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## RESEARCH ARTICLE

## NEONATAL SEPTICAEMIA: BACTERIAL ISOLATES & THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERNS.

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### Abstract

**Aims:** 1) To know the etiology of septicaemia in neonates. 2) To detect the antibiotic susceptibility of their isolates.

**Materials and Methods:** Blood specimens for culture were drawn from 729 newborns admitted in NICU, Sri Venkateswara Ramnarayana Ruia Government General Hospital, S.V. Medical College, Tirupati during March 2015 to August 2015 with sepsis. The specimens were inoculated into Brain Heart Infusion broth & subcultures were performed. The isolates were identified by standard biochemical tests. Antibiotic susceptibility patterns of isolates were identified by Kirby Bauer disc diffusion method.

**Results :** A total of 53 (7.27%) organisms were isolated. These included Klebsiella (22, 41.54%), S. aureus (17, 32.07%), Candida (8, 15.09%), E. coli (4, 7.54%), Pseudomonas (1, 1.88%), Moraxella (1, 1.88%). Majority of organisms isolated were resistant to commonly used antibiotics. Klebsiella showed maximum sensitivity to Levofloxacin (85.7%). S. aureus showed maximum sensitivity to Levofloxacin (100%) & Cefotaxime (88.8%). E. coli showed maximum sensitivity to Amikacin, Gentamycin, Ciprofloxacin, Imipenem, Amoxycylav i.e., 100%.

**Conclusion:** Multi drug resistance organisms were isolated from septicaemia in neonates. Therefore great caution is required in selection of antibiotic therapy.

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### Introduction:-

Neonatal septicaemia is an important cause of morbidity and mortality among neonates in India, with an estimated incidence of approximately 4% in intramural live births.<sup>1</sup> Septicaemia in neonates refers to generalised bacterial infection documented by positive blood culture in the first 4 week of life & is one of the four leading causes of neonatal mortality in India.<sup>2</sup> Prior to antibiotic era, the mortality from septicaemia was 90%, but it is declining to 24-58% after antibiotics came in use.<sup>3</sup>

Hence the present study was undertaken to study the bacteriological profile of neonatal septicaemia cases and their antibiotic sensitivity pattern for planning strategy for management of these cases.

### Materials & method:-

Blood specimens for culture were drawn from 729 newborns admitted in NICU, Sri Venkateswara Ramnarayana Ruia Government General Hospital, S.V. Medical College, Tirupati during March 2015 to August 2015 with sepsis. Blood samples were collected under aseptic precautions and inoculated immediately into 5ml of Brain Heart

Infusion broth. Bottles were incubated at 37<sup>o</sup>c for 7 days. Four subcultures were performed first at 24hr., then at 48hr., at 72hr., and on 7<sup>th</sup> day on blood agar, MacConkey's agar and chocolate agar. The isolates were identified by standard methods including colony morphology, Gram stain and biochemical tests. Antibiotic susceptibility patterns of isolates were identified by Kirby Bauer disc diffusion method as per CLSI recommendations.<sup>6</sup>

### Results:-

Out of 729 samples studied, growth of bacteria was obtained in 53 (7.27%) samples. The incidence of Gram negative & Gram positive organisms was 52.83% & 32.07% respectively. Candida also isolated in 15.09% of cases. Klebsiellae spp. & Staphylococci aureus were the most common Gram negative & Gram positive organisms together accounting for 41.54% & 32.07% of the isolates respectively. Other Gram-negative isolates were Escherichia coli (7.54%), Pseudomonas spp. (1.88%), Moraxella spp. (1.88%). (Table -1).

**Table 1 :** Number of microbial isolates from culture positive neonates. (n=53)

Isolates	Frequency of isolates (%)
Klebsiella spp.	22(41.54%)
Staphylococcus aureus	17(32.07%)
Escherichia coli	4(7.54%)
Pseudomonas spp.	1(1.88%)
Moraxella spp.	1(1.88%)
Candida	8(15.09%)

**Table 2 :** Antibiotic sensitivity patterns of Gram-positive isolates

Antibiotics	Resistance percentages of S.aureus
Ceftazidime	30
Ceftriaxone	31.25
Cefotaxime	11.11
Co-trimoxazole	40
Clindamycin	33.33
Ciprofloxacin	41.66
Erythromycin	57.14
Levofloxacin	0
Oxacillin	37.5
Pencillin	60
Piperacillin	42.85
Vancomycin	35.29

**Table 3 :** Resistance patterns of Gram-negative isolates.

Antibiotics	Resistant percentages of isolates			
	Organisms			
	Klebsiella spp.	Escherichia coli	Pseudomonas spp.	Moraxella spp.
Amikacin	33.33	0	0	0
A/S	78.57	50	0	0
Ciprofloxacin	47.36	0	-	-
Amoxyclav	-	0	-	-
Ceftazidime	57.89	25	0	0
Ceftriaxone	60	33.33	0	0
COT	36.36	-	-	0
Gentamycin	56.25	0	-	100
I/C	50	-	-	-
Levofloxacin	14.28	0	-	0
Piperacillin	87.5	-	0	-
Imipenem	33.33	0	-	-

A/S =Ampicillin /Sulbactam, I/C= Imipenem /Cilastin, - = Not tested, COT- Co-trimoxazole

Table 2 and 3 show the antibiotic sensitivity patterns of the common organisms isolated.

Klebsiella was more sensitive to Levofloxacin (85.7%), followed by Amikacin (66.7%), Imipenem (66.6%). S.aureus was more sensitive to Levofloxacin (100%), followed by Cefotaxime (88.8%) and Ceftazidime (70%). E.coli was equally sensitive to Amikacin, Gentamycin, Ciprofloxacin, Imipenem, Levofloxacin, Amoxyclav i.e., 100%. Pseudomonas was equally sensitive to Amikacin, A/S, Ceftriaxone, Ceftazidime, Piperacillin, Carbencillin i.e., 100%. Moraxella was equally sensitive to Amikacin, A/S, Ceftriaxone, Ceftazidime, Gentamycin, Cotrimoxazole, Imipenem, Levofloxacin i.e., 100%.

### **Discussion:-**

For the effective management of neonatal septicaemia cases, study of the bacteriological profile with their antibiotic pattern plays a significant role. In this study, blood culture positivity rate in neonatal septicaemia cases was 7.27%.

In the present study, Gram negative organisms constituted major group of isolates (52.83%) which correlates with the findings (59.8%) of Kumhar GD et al.<sup>7</sup> Among this group Klebsiella sp. has been found to be the predominant pathogen (41.54%) which correlates with the findings (47.1%) of Madhu Sharma et al.<sup>8</sup>

A total 32.07% of Gram-positive organisms has been observed in our study, similar kind of results also find in I roy et al.<sup>9</sup>

Klebsiella was more sensitive to Levofloxacin (85.7%), followed by Amikacin (66.7 %), Imipenem (66.6%). S.aureus was more sensitive to Levofloxacin (100%), followed by Cefotaxime (88.8%) and Ceftazidime (70%). E.coli was equally sensitive to Amikacin, Gentamycin, Ciprofloxacin, Imipenem, Levofloxacin, Amoxyclav i.e., 100%. Pseudomonas was equally sensitive to Amikacin, A/S, Ceftriaxone, Ceftazidime, Piperacillin, Carbencillin i.e., 100%. Moraxella was equally sensitive to Amikacin, A/S, Ceftriaxone, Ceftazidime, Gentamycin, Cotrimoxazole, Imipenem, Levofloxacin i.e., 100%.

### **Conclusion:-**

Neonatal septicaemia is the single most important cause of neonatal deaths in the community accounting for over half of them. It is a life threatening emergency, and rapid treatment with antibiotics is essential for favourable outcome. For effective management of neonatal septicaemia cases, the study of bacteriological profile with their antibiotic sensitivity pattern plays a significant role. In view of the above facts the strategy of antibiotic usage in the hospital must be reviewed and we are of the opinion that health care practitioners and policy makers could address this problem by implementing a more rational and appropriate use of antibiotics.

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