



Emerging pattern of antibiotic sensitivity at referral neonatal intensive care center

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ABSTRACT **Objectives:** to identify common organisms and pattern of antibiotic sensitivity among culture proven neonatal infections
Methods: babies admitted to NICU with culture proven sepsis between gestational age 28 wks and above are included over 6 months period. Babies with major malformations and those undergoing surgery were excluded from the study
Results: A total of 157 positive out of 452 cases. Most common bacteria was coagulase negative staphylococcus aureus (CONS) 21% followed by acetanobacter species 12%, klebsiella pneumoniae 11% E coli 8.2% enterococci 8.2% pseudomonas aeruginosa 6.3% Staph aureus 4.4% streptococci 2% and enterobacter 1.3% and candida species 24%. CONS was sensitive to daptomycin doxycycline rifamycin levofloxacin tegicycline linezolid and vancomycin and gram negative bacteria sensitive to imipenem meropenem colistin amikacin ciprofloxacin and tegicycline. Enterococci chloramphenicol clindamycin ofloxacin erythromycin linazolid vancomycin and Staphylococcus aureus was sensitive to doxycycline daptomycin linezolid vancomycin and one MRSA sensitive to linezolid and vancomycin
 Candida species all sensitive to fluconazole flucytosine amphotericin B micafungin caspofungin and voriconazole with no resistance
 Antibiotic resistance noted to ampicillin penicillin gentamicin cefotaxime ceftriaxone and partial resistance to imipenem, meropenem
Conclusions: There is an increasing trend of antibiotic resistance to the commonly used first line drugs. Continuous surveillance for antibiotic susceptibility is needed to ensure proper empirical therapy.

KEYWORDS : antibiotic, sensitivity, resistance, bacteria, sepsis

Introduction

Sepsis is one of the commonest causes of neonatal morbidity and mortality. It is responsible for about 30-50% of the total neonatal deaths in developing countries (1,2). In the year 2010, an estimated 7.7 million childhood deaths occurred among which 3.1 million occurred in the neonatal period (3). India contributes to around one-quarter of all neonatal deaths in the World and more than half (52%) of these are estimated to occur due to infections (4). Sepsis related mortality is largely preventable with rational anti-microbial therapy and aggressive supportive care. The risk factors and the clinical presentations of neonatal sepsis are much varied, depending not only on the age of onset, but also on the responsible organism.

It encompasses various systemic infections of the newborn such as septicemia, meningitis, pneumonia, arthritis, osteomyelitis, and urinary tract infections. Superficial infections like conjunctivitis and oral thrush are not usually included under neonatal sepsis (5). According to the data from National Neonatal Perinatal Database (NNPD, 2002-03) the incidence of neonatal sepsis is 30 per 1000 live births and sepsis to be one of the commonest causes of neonatal mortality contributing to 19% of all neonatal deaths (5). Neonatal sepsis is of two types; early onset sepsis and late onset sepsis. Early Onset Sepsis (EOS) presents within first 72 hours of life. In severe cases, the neonate may be symptomatic at birth. Infants with EOS usually present with respiratory distress and pneumonia. The source of infection is generally the maternal genital tract (6). Late onset sepsis usually presents after 72 hours of age. The source of infection is either nosocomial or community acquired and neonates usually presented with septicemia, pneumonia or meningitis (5).

Discussion

One should know the probable etiologic agent and its antibiotic susceptibility pattern in the neonatal intensive care center before commencing empirical therapy.

This study was conducted to determine the causative organisms in suspected cases of neonatal sepsis and to know the pattern of antibiotic susceptibility in the NICU of a tertiary care centre.

Blood culture has remained the gold standard for the confirmation of sepsis (7). In our study culture positivity rate was 28.78% while that in Shah AJ et al. (8) (2012) study was 31.75%, Shaw CK et al. (9) (2007) study was 54.64%, Bhattacharjee et al. (10) study was 32%. In advanced centres, blood culture is positive in 80% of genuine sepsis (11). Thus culture positivity rate is highly variable from place to place.

The rate of admission of early and late onset sepsis as well as the prevalence of organisms and their sensitivity patterns were much similar. This may be due to the fact that not only the vertical transmission but also the horizontal spread of infection may play a part in the early onset of sepsis in hospitalized neonates (12,13). A male predominance was found in our study which is found in almost all the studies of sepsis in newborn (8,9)

The most common organism isolated in our study was CONS among gram positive while acetanobacter species and klebsiella pneumoniae most common among gram negative bacteria.

Most common cause of early onset sepsis was E coli and enterococci while late onset sepsis was CONS followed by acetanobacter klebsiella E coli pseudomonas, enterobacter and staph aureus in our study

Most of the studies have found a preponderance of gram negative organisms like *klebsiella*, *pseudomonas*, and *enterobacter species* (14-17). However, *staphylococcus* was the commonest gram positive organism to be isolated in most of the studies (14,18) In western countries, Group B *streptococcus* is mainly responsible for neonatal sepsis but this is not observed in this part of the world (19) in our study Acetanobacter species was the most common gram negative organism and prematurity to be a risk factor associated with neonatal sepsis. This finding was similar to the study by Monjur F et al. (20).

In our study, most of the isolates were resistant to penicillin. Ampicillin, gentamicin & cefotaxime had lowest sensitivity to all bacterial isolates. Highest sensitivity was recorded with ciprofloxacin meropenem amikacin colistin and linezolid and vancomycin. As far as cephalosporins are concerned, moderate sensitivity was observed for third generation cephalosporins i.e., cefotaxime while higher sensitivity was documented for fourth generation cephalosporins i.e. cefepime. Low sensitivity of commonly used antibiotics and fair sensitivity to amikacin was also observed by other authors (16,21,22) Tallur et al. (22) concur with us that most isolates were resistant to ampicillin, gentamicin Cefotaxime tazobactam with amikacin could be reasonable initial antibiotic of choice

Conclusion: Neonatal sepsis is a leading cause of neonatal admissions, morbidity and mortality in developing countries. Spectrum for sepsis could be different in different regions. Sensitivity pattern also differs accordingly. A low susceptibility to commonly used antibiotics like ampicillin and gentamicin is a cause for concern. Periodic evaluations not only reveals the recent trend of increasing resistance to commonly used antibiotics but also helps in

implementation of a rational antibiotic therapy.

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