



## Original Article

# Isolated Microbes and their Sensitivity Pattern in Tertiary Care Center in Rural Haryana

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## Abstract

**Objective:** *The burden of neonatal sepsis is huge in India, a hospital based study suggest neonatal sepsis rate 30 per 1000 live births whereas a community based study indicates 2.7-17% of all live births. A retrospective study of hospital records was planned with the objective to study the culture proven neonatal sepsis rate, to identify the causative organism and their antibiotic susceptibility pattern.*

**Setting:** *blood culture record of NICU of a rural medical college and hospital over a period of one year 1 jan 2016 to 31 dec 2016.*

**Results:** *total 405 blood culture were send with 67 came positive with positivity rate of 16.5%, candida spp is the most common organism isolated 28(41.7%), gm negative bacteria klebsiella 34(50.7%) is second most predominant in early and late onset sepsis. isolates were highly resistant to third generation cephalosporin and amikacin.*

**Conclusion:** *Candida and drug resistant gm negative klebsiella were most common isolates, similar to other NICU across country. There is an urgent need for designing nationwide strategies to overcome increasing prevalence of antibiotic resistant organisms.*

**Keywords:** *Antibiotic resistant, neonatal sepsis, klebsiella, newborn.*

## Introduction

Neonatal sepsis is major cause of morbidity and mortality in newborn particularly in developing countries. Nearly, 0.75 million neonates died in India in 2013, the highest for any country in the world.<sup>1</sup> The current NMR is 28 per 1000 live births<sup>2</sup>.

The gold standard for the diagnosis of neonatal sepsis is the isolation of the causative organism from a blood culture, the process take 48 hour or more<sup>3</sup>. most of the neonatal sepsis related death are preventable if suspected early and treated with appropriate antibiotics.<sup>4</sup> Treatment protocol for sepsis management must be based on the

causative organism and their antibiotic sensitivity pattern<sup>8</sup>. studies from Indian subcontinent have demonstrated different organism as compared to western studies<sup>9</sup>.since the spectrum of microbes changes overtimes and region to region (cities to states), this present study was undertaken to know the causative microbes and their sensitivity pattern in neonatal intensive care unit of our institute and formulate a antibiotic protocol for prompt treatment of sick newborns.

### Material and Method

A retrospective study of hospital records of blood cultures was conducted in NICU, department of pediatrics Bhagat Phool Singh Government Medical college for women, Khanpur Kalan, Sonapat Haryana, including a period of one year from 1-1-2016 to 31-12 2016. The NICU at rural haryana medical college and hospital caters to babies born in this institute and as well as out born from surrounding area with total capacity of 9 intensive care beds.

The blood culture data collected reviewed and analyzed to determine the microbiological profile and antibiotic sensitivity and resistant pattern of isolates.

### Method

About 1ml of blood was collected aseptically and send to microbiology laboratory which was inoculated into brain heart infusion broth, subcultures were done onto blood agar and macConkey agar after 24 hours, 48 hours,72 hours and 7<sup>th</sup> day. For fungal cultures biphasic blood heart infusion agar was used. Isolates were

identified by standard microbiological procedures like gram staining, colony characters and biochemical tests. antibiotic susceptibility of all bacterial isolates was performed by the Kirby Bauer disc diffusion method according to the recommendations of the clinical & laboratory standard institute (CLSI<sup>5&6</sup>.)

### Results

During the one year period total 405 blood cultures of clinically suspected cases of neonatal sepsis were send and out of them 67came positive with positivity rate of 16.5 %.among the positive blood cultures there was 41male and 26 female newborn with male to female ratio was 1.57% .there were 28 term (41.7%) and 39(58.2%) preterm in positive cultures. When cultures were send the post natal days of life was written on record which helps in identified 24(35.8%) cases belongs to early onset sepsis and 43(64.1%) were late onset sepsis

The most common organism isolated was candida spp. 28 (41.7%).the gram negative microbes 34 (50.7%) were leads to gram positive isolates 5(7.4%). different organism isolated are shown in table

Isolates	No.	percentage
Candida	28	41.7%
Gm negative microbes		
Klebsiella	17	25.3%
Enterobacter	6	8.9%
Citrobacter	5	7.4%
acinetobacter	4	5.9%
pseudomonas	2	2.9%
Gm positive microbes		
Staph.aureus	3	4.4%
Enterococcus	2	2.9%

### Resistant pattern of isolated organism

antibiotics	Klebsiella(17)	Enterobacter(6)	Acinetobacter(4)	Pseudomonas(2)
ampicillin	14(82.3%)	3(50%)	3(75%)	2(100%)
gentamycin	9(52.9%)	2(33.3%)	2(50%)	2(100%)
Ciprofloxacin	9(52.9%)	1(16.6%)	1(25%)	1(50%)
Piperacillin tazobactem	14(82.3%)	1(16.6%)	1(25%)	1(50%)
cefalosporin	14(82.3%)	4(66.6%)	2(50%)	2(100%)
meropenam	8(47%)	2(33.3%)	-	1(50%)
ceftazidime	13(76.4%)	1(16.6%)	1(25%)	1(50%)
imipenam	11(64.7%)	1	-	-

## Resistant pattern of gm positive organism

antibiotics	Staph.aureus(3)	Entrococcus(2)
Vancomycin	2(66.6%)	1(50%)
linezolid	2(66.6)	1(50%)
azithromycin	3(100%)	2(100%)
ciprofloxacin	2(66.6%)	1(50%)
gentamycin	2(66.6%)	1(50%)

**Discussion**

Neonatal infection still continues to be a major problem in bringing down the neonatal mortality in India and other developing countries. The usual source of infection in NICU include resuscitators, ventilators, catheter, prongs, infusion set and punctured sites etc<sup>5</sup> (Cassone A2003,).

The total blood cultures positivity rate in present study was 16.5%, which was comparable to 16%<sup>9</sup>, (sareen et al 2015) 26.6%<sup>11</sup>, (Muley et al 2015). but contrast to studies with high positivity rate 66.67%<sup>4</sup> (Garg A et al 2016), 62.8%<sup>12</sup> (Rahman S et al 2002) & 64%<sup>13</sup> (Tallur SS et al 2000).

The most common organism isolated was candida spp, similar to Sharma<sup>3</sup> et al & Rani<sup>10</sup> et al, inappropriate use of antibiotics and poor asepsis maintenance in neonatal units usually results in high incidence of candidal infections<sup>3</sup>.

The most common gram negative bacteria isolated was klebsiella spp. 17 (25.3%), similar to Garg A et al<sup>4</sup>, Sharma et al<sup>3</sup>, Kapoor et al<sup>15</sup>. Klebsiella was responsible for similar cases of early and late onset sepsis the emergence of enterobacter is alarming nowadays, gm positive microbes were only 7.4% in this study and ratio of gm negative to gm positive isolate was 6.8:1, most common gm positive organism was staph aureus. In some studies staphylococci is most frequent organism isolated<sup>3,4&14</sup> studies from other countries report coagulase negative staphylococci predominant in late onset sepsis.

Emergence of resistance poses major therapeutic challenge in neonatal treatment, in present study Gm negative bacteria specially klebsiella is highly resistant to third generation cephalosporin, amikacin and imipenem similar to (Kapoor L 2005, Sheth KV2012, amitgarg 2016 Sharma et al 2016. klebsiella resistant to ciprofloxacin and gentamycin is slightly lower as compare to

cefalosporins. S.aureus was 66% resistant to vancomycin and linezolid. We recommend ciprofloxacin and gentamycin as first choice drugs in suspected cases of neonatal sepsis similarly kheneja et al<sup>17</sup>.

**Conclusion**

Regular monitoring of isolates is must and on this basis antibiotic policy should be revise time to time. candida and klebsiella were commonest organism in our study with high emergence of resistance among them, ciprofloxacin and gentamycin are still sensitive to treat gm negative infection.

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