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Antibiotic Sensitivity Pattern of Bacterial Isolates in Neonatal Septicemia in Bangladesh

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Abstract **Original Research Article**

Objective: In this study our main goal is to evaluate the Antibiotic sensitivity pattern of Bacterial Isolates in Neonatal Septicemia in Bangladesh. ***Methods:*** This cross sectional study is conducted at Neonatal unit of the department of paediatrics, Sir Salimullah Medical College and Mitford Hospital, Dhaka, From July 2007 to June 2008.Among 90 clinically diagnosed septicemic neonates, 30 were blood culture positive. ***Results:*** During the study, 30 samples showed growth of different organisms, 12(40%) samples showed growth of klebsiella, 6 samples (20%) growth of coagulase negative staphylococcus, 5 samples (17%) were pseudomonas positive. 4 samples (13%) showed growth of E. coli. Here 18(60%) neonates developed late onset and 12(40%) early onset infection with various organisms. Ciprofloxacin was the most sensitive antibiotics against all organisms ranging from (4.0-100%) then was the chloramphenicol 20-83%. Ceftriaxone was (40-80%) sensitive against almost all organisms but E. coli were resistant to ceftriaxone. Gentamicin and Cotrimoxazole were sensitive to organisms from 0-66% and 0-40% respectively. ***Conclusion:*** From our result, we can conclude that, gram negative organisms remain as the main pathogens causing neonatal septicaemia with predominance of klebsiella. The emergence of kelbsiella species is a new one in this institution. Further study should be carried out to find out the source of this organism.

Keywords: Neonatal septicemia, bacteria, antibiotic sensitivity.

INTRODUCTION

Early onset Sepsis defined as presentation during the first week of life (0-7 days) and late onset sepsis during 8-28 days of life [1]. Early onset sepsis usually results when the neonate has contact with bacteria residing within the maternal vaginal canal (i.e. vertical transmission), whereas late onset sepsis is generally acquired, by exposure to nosocomial pathogens (i.e. horizontal transmission) [2-4].

Late onset infection occurs more in low birth weight (LBW) infant which is in agreement with the longer nursery stays and greater exposure of these neonates to nosocomial microbes [4]. The risk of late onset infection increases with decreasing birth weight and gestational age.The pattern of bacterial organism for neonatal sepsis are constantly changing with time and place. In developed countries group B Streptococcus is the commonest cause of neonatal sepsis followed by E.coli and Listeria monocytogens [5-7] but there is preponderance of gram negative organisms in tropical and developing countries [8]. Different studies in developing countries showed that the main organism causing neonatal septicemia are klebsiella, Acinobacter, Coagulase negative Staphylococcus and E. coli.

In this study our main goal is to evaluate the antibiotic sensitivity pattern of Bacterial Isolatesin neonatal septicemia in Bangladesh.

OBJECTIVE

General objective

- To evaluate the Antibiotic Sensitivity Pattern of Bacterial Isolates in Neonatal Septicemia.

Specific objectives

- To identify the organisms responsible for Neonatal septicemia among Culture positive cases.
- To determine the Antibiotic Sensitivity pattern of Bacterial Isolates.

METHODOLOGY

Type of study	Cross sectional study
Place of study	Neonatal unit of the department of Paediatrics, Sir Salimullah Medical College and Mitford Hospital, Dhaka
Study period	From July 2007 to June 2008.
Study population	All admitted Neonates with clinically suspected Septicemia
Sample	Among 90 clinically diagnosed Septicemic neonates, 30 were blood culture positive
Sampling technique	Purposive

METHOD

Blood culture was done in all suspected cases of septicemia and only those who were culture positive enrolled in this study. For blood culture, 1-2ml of blood was drawn from peripheral vein with all strict aseptic precaution. In microbiology laboratory sample is incubated at 37°C for 24 hours then sub-cultured first in blood agar, chocolate agar and in Macconkey agar media and observed after 24 hours for growth of the microorganism. If there was no growth, second sub-culture in same media and reading was taken after 24 hours. If growth was present in first subculture further culture in macconkey media to isolate colony and sensitivity of the organisms was done.

Inclusion criteria

- Clinical diagnosis of septicemia within the first 28 days of life.
- Clinical diagnosis was based on the presence of 2 or more of the following features present at the time of admission.
  - Poor feeding Lethargy
  - Fever (>37.2°C) or hypothermia (<36°C)
  - Respiratory distress, Cyanosis, Apnoea, Seizures

RESULTS

In figure-1 shows distribution of the patients according to age where 40% neonates presented in the first week of life and 60% neonates presented between 8-28 days. The following table is given below in detail:

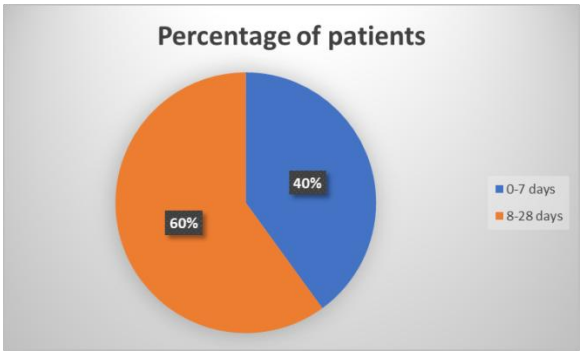

Fig-1: Distribution of the patients according to age

In table-1 shows gender distribution of the patients where most of the patients were male, 60%.

Table-1: Gender distribution of the neonates with septicemia (n= 30)

Gender	Number of patients	Percentage	Ratio
Male	18	60	1.5:1
Female	12	40	

Table-2 shows distribution of patients according to gestational age where 16 neonates (53%) were preterm and 14 neonates (47%) were term.

Table-2: Distribution of patients according to gestational age

Number of patients	Preterm	Term
30	16(53%)	14(47%)

In table-3 shows type of organisms isolated from blood culture (n= 30) where blood culture was done in all patients. 30 samples showed growth of different organisms. Klebsiella growth showed in 12(40%) samples, 6 samples (20%) growth of coagulase negative staphylococcus, 5 samples (17%) were pseudomonas positive. 4 samples (13%) showed growth of E. coli. Here 18(60%) neonates developed late onset and 12(40%) early onset infection with various organisms. The following table is given below in detail:

Table-3: Type of organisms isolated from blood culture (n= 30)

Organism	Frequency of isolation Number (%)	Early onset n = 12	Late onset n = 18
Klebsiella	12(40%)	04	08
Coagulase Negative Staphylococcus	6(20%)	02	04
Pseudomonas	5(17%),	02	03
E. coli	4(13%)	02	02
Staph aureus	1(3%)	01	00
Non-hemolytic	1(3%)	01	00
streptococcus			
Citrobacter	1(3%)	0	01

In table-4 shows susceptibility patterns of organisms to different antibiotics are recorded. Ciprofloxacin was the most sensitive antibiotics against all organisms ranging from (40-100%) then was the chloramphenicol 20-83%. Ceftriaxone was (40-80%) sensitive against almost all organisms but E. coli were resistant to ceftriaxone. Gentamicin and cotrimoxazole were sensitive to organisms from 0-66% and 0-40% respectively. All organisms were resistant to ampicillin.

Table-4: Sensitivity pattern of the organisms

Drugs	Klebsiella (n=12)	Coagulase -ve staph. (n=06)	E. coli (n=04)	Pseudomonas (n=05)
Ampicillin	0(00%)	0(00%)	0(00%) •	0(00%)
Gentamicin	1(8%)	4(66%)	0(00%)	0(00%)
Ceftriaxone	5(41%)	3(50%)	0(00%)	4(80%)
Ciprofloxacin	5(41%)	4(66%)	3(75%)	5(100%)
Chloramphenicol	6(50%)	5(83%)	2(50%)	1(20%)
Cotrimoxazole	4(33%)	0(00%)	1(25%)	2(40%)

In figure-2 shows outcome of the patients according to organisms isolated where neonatal death due to klebsiella 8(58%) and Escherichia coli 3(21%), coagulase negative staphylococcus 2(14%) and Pseudomonas 1(7%). The following figure is given below in detail:

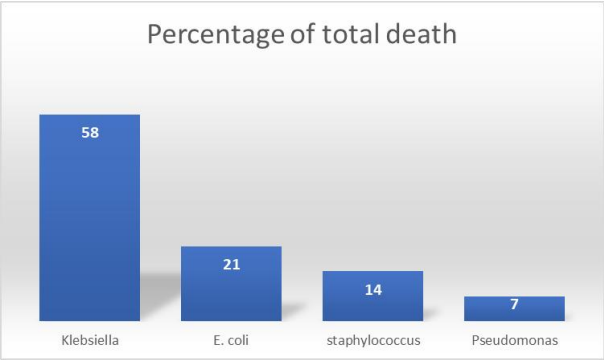

Fig-2: Outcome of the patients according to organisms isolated

DISCUSSION

In the developing countries, like Bangladesh where perinatal care, is minimum, neonatal septicaemia has occupied a major part in neonatal morbidity and mortality. Furthermore, the aetiological agents of neonatal septicaemia vary in different geographical areas and in the same area with time. So, it is very important to find out the aetiological factors for neonatal septicaemia from time to time.

During one year study period, 90 neonates were diagnosed as septicemic on clinical basis, which was 12% of the total neonatal admission. Out of 90 neonates, 30(33%) were blood culture positive.

The incidence of coagulase negative staphylococcus is increasing in various North America, Australia, Scandinavian and European countries. One study showed the prevalence of coagulase negative staphylococcus in case of late onset sepsis in very low birth weight neonates [8]. In this series there were 5(16%) growth of pseudomonas which is higher than the findings of one study [4]. In this study there were 4(13%) growth of E. coli which was similar to another study [9], there were 1(3%) growth of Staph. aureas-01(3%), non-haemolytic streptococcus 01(3%) and citrobacter 01(3%) which is comparable with the findings of one study [10].

Case fatality was highest in neonates infected with klebsiella (58%) and Escherichia coli (21%) and least in pseudomonas aeruginosa (7%). This result is comparable to one study [10].

CONCLUSION

From our result, we can conclude that, gram negative organisms remain as the main pathogens causing neonatal septicaemia with predominance of klebsiella. The emergence of kelbsiella species is a new one in this institution. Further study should be carried out to find out the source of this organism.

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