ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICAL MICROBIOLOGY AND ITS OUTCOME OF NEONATAL SEPSIS IN A TERTIARY CARE HOSPITAL – A PROSPECTIVE STUDY OF 250 CASES

Neonatology

Dr. D. S. Jothi MD Paediatrics, Assistant Professor Madurai Medical College, Madurai

Dr. C. C. Nandhini* MDOG, Assistant professor Madurai Medical College, Madurai *Corresponding Author

Dr. Karthika Sankar DGOP, ostgraduate Madurai Medical College Madurai

ABSTRACT

Background: Neonatal Septicaemia is continued to be the major causes of the mortality and morbidity in newborns, particularly in premature infants. The signs and symptoms of neonatal sepsis are nonspecific. Objectives: To analyze the causative organism and its outcome in neonatal sepsis.

Material and Method: A prospective study performed at the Department of paediatrics, Annai Gandhi memorial government hospital, Trichy, over a period of one year from November 2010 to October 2011. Totally, 250 subjects were enrolled in the study.

Result: Out of the 250 neonates 84% of infections were caused by gram negative organisms and 16% were gram positive organisms.

Conclusion: Based on the above analysis, a positive blood culture and the antibiotic susceptibility testing of the isolates are the best guide in choosing the appropriate antimicrobial therapy in treating neonatal septicaemia.

KEYWORDS

Infant, newborn, Sepsis, neonatal

1. INTRODUCTION:

Neonatal Septicemia refers to a clinical syndrome characterized by systemic signs and symptoms due to generalized bacterial infection with a positive blood culture in the first four weeks of life.

Bacterial infections are the commonest cause of morbidity and mortality during the neonatal period. Fulminant and fatal such as shock,disseminated intravascular coagulation and multi-system organ failure, mandating early diagnosis of this life-threatening condition for a timely treatment and a favourable outcome. It is estimated that 20% of all neonates develop sepsis, and it is responsible for 30-50% of the 5 million total neonatal deaths each year.The repoted incidence of neonatal sepsis varies from 7.1 to 38 per 1000 live births in Asia.

Gram negative organisms are found to be more frequently than Gram positive organisms by many Indian studies[1], [2]. Group B streptococcus (GBS, Streptococcus agalactiae), Escherichia coli (E. coli) remains the leading cause of neonatal sepsis and meningitis. E. coli is frequently associated with severe infections and meningitis and is the leading cause of sepsis related mortality among VLBW infants .GBS and E. coli together account for about 70% of cases of EOS in the neonatal period. Although less common, Listeria monocytogenes is associated with invasive disease in the newborn, spontaneous abortions or stillbirth if acquired during pregnancy.

LOS has become an important cause of morbidity and mortality among low birth weight infants. LOS is mainly associated with the organisms acquired from the environment after birth. Coagulase-negative staphylococci, Pseudomonas aeruginosa, Candida albicans, Serratia marcescens, and E. coli accounting for 48% of the infections. The incidence of late-onset GBS disease has remained unchanged despite intrapartum antibiotic prophylaxis. Meningitis remains a common presentation of late-onset GBS disease, with serious neurologic sequelae and permanent impairment among many survivors.

The clinical presentation is often subtle or nonspecific and usually mimicked by several other disorders. The signs and symptoms of neonatal sepsis are nonspecific. These include fever or hypothermia, respiratory distress including cyanosis and apnea, feeding difficulties, lethargy or irritability, hypotonia, seizures, bulging fontanel, poor perfusion, bleeding problems, abdominal distention.

Based on the timing of the infection neonatal sepsis has been classified into early-onset sepsis (EOS) and late-onset sepsis (LOS). This classification helps to guide antibiotic therapy as it implies differences in the presumed mode of transmission and predominant organisms. EOS is defined as onset of sepsis in the first 3 days and is mostly the result of vertical transmission of bacteria from mothers to infants during the intrapartum period.

LOS is defined as infection occurring after 72 hours of life is attributed to the horizontal transmission of pathogens acquired postnatally and is often more insidious in onset.

a. Early onset sepsis usually presents within the first 72 hours of life.
b. Late onset sepsis usually presents after 72 hours of age.

2. MATERIAL AND METHOD:

This prospective study was done during the period of NOV 2010 to OCT 2011 in the neonatal ward,department of paediatrics,AGM government hospital, Trichy.

This hospital is a tertiary care centre which services predominantly low income community.The study population constituted all neonates admitted with history and clinical features suggestive of neonatal sepsis.The sample size of 250 neonates with suspected sepsis was studied.

The study was approved by the ethical committee of our institute.Neonates with suspected sepsis whose parents gave consent were enrolled for the study.After selection, a complete history with importance given to maternal risk factors like prematurity,intrapartum fever, PROM>18 hours, per vaginal examination >3 during delivery and neonatal risk factors like feeding pattern,administration of native medicines was taken for all newborns who were admitted with feature of sepsis from the parent or caretaker and a thorough physical examination was done.The findings were recorded in a predesigned proforma.All suspected septic newborns were investigated at the time of admission with chest x-ray,blood culture,C-reactive protein, lumbar puncture (if necessary) and peripheral smear studies for total WBC count, IT ratio and toxic granules.The patients were treated with empirical antibiotics and modified based on the investigations.With all these data the risk factors,clinical presentation,etiology of sepsis,outcome of sepsis with the management will be analyzed.

Based on clinical features and resuts of investigations,diagnosis of cases categorized into 3 groups as

1. Clinical sepsis
2. Probable sepsis
3. Proven sepsis

INCLUSION CRITERIA:

All neonates with symptoms and clinical signs suggestive of sepsis with or without maternal/neonatal risk factors.

EXCLUSION CRITERIA:

1. Birth Asphyxia
2. Meconium aspiration syndrome

3. Physiological Jundice
4. Nosocomial infection
5. ELBW <1 kg

3. RESULTS:

Totally, 250 subjects were included in the study. Gram negative organisms formed the majority of the isolates compared to gram positive organisms (84% versus 16% respectively) in the present study.Klebsiella pneumonia (36%) was the predominant isolate followed by E.coli (34%).

4. DISCUSSION:

Organisms causing sepsis:

Proven sepsis

Proven sepsis	n	%
Gram positive	8	16
Gram negative	42	84

Organisms and their frequency

Specific organisms	N	%
Klebsiella	18	36
E.coli	17	34
Staph aureus	8	16
Pseudomonas	4	8
Enterobacter	3	6

Klebsiella was the commonest organism with 36% , E.Coli was 34%, Pseudomonas and enterobacter had 8%and 6 % respectively.Among the gram positive staph aureus was the only organism 16% Among the early onset sepsis 91.5% were gram negative organisms and 8.3% were gram positive organisms.Among the late onset sepsis (76.7%) were gram negative organisms, grampositive were 23 % and pseudomonas were 15.3%.

Mortality is high with gram negative organism in early onset sepsis.In late onset sepsis gram positive had high mortality 12.5%.Mortality due to sepsis is 23.2% which is comparable to other hospital based studies.[3,4]

Similar observations were made in other studies.However studies by few authors showed s.aureus as the commonest isolate [5], while P.aeruginosa was the commonest pathogen isolated in another study[4].NNPD data 2002-2003 shows that among the intramural births,Klebsiella pneumonia is the most frequently isolated pathogen followed by staphylococcus aureus while, among the extramural neonates klebsiella pneumonia again the common organism isolated followed by staphylococcus aureus and pseudomonas.

5. CONCLUSION:

Blood culture was positive in 50 (20%) neonates.About 84% of infections were caused by gram negative organisms, Klebsiella being the commonest organism causing sepsis.

Blood culture is still the “Gold standard” for the diagnosis of septicaemia in neonates and should be done in all cases of suspected septicaemia. In view of the changing spectrum of the causative agents of neonatal septicaemia and their antibiotic susceptibility patterns from time to time and from one hospital to another, a positive blood culture and the antibiotic susceptibility testing of the isolates are the best guide in choosing the appropriate antimicrobial therapy in treating neonatal septicaemia.

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