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RESEARCH ARTICLE

PREVALENCE OF DIFFERENT BACTERIAL ISOLATES IN NEONATAL SEPTICAEMIA IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Neonatal septicemia is the commonest cause of neonatal mortality and morbidity. To reduce the mortality caused by Neonatal septicemia, it becomes essential to diagnose it as soon as possible and treat with administration of appropriate antibiotics. **Material and methods:** The study was done on neonates coming to Patna Medical College and Hospital, Patna. About 100 neonates were screened in the study for a time period of 6 months. **Results:** Out of 100 clinically suspected cases of neonatal septicaemia 68 (68%) were blood culture positive and 32 (32%) were blood culture negative. The commonest organism isolated was Escherichia coli (26.47%), followed by Klebsiella spp (23.52%). Among Gram positive organisms Staphylococcus aureus (19.11%) was the commonest isolate followed by CONS with 14.70% cases. Positive blood culture is the gold standard for the diagnosis of septicaemia. **Conclusion:** Neonatal septicaemia is more common in males, low birth weight and preterm neonates. A positive blood culture is the only definitive method of confirming a case of septicaemia which helps in prompt and timely administration of antibiotics which could be life saving.

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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 (Gotoff, 1970). According to the National Neonatal Perinatal Database (NNPD) report 2002-2003, the incidence of neonatal septicemia in India was reported to be 30 per 1000 live births (3%) among intramural babies in tertiary care centres in India and 39.7% among extramural babies (Shalini Tripathi, 2010). Several authors categorize neonatal septicemia into two groups: Primary and Secondary. Primary neonatal septicemia is further divided into early onset septicemia (before one week of life) and late onset septicemia (after one week of life) for epidemiological and therapeutic purposes (Ved Parkash Takkar, 1974). Bacterial infections are the commonest cause of morbidity and mortality during the neonatal period. Fulminant and fatal course of infection may result from complications such as shock, disseminated intravascular coagulation and multi-system organ failures. Thus, the early diagnosis of this life threatening condition is mandatory for a timely treatment and a favourable outcome (Shalini Tripathi and G.K.Malik, 2010).

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The bacteriological patterns of neonatal septicemia has changed from time to time and from place to place over the years in India. While *Group B Streptococci* and gram negative bacilli like *Escherichia coli* (E.coli), *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Citrobacter diversus*, *Proteus mirabilis* and *Enterobacter cloacae* were the major pathogens isolated in the developed countries. In the developing countries like India 65% to 85% of septicemia are caused by gram negative organisms and 15% by gram positive organisms (Paul, 1996). The major isolates in our country include *Klebsiella pneumoniae* followed by *E.coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *CONS*, *Enterobacter spp*., *Citrobacter spp*., *Proteus mirabilis* and *Serratia*. Interestingly, Group B β-haemolytic streptococci which has been found to be of great concern in the West, have not established a major foothold in Indian nurseries (Mathur, 1996). The case fatality rate of neonatal septicemia is high without treatment, but with the presently available antimicrobial agents, theoretically, all cases of neonatal septicemia may be treated successfully. Thus, there is an urgent need for early diagnosis and treatment. The gold standard for the diagnosis of neonatal septicemia is a positive Blood culture. Although blood culture is gold standard for the diagnosis of sepsis, culture reports would be available only after 48-72 hours. It is possible to detect growth in 12-24 hours by BACTEC or BACT/ALERT culture system which can detect bacteria at a concentration of 1-2 cfu per ml.

To avoid multidrug resistance in post antibiotic era, it is mandatory to avoid unnecessary use of antibiotics to treat non-infected infants. Thus, rapid and newer diagnostic tests are available for diagnosis of neonatal sepsis which include Interleukin-6, neutrophil CD 64, procalcitonin, acute phase reactants and nucleated RBC count etc (Shalini Tripathi and G.K.Malik, 2010; Paul, 1996 and Mamatha, 2016). The aim of this study is to know the prevalence of different bacterial isolates in cases of neonatal septicaemia in NICU.

MATERIALS AND METHODS

This study was carried out in the Department of microbiology, Patna medical College, Patna. 100 cases selected for this study were taken from Neonatal Intensive Care Unit of PMCH, Patna from April 2018 to September 2018. About 2ml of venous blood was drawn by a percutaneous venous puncture following strict aseptic precautions and inoculated into blood culture bottle containing 20ml of brain heart infusion broth and this constituted 1 in 10 dilution of blood. After the blood was inoculated in blood culture bottles, these bottles were incubated at 37^0C under aerobic conditions in the incubator for 7 days. The presence of growth was indicated by generalized turbidity. The first subculture was done after 24 hours of incubation, the second subculture on fifth day and last on seventh day. Using sterile inoculation loop, a loopful of inoculum was drawn from blood culture bottle taking care of contamination, was inoculated on Blood agar, and Mac Conkey agar plate and Nutrient agar plate. The inoculated plates were incubated aerobically in incubator at 37^0C for 24 hours. After 24 hours plates were observed for growth, if any growth was seen on plates it was subjected for identification by Gram's staining, Motility test and biochemical tests.

RESULTS

Table I showed, out of 100 clinically suspected cases bacteria isolated from 68 samples. The commonest organism isolated were Escherichia coli (26.47%), followed by *Klebsiella pneumoniae (23.52%), Staphylococcus aureus(19.11%), CONS (14.70%), Psuedomonas aeruginosa (11.76%), Proteus spp (2.94) and Enterobacter (1.47%).* Table II showed out of 100 suspected cases 68 were males (68%) and 32 were females (32%). Among 68 culture positive cases 48 (70.58%) were males and 20 (29.41%) were females. So males were higher in number compared to females. Table III showed out of 100 suspected cases 62 (62%) were preterm (<37 weeks) neonates and 38 (38%) were term neonates (>37 weeks). Among culture positive cases 47 (69.11%) were preterm neonates and 21 (30.88%) were term neonates. So incidence was higher in preterm neonates compared to term neonates. Table IV showed out of 100 suspected cases 57 (57%) were of low birth weight and 43 (43%) were of normal birth weight.

Table 1. Organisms isolated by Blood culture

S. No	Organism	Isolates	
		Number	Percentage
1	Escherichia coli	18	26.47
2	Klebsiella spp.	16	23.52
3	Staphylococcus aureus	13	19.11
4	CONS	10	14.70
5	Pseudomonas aeruginosa	8	11.76
6	Proteus spp.	2	2.94
7	Enterococcus spp.	1	1.47
	Total	68	100

Table 2. Sex wise distribution of cases

Sex	Suspected cases		Culture positive cases	
	Number	Percentage	Number	Percentage
Males	68	68	48	70.58
Females	32	32	20	29.42
Total	100	100	68	100

Table 3. Distribution of cases according to Gestational age

Gestational age	Suspected cases		Culture positive cases	
	Number	Percentage	Number	Percentage
Preterm (<37 weeks)	62	62	47	69.11
Term (>37 weeks)	38	38	21	30.88
Total	100	100	68	100

Table 4. Distribution of cases according to birth weight

Birth Weight	Suspected cases		Culture positive cases	
	Number	Percentage	Number	Percentage
Low birth Weight (<2.5 kg)	57	57	40	58.82
Normal birth weight (>2.5 kg)	43	43	28	41.18
Total	100	100	68	100

Among 68 culture positive cases 40 (58.82%) were of low birth weight and 28 (41.17%) were of normal birth weight. So, incidence of neonatal septicaemia was higher in low birth weight neonates compared to normal birth weight.

DISCUSSION

In 68% isolates Gram negative organisms were 45 (66.17%) and Gram positive organisms were 23 (33.82%) Anuradha De *et al*. in 1998 reported 72.4 % of Gram negative septicaemia (Anuradha, 1996). Mamtha P. Samaga *et al.* in 2016 reported neonatal septicaemia by Gram negative organisms were 78% and 21.4 % by Gram positive organisms (Mamatha, 2016). In our study neonatal septicaemia was more common in males (70.58%) as compared to females (29.41%), which is in accordance with other studies. Khatua *et al*. reported 70.7% cases of neonatal septicaemia in males. P. Jyothi *et al*. also reported males predominance 65.5% males and 34.5% females (Jyothi, 2013). In our study, 47 preterm neonates were blood culture positive (69.11%) out of 62 and out of 38 term babies 21 were blood culture positive (30.88%). Similar reports have been found by K.K. Anand who reported 62.1% blood culture positive neonates were preterm. This study also concur with other studies (Anand, 1991). In our study septicemia was more common in low birth weight neonates (58.82%) as compared to normal weight neonates (41.17%). G.G.Christo *et al* in 1990 reported high rate of septicemia among low birth weight neonates (Christo, 1990). Babara J Stoll *et al* in 1991 found rate of infection is inversely proportional to birth weight (Stoll Barbara, 1991).

Conclusion

Neonatal septicaemia is an medical emergency and a leading cause of mortality and morbidity in developing countries like India. The aetiology is multifactorial and it presents with non-specific sign and symptoms. Positive blood culture is the gold standard for the diagnosis of septicaemia. Culture reports would be available only after 48- 72 hours. So there is need for automation in blood culture to speed up and give better antibiotic susceptibility to avoid unnecessary use of antibiotics and development of multidrug resistance. Last but not the least

hand washing between patients contact is essential to decrease the nosocomial spread of infection.

REFERENCES

Anand K.K. *et al*., "Coagulase negative staphylococcus septicemia in newborns". Indian paediatrics. 1991; 28: 1241-47.

Anantanarayan R. and Jayaram Paniker C.K. "Text book of Microbiology" 10 th edition .

Anuradha De, Alka Gogate. C-Reactive Protein. The Indian Practitioner 1996 Feb; 49 (2): 119-24.

Bailey and Scott's. "Diagnostic Microbiology". 13 th edition .

Christo G.G. *et al*., Neonatal Citrobacter sepsis clinical and Epidemiological Aspects" *Indian J. Pediatr*. 1990; 57: 781-784.

Gotoff, S.P., Behrman, R.E. 1970. Neonatal septicemia. *J Pediatr.,* Jan; 76 (1): 142-153.

Mackie and McCartney. "Practical medical microbiology". 14th edition

Mamatha P Samaga and B Sumangala 2016 ;Bacteriological profile of neonatal septicaemia in MIMS Mandya , India . *International journal of currennt microbiology and applied sciences.*

Mathur NB. Neonatal Sepsis. Indian Pediatrics 1996 Aug; 33: 663-74.

P Jyothi ,Metri c Basavaraj and Peerapur V Basavaraj; bacteriological profile of neonatal septicaemia and antibiotic susceptibility pattern of isolates; *Journal of Natural science , Biology And Medicine* ; J Nat Sci Bio Med 2013Jul-Dec;4(2) ; 306-309.

Paul VK, Singh M. Diagnosis and Treatment of Neonatal Sepsis. Indian Pediatrics 1986 Dec; 23: 1023-35.

Shalini Tripathi and G.K.Malik; Internal journal of Medical update 2010 July; 5(2): 45-54

Stoll Barbara J. *et al*., "Late onset sepsis in very low birth weight neonates. A report from the National Institute of child Health and Human Development neonatal research Network". NICHD Neonatal Research Network. 1991; 29: 63-70.

Ved Parkash Takkar, Omkar Nath Bhakoo, Anil Narang. Scoring System for the Prediction of Early Neonatal Infections. *Indian Pediatrics* 1974 Sept; 11 (9): 597-600.

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