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Pediatrics

The Bacteriological Profile of Neonatal Sepsis in Preterm Babies in Tertiary Medical College and Hospital

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Abstract | **Original Research Article**

Objective: In this study our main goal is to evaluate bacteriological profile of neonatal sepsis in preterm babies of tertiary medical college and hospital. *Method:* this was a prospective observational and experimental study was carried out at Sir Salimullah Medical College and Mitford Hospital, Dhaka from July 2010 to October 2011 among 80 preterm babies. *Results:* The mean (±SD) weight of the babies was 1713.8 (±436.0) gm with a range of 500-2750 gm, 4(5.0%) babies were extreme preterm (gestational age <28 weeks), 12(15.0%) babies were very preterm (gestational age 28 to <32 weeks) and 64(80.0%) babies were preterm (gestational age 32 to <37 weeks). Ampicillin 71(88.8%)andgentamicin71(88.8%) were used in most of the cases, followed by ceftazidime35(43.8) and amikacin in 35(43.8%) cases, meropenem in 8(10.0%) cases, ciprofloxacin in 7(8.8%) cases, metronidazole in 11 (13.8%) cases. Among the organisms, Acinatobacter were present in 2 (2.5%) patient, Pseudomonas were present in 2(2.5%), CONS were present in 2(2.5%), Citrobacter in 1(1.3%) patient. *Conclusion:* From our study we can say that Acinatobacter, Pseudomonas and CONS were the most common isolate in our study. Early diagnosis and therapy are essential for the prevention of morbidity and mortality of neonatal sepsis in the neonatal intensive care unit.
Keywords: Bacteriological profile, neonatal sepsis, preterm babies.

INTRODUCTION

Neonatal sepsis is defined as a clinical syndrome of bacteremia with systemic signs and symptoms of infection in the first 4 weeks of life [1]. Septicemia occurs in 2.3% of intramural live births. Over 40% of the under-5 deaths globally occur in the neonatal period [2]. The World Health Organization estimates that >1 million neonatal deaths worldwide annually are caused by severe infections, and ~1 million deaths are due to neonatal sepsis or pneumonia alone [3]. Morbidity of neonatal sepsis differs significantly from country to country. The incidence of neonatal sepsis varies from 1 to 5 cases per 1,000 live births in developed countries, but increases in developing countries, varying from 49 to 170 per 1,000 [4]. Early empirical antibiotic treatment of neonates suspected of having septicemia is the standard practice. Nonetheless, the dilemma of unnecessary exposure to antibiotics in this vulnerable population remains, creating an environment for emerging bacterial resistance and the potential for poor prognosis [5]. In this study our main goal is to evaluate the bacteriological profile of neonatal sepsis in preterm babies in tertiary medical college and hospital.

OBJECTIVE

General Objective

To assess the bacteriological profile of neonatal sepsis in preterm babies in tertiary medical college and hospital.

Specific Objective

- To detect blood culture findings of the patients.
- To identify specific antibiotics usage according to blood culture sensitivity of the patients.

METHODOLOGY

Types of Study

- This was a prospective observational and experimental study.

Study place and period

- This study was conducted at Neonatal Care Unit (NCU) of Sir Salimullah Medical College and Mitford Hospital, Dhaka among 80 preterm babies from July 2010 to October 2011.

Inclusion Criteria
- Preterm babies within 72 hours of life admitted in Neonatal Care Unit.

Sampling Technique
- Patients were selected by purposive sampling.

Study Procedure

Informed consent was taken from mother, father or any legal attendant of the baby. Information was collected by reviewing the clinical and laboratory findings. Data was collected in a structured questionnaire by the principal investigator. Detail records of gestation, birth-weight, gender and whether the baby transferred after delivery elsewhere were included. Blood culture for bacteria was done in each preterm baby admitted at NCU on admission. Cultures were plated on selective media for isolation of bacteria. Duration of antibiotics, intubation, parenteral nutrition, total central catheter use (umbilical venous catheter, peripherally inserted central catheter), corticosteroids and theophylline were noted and the duration defined in days (with any portion of a day constituting 1 day of treatment). The specimens were placed in a dry medium and taken to the Microbiological Laboratory.

Data Analysis
- Analysis was performed by using a computer based statistical program SPSS (Statistical Package for Social Sciences) version 12, where descriptive analysis was done for percentage and mean value.

RESULTS

In Table-1 shows age distribution of the patients where most of the patients belong to 'up to 24 hours', 50(62.5%). The following table is given below in detail:

Table-1: Age distribution of the patients (N=80)

Age group	Frequency (%)
Up to 24 hours	50(62.5%)
24-48 hours	21(26.3%)
48-72 hours	9(11.3%)
Total	80(100%)

In Table-2 shows gender distribution of the patients. Among the patients, 49(61.3%) babies were male and 31(38.8%) were female. The following table is given below in detail:

Table-2: Gender distribution of the patients

Sex of the babies	Cases
	Frequency (%)
Male	49(61.3%)
Female	31(38.8%)
Total	80(100%)

In Table-3 shows distribution of the babies according to gestational age where 4(5.0%) babies were extreme preterm (gestational age <28 weeks), 12(15.0%) babies were very preterm (gestational age 28 to <32 weeks) and 64(80.0%) babies were preterm (gestational age 32 to <37 weeks). The following table is given below in detail:

Table-3: Distribution of the babies according to gestational age

Gestational age	Frequency (%)
<28 weeks	4(5.0%)
28 to <32 weeks	12(15.0%)
32 to <37 weeks	64(80.0%)
Total preterm babies	80(100%)

Table-4 shows use of antibiotics of the patients where ampicillin 71(88.8%) and gentamicin71(88.8%) were used in most of the cases, followed by ceftazidime and amikacin in 35(43.8%) cases, meropenem in 8(10.0%) cases, ciprofloxacin in 7(8.8%) cases, metronidazole in 11 (13.8%) cases. The following table is given below in detail:

Table-4: Use of antibiotics of the patients

Antibiotics used	Frequency (%)
Ampicillin	71(88.8%)
Gentamicin	71(88.8%)
Ceftazidime	35(43.8%)
Amikacin	35(43.8%)
Meropenem	8(10.0%)
Ciprofloxacin	7(8.8%)
Metronidazole	11(13.8%)

In Table-5 shows blood culture findings of the patients. Among the organisms *Acinatobacter* were present in 2 (2.5%) patients, *Pseudomonas* were present in 2(2.5%), *CONS* were present in 2(2.5%) *Citrobacter* in 1(1.3%) patient. The following table is given below in detail:

Table-5: Blood culture findings

Growth on blood culture Organisms	Frequency (%)
Acinatobacter	**2(2.5%)**
Pseudomonas	**2(2.5%)**
CONS	**2(2.5%)**
E.coli	**1(1.3%)**
Citarobacter	**1(1.3%)**
Serratia	**1(1.3%)**
Staph. aureus	**1(1.3%)**
Staph. epidermidis	**1(1.3%)**

DISCUSSION

The study included preterm babies because preterm babies are more prone to develop invasive bacterial infection. The mean (±SD) age of the babies was 23.9(±19.3) hours.

In one study reported that, males have been described to be have two- to five-fold higher likeliness to develop septicemia than females, the nearly 2:1 ratio of male to female neonates which is similar to various studies that showed an increase in preponderance among male neonates [6, 7].

In our study we found that, among the patients, 49(61.3%) babies were male and 31(38.8%) were female. The mean (±SD) weight of the babies was 1713.8 (±436.0) gm with a range of 500-2750 gm. Also, we noticed that, 4(5.0%) babies were extreme preterm (gestational age <28 weeks), 12(15.0%) babies were very preterm (gestational age 28 to <32 weeks) and 64(80.0%) babies were preterm (gestational age 32 to <37 weeks).

In other article it was reported that, 57% babies birth weight was <2500 g. In our study we noticed that, among the organisms *Acinatobacter* were present in 2(2.5%) patients, *Pseudomonas* were present in 2(2.5%), *CONS* were present in 22.5%), *Citarobacter* in 1(1.3%) patient. Where as in other study reported that, *Klebsiella* species were the most frequent causative organisms of neonatal sepsis, a similar finding was observed in other study [5, 6]. In contrast, another study conducted in the neonatal nurseries showed *CONS* as a major isolate [7]. The variation in the major isolate could be due to differences in study setting, study population and adherence to hand hygiene practices.

CONCLUSION

From our study we can say that, *Acinatobacter, Pseudomonas and CONS* were the most common isolate in our study. Early diagnosis and therapy are essential for the prevention of morbidity and mortality of neonatal sepsis in the neonatal intensive care unit.

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