International Journal Of Scientific And University Research Publication

ISSN No 2364 I2018

Listed & Index with
ISSN Directory. Paris

Multi-Subject Journal

Volum : (3) | Issue : 211 |

INTERNATIONAL JOURNAL OF SCIENTIFIC AND UNIVERSITY RESEARCH PUBLICATION

Research Paper

A BACTERIOLOGICAL STUDIES OF NEONATAL SEPTICEMIA

Director publisher

ABSTRACT

ABSTRACT Neonatal sepsis is characterized by bacteraemia and clinical symptoms caused by micro-organisms and their toxic products and is one of the four leading causes of neonatal mortality and morbidity in India, so the study iscarried out by taking 65 neonates blood samples which were proceed for blood culturing, it is carried out by inoculating on brain heart infu- sion broth and after 24 hrs transfer on Blood agar, MacConkey agar and Nutrient agar out of the total samples, 38 samples were found to be blood culture positive. Total six different isolates were obtained from which Klebsiella spp. 13 (34.2%) and Proteus spp. 10 (26.3) was most predominant organisms the other isolates were E.coli 8 (21%), Pseudomonas spp. 7 (18.4%), S.aureus 2 (5.2%) and Salmonella spp. 1 (2.6%). The results showed that a majority of the bacterial isolates in neonatal sepsis were found sensitive to imipenem, ciprofloxacin, meropenem and chloramphenicol and resistant to most of the commonly used antibiotics, eg. ampicillin and cephalexin.

KEYWORDS :

INTRODUCTION

Neonatal sepsis is characterised by bacteraemia and clinical symptoms caused by micro-organisms and their toxic products (Waheed M, *et al*., 2003) and is one of the four leading causes of neonatal mortality and morbidity in India (Tsering *et al*., 2011; Kumhar *et al.,* 2002). Early onset (within first week of life) neona- tal sepsis is generally acquired from pathogens of maternal geni- tal tract, whereas late onset sepsis (after first week till 28 days of life) has its environmental origin either in the community or in hospital (Zaidi AKM, *et al*., 2009).

Neonatal sepsis or sepsis neonatorum has considerable contri- bution in the high neonatal morbidity and mortality. World over, nearly 1.6 million neonatal deaths are caused by neonatal infec- tions (Sundaram V. *et al.,* 2009). Bacterial sepsis is considered to be an important cause of neonatal mortality. (Movahedian AH, *et al*., 2006) Depending upon the type of micro-organism the mortality rate ranges between 20 to 50% being highest with gram-negative and enterococcus (Aletayeb SMH. *et al.,* 2011). The spectrum of bacteria most commonly implicated in neo- natal sepsis are quite different in industrialized countries com- pared with middle and low income countries (Sundaram V. *et al.,*2009).

Neonatal sepsis incidence increased during the recent years, it may be due to the more common use of invasive procedures and the development of resistance organisms. Bacterial resistance to commonly used antibiotics has emerged and complicated to the management of neonatal sepsis, so the present study refers to prompt recognition of microorganisms through blood culturing and appropriate antimicrobial activity testing.

Material and Methods

Patients: During a period of research work, a total of 65 neo- nates who admitted to the preterm unite and intensive care unit (ICU) in Akola city were investigated for early onset sepsis (0-7 days of age) and late onset sepsis (>7-90 days of age).

Blood Samples: Using aseptic conditions, by applying Povidone iodine and 70% alcohol at the site of vein puncture, 2 ml. venous blood was drawn from the antecubital or femoral vein. The spec- imens were gently poured in sterile tubes containing anticoagu- lant and transported within one hour to the microbiology lab.

Culture and Identification: All blood cultures were incubated in brain heart infusion broth at 37°C and inspected daily for 3 days for presence of visible microbial growth by observing any of one of the following; turbidity, haemolysis, air bubbles (gas production) and coagulation of broth, otherwise the results were considered as negative for microbial growth. Subcultures were made during 3 successive days on nutrient agar, blood agar, and MacConkey's agar. The inoculated plates were incubated under aerobic conditions for 24 hr. The positive blood cultures were in- vestigated for identification of growing organisms. Members of the family *Enterobacteriaceae* were further identified by: indole production, H2S production, citrate utilization, motility test, urease test, oxidase test and carbohydrate utilization tests. For diagnosis of Gram-positive bacteria; cellular and colonial mor- phology were examined and confirmed by: coagulase, catalase, bacitracin and optochin susceptibility test.

Results

Table 1: Results of Blood Culture According to Maturity of Neonates and Onset of Sepsis

Organisms	Frequency n (%)	Mature n (%)	Preterm n (%)	Early onset n (%)	Late onset n (%)
Klebsiella spp.	13 (34.2%)	6 (46.1%)	7(53.8%)	9(69.2%)	4(30.7%)
Proteus spp.	10 (26.3)	9(90 %)	1(10 %)	5(50 %)	5(50 %)
Escherichia coli	8 (21 %)	6 (75 %)	2(25 %)	7(87.5%)	1(12.5%)
Pseudomonas spp.	7 (18.4%),	4 (57.1%)	3(42.8%)	5(71.4%)	3(42.8%)
Staphylococcus aureus	2 (5.2 %)	2(100 %)	0(0%)	2(100 %)	0(0%)
Salmonella Spp.	1 (2.6 %)	1(100 %)	0(0%)	0(0%)	1(100 %)

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Volume : 4 | Issue : 6 | June 2015 • ISSN No 2277 - 8179

Table 2: The Level of Antibiotic Resistance Based on Susceptibility Testing of the Subject Population

Antibiotics	Klebsiella spp. n=13		rtiusp n=10		E. coli n=8	Pseudo. spp. n=7	aureu n=2	almonell n=1	
	S	R	S	R	S	R	S	R	
Chlora	11	2	10	0	6	2	6	1	
A	1	12	0	10	1	7	0	7	
Cefotaxi	4	9	7	3	2	6	3	4	
Penicillin	1	12	2	8	3	5	1	6	
Ceftazi	1	12	2	8	1	7	2	5	
dine									
Ceftizoxi	0	13	3	7	2	6	1	6	0
Ciprofloxacin	12	1	7	3	4	4	5	2	2
Erythro	10	3	4	6	3	5	3	4	0
Carbapene	8	5	5	5	5	3	2	5	1
Norfloxacin	2	11	1	9	4	4	3	4	0
I	13	0	7	3	5	3	4	3	2
Genta	10	3	5	5	3	5	1	6	1
	1	2	7	3	6	2	4	3	2

			Meropenem	0			

Nalidiric acid	4	9	5	5	2	6	3	4	0
Tetracycline	0	13	3	7	5	3	3	4	0
A	1	12	4	6	1	7	2	5	0
Vanco	8	5	6	4	2	6	1	6	0
A	0	13	4	6	2	6	2	5	0

S: Sensitive; R: Resistant;

Graph 1: Results of Blood Culture According to Maturity of Neonates and Onset of Sepsis

Graph 2: The Level of Antibiotic Resistance Based on Sus- ceptibility Testing of the Subject Population

Images of Blood Agar Culture.

α hemolysis, β hemolysis and γ hemolysis on blood agar

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Research Paper Image shows antibiotic activity against *Klebsiella spp.* Im- age shows antibiotic activity against *Protious spp.* Image shows antibiotic activity against *Klebsiella spp.*

Total six different isolates were obtained from which *Klebsiella spp*. 13 (34.2%) and *Proteus spp*. 10 (26.3) was most predominant organisms the other isolates were *E.coli* 8 (21%), *Pseudomonas spp*. 7 (18.4%), *S.aureus* 2 (5.2%) and *Salmonella spp*. 1 (2.6%) [Ta- ble 1].

Maximum microorganism isolated from mature infants rather than premature except *klebsiella spp.*found higher in premature infants and higher incidence of bacteria were found in the pe- riod of Early Onset.

Discussion

Developing countries share 99% of the estimated 4 million neo- natal deaths world over, and infections such as sepsis, pneumonia, diarrhea and tetanus are major contributor to it being responsi- ble for about 34/1,000 live births compared to developed coun- tries where neonatal mortality due to sepsis is around 5/1,000 live births (Awoniyi DO *et al.,*2009).

CONCLUSION

Antibiotic susceptibility pattern was studied for all isolates causing neonatal sepsis. The analysis of drug resistance pattern showed that, the maximum numbers resistant observed against commonly used antibiotics such as ampicillin, penicillin, amoxiclav and ce- phalexin. The greater prevalence of resistance to commonly used antibiotics has also been reported by other studies. (Tsering DC et al., 2011, Kumhar GD et al., 2002) In this study, maximum sensi- tivity was observed in imipenem, meropenem and chloramphenicol. Sensitivity to imipenem was much higher than that to other antibiotics.

In this study maximum number of bacteria isolated from mature infants rather than premature except Klebsiella spp. found higher (53.8%) in premature infants and higher incidence of bacteria were found in early onset.

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