Research Paper

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# Neonatal Septicemia Due to Acinetobacter Spp. in Tertiary Care Hospital, Rajkot,Gujarat,India

Medical Science

KEYWORDS: Neonatal sepsis, Acinetobacter spp., Emerging Pathogen, Blood culture,

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## ABSTRACT

*Neonatal septicemia is the major cause of Neonatal mortality. It might be possible to reduce these deaths by early diagnosis and treatment. Acinetobacter spp. is emerging as a potential pathogen in neonatal septicaemia because of its frequent isolation and multidrug resistance. Objectives: (1) To find out the incidence of Acinetobacter spp. in neonatal septicaemia in PDU Medical college & Hospital, Rajkot (2) To identify various species of Acinetobacter responsible for neonatal septicemia (3) To find out antibiotic susceptibility of Acinetobacter spp. Methods: A hospital based prospective study was carried out in 400 clinically suspected cases of neonatal septicemia in New Born Intensive Care Unit (NICU) at P.D.U Medical College & Hospital Rajkot. Results: Out of 400 neonates with clinically suspected neonatal septicemia, 149 were blood culture positive, Acinetobacter accounted for 17 (11.4%) of the blood culture positive sepsis of which 11 are Acinetobacter baumanni & 6 are Acinetobacter lowffii. Gram negative bacteria accounted for 123(82.55%) & Gram positive bacteria accounted for 26(14.44%) of all cases. Acinetobacter was sensitive to Ampicillin (0%), Ciprofloxacin6(35.29%), Amikacin4(23.52%), Gentamicin2(14.28%), Tobramycin6(35.29%), Ceftazidime6(35.29%), Cefotaxime4(23.52%), Ticarcillin2(14.28%), Piperacillin4(23.52%) , Meropenem(100%), Imipenem(100%), Piperacillin+Tazobactam 8(47.55%). Conclusion: Acinetobacter is one of the causative organisms causing severe nosocomial infection in neonatal intensive care units. Multi-drug resistant nosocomial Acinetobacter septicemia may be responsible for severe clinical disease in neonates and associated with a high mortality, early diagnosis by blood culture as well as proper use of antibiotics along with proper implementation of infection control policy in hospital prevent morbidity and mortality in neonates because of septicaemia.*

**Introduction:**

Neonatal sepsis is a significant cause of morbidity and mortality in new born mostly in developing country like india.

In India, according to the National Neonatal Perinatal Database (NNPD) 2000, the incidence of neonatal septicaemia has been reported to be 24/1000 live births. Along with other gram negative organism like E.coli, Kleibsiella, and Pseudomonas Acinetobacter spp. are emerging as a potential pathogen causing septicaemia in neonates. As Acinetobacter spp. are frequently isolated in hospital as well as it is resistant to many antibiotics, so it is important cause of nosocomial infection in NICU 1,2.

Septicaemia due to Acinetobacter spp. is common in babies with predisposing factors such as intravascular catheterization, endotracheal intubation, parenteral nutrition, broad spectrum antibiotic therapy and artificial ventilation3. Neonatal septicaemia is more common in male, premature baby, hospital delivered baby. Associated risk factors are prolonged rupture of membrane, IUGR, perinatal asphaxia, neonatal jaundice and congenital anomalies4.

Material and Methods: This study was carried out in P.D.U Medical College and Hospital, Rajkot from a period of December 2009 to December 2010. Blood Samples were collected from 400 clinically suspected cases of neonatal septicemia, admitted in New Born Intensive Care Unit (NICU) at P.D.U Medical College & Hospital Rajkot. The sample was collected from all neonates less than 4 weeks who presented with clinical history suggestive of neonatal septicemia were included in this study. Blood samples were collected by aseptic vein puncture and inoculated into a blood culture bottle containing 20 ml of Brain Heart Infusion broth. After inoculation, the blood culture bottles were incubated at 37°C under aerobic conditions in the incubator for 7 days. The first subculture was done after 24 hours of incubation, the second on third day & final on the seventh day. Subcultures were done onto, 5% sheep blood agar and McConkey agar plates. The inoculated plates were incubated aerobically in the incubator at 37oC for 24 hours, and the plates were observed for growth. The growth was identified by colony characteristics, gram's stain and standard biochemical tests (penicillin susceptibility, oxidase, catalase and urease activity, citrate reduction,glucose and lactose fermentation, and growth at 37°C and 44°C) described in Mackie & McCartney, Practical Medical Microbiology5& Bailey and Scott's Diagnostic Microbiology6 & Koneman7. Samples which did not yield any growth following three subcultures were reported negative at the end of 7 days. Data of 400 cases were collected and analyzied.

Antimicrobial susceptibility testing was performed on Muller Hinton agar by disc diffusion method for the following antimicrobial agents according to the Clinical and Laboratory Standards Institutes guidelines (CLSI) amikacin (30 µg), ampicillin (10 µg), cefotaxime (30 µg), ceftazidime (30 µg), ciprofloxacin (5 µg), gentamicin (10 µg), tobramycin (10µg), ticarcillin (75µg), piperacillin (100 µg), piperacillin + tazobatam(100/10 µg), imipenem (10 µg), and meropenem (10 µg). Escherichia coli ATCC 25922 and Pseudomonas aeruginosa ATCC 27853 were used as quality control strains.

Result: In our study out of 400 cases of neonatal septicemia, blood culture were positive in 149(37.25%). Gram negative bacteria accounted for 123(82.55%) & Gram positive bacteria accounted for 26(14.44%) of all cases Acinetobacter accounted for 17 (11.4%) of the blood culture positive sepsis of which 11 are Acinetobacter baumanni & 6 are Acinetobacter lowffii.

**Table 1: Result of total and positive blood culture.**

| Total | Positive | Gram negative | Gram Positive |
|---|---|---|---|
| 400 | 149(37.25%) | 123(82.55%) | 26(14.44%) |

Table 2: Result of Acinetobacter spp.

| Total positive | Acinetobacter spp. | Acinetobacter baumanni | Acinetobacer lowffii |
|---|---|---|---|
| 149 (37.25) | 17 (11.4%) | 11 | 6 |

**Table 3: Distribution of cases according to sex.**

| Total | Male | Female |
|---|---|---|
| 17 | 12(70.58%) | 5(29.41%) |

**Table 4: Risk factors associated with Acinetobacter spp. septicemia.**

| Risk Factors | No of neonates (n=17) (%) |
|---|---|
| Hospital delivery | 13(76.47%) |
| Ceserean section | 9(52.94%) |
| Pre term baby | 12(70.58%) |
| Lowbirth weight<2500gms | 10(58.82%) |
| LOS | 9(52.94%)) |
| Hospitalization >7 days | 7(41.17%) |
| Incubation | 5(29.41%) |
| Mechanical ventilation | 5(29.41%) |

**Table 5: Antibiotic sensitivity pattern of Acinetobacter spp.**

| Antibiotics | Sensitivity(n=17) (%) |
|---|---|
| Ampicillin | (0%) |
| Amikacin | 4(23.52%) |
| Gentamicin | 2(14.28%) |
| Tobramycin | 6(35.29%) |
| Ceftazidime | 6(35.29%) |
| Cefotaxime | 4(23.52%) |
| Ciprofloxacin | 6(35.29%) |
| Ticarcillin | 2(14.28%) |
| Piperacillin | 4(23.52%) |
| Piperacillin + Tazobactam | 8(47.55%) |
| Meropenam | (100%) |
| imipenam | (100%) |

**Discussion:**

Acinetobacter spp. is emerging nosocomial pathogen in NICU which is responsible for 11.4% of neonatal septicemia which is compare with 12.3% in Arora U et al8,15.2% Mondal GP et al9,8.3% Vinodkumar CS et al1.

In our study 11/17 are Acinetobacter baumanni & 6 /17are Acinetobacter lowffii, where as it was 22/26 Acinetobacter baumanni & 4/26 Acinetobacter lowffii inVishal B.Shete et al10 and in Arora U et al8 it was 13/23 Acinetobacter baumanni & 10/23 Acinetobacter lowffii.

M: F Ratio in our study is 2.4:1, where as it was 3:2 in Jeyamurugan T et al11.

Associated risk factors in our study are hospital delivery13 (76.47%),Cesearian Section9(52.94%),Pre term delivery12(70.58%), low Birth weight10(58.82%) and others like incubation,mechanical ventilation and endotrachial intubation which are compared with Vishal B.Shete et al10and Arora U et al8.

In our study Acinetobacter spp. Are resistant to Ampicilin, where as sensitive to meropenam(100%)&Imepenam(100%),Amikacin(23.52%),Gentamicin(14.28%),Tobramycin(35.29%),Ceftazidime(35.29%),Cefotaxime(23.52%),Ciprofloxacin(35.29%),Ticarcillin(14.28%),Piperacillin(23.52%),Piperacillin+Tazobactam(47.55%) which is compared with Arora U et al8 & Jeyamurugan T et al11

**Conclusion:**

Varieties of microorganisms like gram negative and gram positive bacteria are responsible for neonatal septicemia. Therefore early diagnosis & effective treatment with appropriate antibiotics is the only way to prevent neonatal morbidity & mortality. For definitive diagnosis of septicemia causative microbes are required to be isolated from blood culture which takes minimum time of 48 hours. It also provides correct guideline to institute rational antibiotic therapy.

Acinetobacter is one of the causative organisms causing severe nosocomial infection in neonatal intensive care units. Multidrug resistant nosocomial Acinetobacter septicemia may be responsible for severe clinical disease in neonates and associated with a high mortality,early diagnosis by blood culture as well as proper use of antibiotics along with proper implementation of infection control policy in hospital prevent morbidity and mortality in neonates due to septicaemia.

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