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Spectrum of Neonatal Sepsis in NICU

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Abstract: *Neonatal sepsis is one of the commonest conditions encountered in neonatal nursery of any institution. Dynamicity of changing bacterial flora and frequent emergence of resistant strain is main problem. It requires appropriate and accurate clinical & laboratory diagnosis.*
Present study was aimed to find out spectrum of neonatal sepsis causing microorganism in our set up and comparing same from our previous study done in 2007-08.
During study period 106 cases of diagnosed newborns were included. Out of this 43 newborn were culture positive. Current study shows predominance of gram positive staphylococcus (8.5%) followed byklebsiella, whereas previous study had shown predominance of gram negative klebsiella (33.3%).
Keywords: *Septicaemia, Culture isolate, Risk factors.*

I. Introduction

Bacterial sepsis is major cause of neonatal morbidity and mortality. A large no. of bacterial and non bacterial organism causes sepsis during intrauterine, perinatal period or postpartum period. Neonatal bacterial sepsis is characterized by positive blood culture, Raised acute phase reactants with clinical symptoms or signs such as lethargy, respiratory distress, poor feeding or vomiting, abdominal distension, seizures and shock characterized by prolonged capillary refill time. Multiorgan failure and severe shock may be manifestations of severe sepsis.

Neonatal sepsis may be classified as early onset sepsis (EOS), Late onset Sepsis (LOS) or very late onset Sepsis (VLOS). Sepsis presenting within 72 hrs. of life are called Early onset sepsis whereas manifestations after 72 hrs. are called Late onset sepsis. Some authors use term as very late onset sepsis in conditions manifesting after 30 days of age. In very late onset sepsis, Infection usually comes from community or is acquired during NICU stay but symptoms appear after discharge. This special classification helps in suspecting organism, planning investigation, choosing antimicrobial agents, prognostication and follow up.
Neonatal infections are estimated to cause about 1.6 million deaths worldwide and 40% of all neonatal deaths due to sepsis occur in developing countries [1].

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.

The bacteriological profile of neonatal sepsis is constantly under change, more so with advances in early diagnosis, treatment and increased survival of preterm babies. Sepsis, if identified and treated appropriately in time, has very good outcome thus the bacteriological profile needs to be reviewed from time to time.

This study was conducted to know the current incidence of sepsis among the babies admitted in our hospital, the pattern of etiological agent in neonatal sepsis and the antibiotic sensitivity profile of the microorganisms isolated.

II. Objective

To study the spectrum of neonatal sepsis in 2014-15 and comparison of similar type of study done in 2007-2008 in RIMS, Ranchi

Setting

This study was conducted in the neonatal intensive care unit in the department of paediatrics in Rajendra Institute of Medical Sciences, Ranchi from May 2014 to April 2015.

III. Materials And Methods

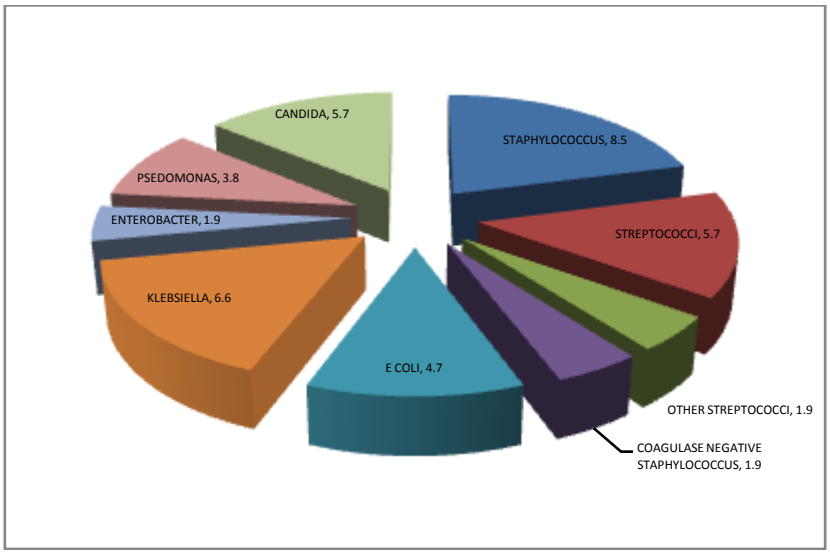
This observational, prospective, single centre study consists of 106 cases diagnosed as clinical sepsis from May 2014 to April 2015 at level III NICU of Rajendra Institute of Medical sciences. The study was carried out on clinically suspected and already admitted cases in NICU.

Blood sample for blood culture and sensitivity and sepsis screen (excluding mESR) and other relevant investigations were sent t our pathology and Microbiology department.. X ray, CSF study and cultures of urine etc were done only in selected cases.

Blood cultures were sent for bacterial as well as fungal organisms by standard method. Blood cultures were plated in Mac-Conkey and blood agar. For fungal culture, bottles were cultured using sabouraud's agar and incubated at 25 deg C and 37 deg c. Sub cultures were made at 24 hrs, 48 hrs, and 72 hrs and on 7th day. The plates were observed for evidence of growth, the colony morphology was noted, a smear was made and gram stained. If gram stain show yeast cell, the isolate was further processed for species identification.

Observation

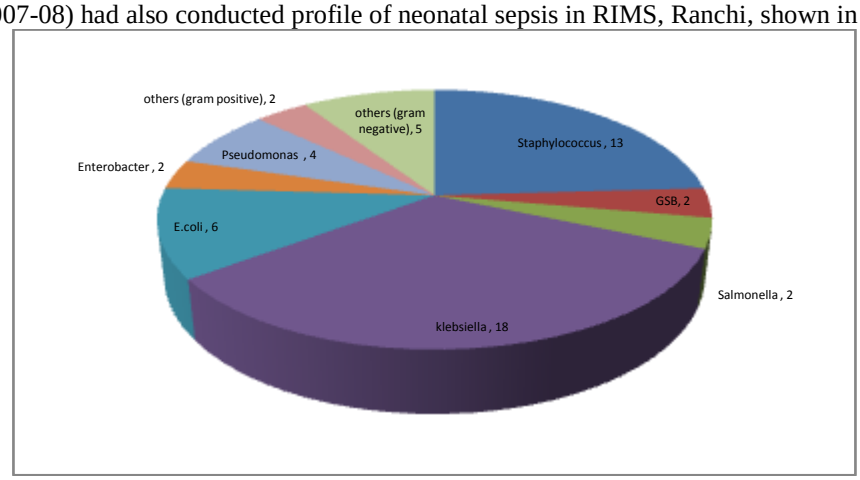
106 cases diagnosed as clinical sepsis from May 2014 to April 2015 were selected for study.



Gram Positive	[n]	Gram negative	[n]	Fungal culture
Staphylococcus	9	Klebsiella	7	Candida spp [n=6]
GB Streptococcus	6	E. Coli	5	
Coagulase negative staphylococcus	2	Pseudomonas	4	
Other streptococcus	2	Enterobacter	2	
Total	19		18	6

IV. Discussion

Verma et al (2007-08) had also conducted profile of neonatal sepsis in RIMS, Ranchi, shown in following table-



Gram positive	[n]	Gram Negative	[n]
Staphylococcus	13	Klebsiella	18
GBS	2	E. coli	6
Salmonella	2	Pseudomonas	4
Other gram positive	2	Enterobacter	2
		Other gram negative	5

	Present Study (2015)	Previous study (2007-08)106
Total no of patients	106	187
Sex- Male -Female	52 54	-
Age -Early Onset Sepsis -Late Onset Sepsis	 32 74	-
Name of organism	Present study Number of cases and percent	Previous study (2007-08) Number of cases and percent
Gram positive= Staphylococcus aureaus	 9 (8.5%)	 13 (24.07%)
Grp B streptococcus	6(5.7%)	2(3.7%)
Other streptococcus	2(1.9%)	-
Coagulase negative Staphylococcus	2(1.9%)	-
Salmonella	-	2(3.7%)
Others	-	2(3.7%)
Gram negative= Klebsiella	 7 (6.6%)	 18(33.33%)
E coli	5(4.7%)	6(11.11%)
Enterobacter	2(1.9%)	2(3.7%)
Pseudomonas	4 (3.8%)	4 (7.41%)
Others	-	5 (9.25%)
Candida	6(5.7%)	-

The present study has demonstrated change from the previous result obtained in 2007-08. The present study shows a predominance of gram positive staphylococcus, Whereas previous study had shown predominance of gram negative Klebsiella. The present study also shows a good amount of Candida sp. in the blood culture of the neonates. A rising trend has been noted in the incidence may be due to availability of newer diagnostic tools. Preterm infants are predisposed to Candida infections because of immaturity of their immune system, frequent invasive interventions and prolonged hospital stay. It may not be a coincidental finding & needs further study.

Risk factors for hospital acquired infections include lower gestational age, low birth weight, invasive procedures, invasive devices (intravenous catheters, endotracheal tubes, parenteral nutrition and intravenous lipids), colonisation of skin, gastrointestinal tract and airway with invasive organism, nursery overcrowding and hand washing All these factors may lead to a rise in hospital acquired infections. The preponderance of gram positive organisms may be due to above mentioned conditions.

V. Conclusion

The bacteriological profile has changed in the past few years in our institution thus it is important that it should be reviewed from time to time to set up empirical management protocol. The antibiotic sensitivity profile also needs to be reviewed. This may help in use of appropriate antibiotics for proper duration thus leading to reduction in misuse of antibiotics.

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