

Bacterial septicemia in neonates

Aida H. Ibrahim; M.Sc*

Summary:

Background: This study was conducted to isolate and identify the bacterial isolates of neonatal septicemia in a Neonatal Intensive Care Unit in the Baghdad teaching hospital and the resistance of these locally isolates to different antibiotics. Suspected cases of neonatal sepsis which were not treated with any antibiotics were enrolled.

Methods: One to two milliliter of blood specimens were collected from these neonates aged from 3-7 days and cultured in Brain heart infusion broth.

Results: Out of 90 neonates, 15 (15.5%) were positive on blood cultures. Results showed that nine isolates have been obtained belonging to *Klebsiella* spp. comprising (60%) out of the total isolates followed by *Staphylococcus aureus* (27.7%) and *E coli* (13.3%).

Depending on these results, all isolates from neonates possessed high resistance against Penicillin, Ampicillin and Gentamicine, but were sensitive to Cefotaxime, Ciprofloxacin and Amikacin.

Of the 15 cases four died only.

Conclusion: I concluded from this study that the Gram negative bacteria especially *Klebsiella* spp (nonsocial al pathogen was a major pathogen especially among premature neonates.

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Introduction

In spite of great advances in antimicrobial therapy, neonatal life support measures and the early detection of risk factors, septicemia continues to be a major cause of mortality and morbidity among neonates around the world.¹

Several risk factors have been identified both in the neonates and in the mother which make them susceptible to infections. Blood stream infections have been quoted as the most common infections in this age group.

A very wide spectrum of organisms has been described for cases of neonatal septicemia and this spectrum is subjected to geographical alterations. Moreover, the isolated organisms are often resistant to multiple antimicrobials which make the treatment difficult and grave sequelae ensue.²

Patients and methods :

The study was conducted in the neonatal intensive care at Baghdad Teaching Hospital, the unit has a maximum capacity of 12 inpatients at a time. During the study period, June 2004 to August 2004, the total number of admissions was 90 patients.

One to two milliliters of blood was collected from each patients using proper a septic precautions and inoculated immediately into 5 milliliters of brain heart infusion broth with 0.025% Sodium Polyanthol Sulfonate (SPS) as anticoagulant. The broths were subcultured after overnight incubation on chocolate, followed by examining the broth daily and doing a final subculture at the end of 3 days, or at appearance of turbidity, which ever was earlier. Any growth was identified by colonial characteristic and standard biochemical tests.³

Antibacterial susceptibility testing was performed by the Kirby – Bauer disc diffusion method.⁴

Results:

The total number of neonates with positive culture was 15 (15.5%), 9 of whom were boys and 6 were girls. Of the 15 cases, 10 (66.7%) were preterm and 5 (33.3%) were full term.

The most offender microorganism was *Klebsiella* spp. 9(60%) followed by *Staphylococcus aureus* 4 (26.7%) and *E.coli* 2(13.3%) (Table 1).

Premature infants were more susceptible to septicemia than full term infants. Only one full term

* Depart. of Microbiology, College of Vet. Med. University of Baghdad

infants died, whereas 4 premature infants died. The commonest bacteria isolated in this group were *Klebsiella* spp. (Table 2).

The most frequent neonatal risk factors was low birth weight affecting (65.8%) of the neonates followed by prematurity 35 (38.8%) (Table 3).

The antibacterial susceptibility testing revealed that all Gram negative bacteria isolated from patients were resistant to Pencillin and Gentamicin, but almost were sensitive to Amikacin, Ciprofloxacin and Trimoxazol. None of the Gram positive isolates were resistant to Vancomycin and Tetracycline.

Table 1 : Types of microorganisms isolated from blood cultures.

Organisms	Total isolates (%)
<i>Klebsiella</i> spp.	9 (60%)
<i>Staphylococcus aureus</i>	4 (26.7%)
<i>E. coli</i>	2(13.3%)
Total	15(100%)

Table 2 : Types of bacteria isolated by gestational age.

Species	Preterm (%)	No.of deaths (%)	Full term (low weight) (%)	No.of deaths (%)
<i>Klebsiella</i> spp.	6(60%)	3 (30%)	3(30%)	1(10%)
<i>Staphylococcus aureus</i>	3(30%)	1(10%)	2(20%)	0
<i>E.coli</i>	1(10%)	0	0	0
Total	10(100%)	4(40%)	5(50%)	1(10%)

Table 3 : Risk factors associated with neonatal septicemia.

Neonatal risk factors	No. of cases %
Low birth weight (preterm)	60 (66.6%)
Perinatal asphyxia	15(16.6%)
Prematurity	35(38.8%)
Total	90(100%)

Discussion:

The varying microbiological pattern of neonatal septicemia warrants the need for an

ongoing review of the causative organisms and their antibiotic sensitivity pattern. Some reports from abroad show the incidence of neonatal septicemia to vary between 36% to 55%.^{5,6} In our study, incidence of neonatal septicemia confirmed that spectrum confirmed by culture was 15.5%. an area based knowledge of the bacteriological spectrum is essential because the first antibiotic administered will not wait for the cultures results and keep in mind the high morbidity and mortality associated with neonatal sepsis, a right choice for such empiric therapy is of utmost importance.

The spectrum of bacteria causing neonatal septicemia in our hospital is comparable to that of National perinatal network Database report.⁷ Group B Streptococcus, as is evident from same report, is not common in our country and also did not isolate group B Streptococcus from our cases.

Gram negative septicemia resulted in a higher mortality rate, especially among premature neonates. Because of preterm are particularly vulnerable to infections because of weak immune barriers and their need for invasive process, e.g. intravenous line, endotracheal intubations and mechanical ventilation, and they have a higher mortality rate than full term and the infants.⁸ And a similar observations have been made by other authors. ^{9,10}

All gram negative bacterial isolates were resistant to commonly used antibiotics, such as Ampicillin, Pencillin and Gentamicin. This observation is similar to that of other researchers ^{1,6,8}

The high incidence of gram – negative septicemia (especially *Klebsiella* spp.) and the antibiotic sensitivity pattern indicate that the infection was most probably nosocomial in origin and that cefotaxim should be used as an initial therapy while a waiting culture results.¹¹

All cases detected by blood culture occurred in the first week of life. This calls for close monitoring of the newborns especially those in high risk categories as soon as they are born. Administration of empiric antimicrobial therapy aimed at gram negative bacteria in suspected cases of neonatal septicemia is suggested.

The conclusion from this study that the Gram negative bacteria especially *Klebsiella* spp.(nosocomial pathogen) was a major bacterial pathogen especially among premature neonates, and the main neonatal risk factors was low weight and prematurity.

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