis J 1994; 13: 1110–16.
10. Trollfors TB, Thiringer K, Larsson P. Ampicillin-aminoglycoside combinations as initial treatment for neonatal septicaemia or meningitis. Acta Paediatr Scand 1991; 80: 911–16.
11. Flidel-Rimon O, Leibovitz E, Juster-Reicher A, et al. An outbreak of antibiotic multi-resistant Klebsiella. Am J Perinatol 1996; 13: 99–102.
12. EDWIN D, Vigneshwaran P. The bacterial profile of neonatal septicaemia in a rural hospital in south India.Journal of Clinical and Diagnostic Research. 2010;(4):3327-3330.
13. Desinor OY, Silva JL, Menos MJ. Neonatal sepsis and meningitis in Haiti. J Trop Peditr. 2004; 50(1): 48-50.