

Evaluation of clinical outcome of neonatal sepsis

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Abstract

Background: Neonatal sepsis is a systemic infection occurring in infants at 28 days of life and is an important cause of morbidity and mortality of newborns. The present study was conducted to assess clinical outcome of neonatal sepsis. **Materials & Methods:** 120 neonates diagnosed of neonatal sepsis in both genders were included. Parameters such as antenatal care (ANC), duration of labour (DOL), gestational age (GA), mode of delivery (MOD), total white blood cells (TWBC), types of antibiotics used etc. was recorded. **Results:** Age of patients was 0-7 days in 90 and 8-28 days in 30, DOL was <6 hours in 20, 6-12 hours in 40, 12-24 hours in 50 and >24 hours in 10. ANC was seen in 80, GA was pre-term in 50 and term in 70, MOD was vaginal in 85 and caesarean in 35, TWBC count was <5000/mm³ in 30, 5000-12000/mm³ in 25 and >12000/mm³ in 65 patients. Type of antibiotic used was Ampicillin+ Gentamicin in 62%, Benzyl Penicillin in 20%, Cloxacillin in 14% and Ciprofloxacin in 4%. The difference was significant (P< 0.05). **Conclusion:** Neonates with sepsis were mostly managed with Ampicillin+ Gentamicin combination. Boys were affected more than girls.

Key words: Antenatal care, Neonatal sepsis, labour

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Introduction

Neonatal sepsis is a systemic infection occurring in infants at 28 days of life and is an important cause of morbidity and mortality of newborns.¹ Early-onset neonatal sepsis (EOS) has been variably defined based on the age at onset, with bacteremia or bacterial meningitis occurring at 72 hours in infants hospitalized in the neonatal intensive care unit (NICU), versus 7 days in term infants.² In preterm infants, EOS is most consistently defined as occurring in the first 3 days of life and is caused by bacterial pathogens transmitted vertically from mother to infant before or during delivery.³ Late-onset sepsis (LOS) is sepsis occurring after 72 h in NICU infants and 7 days of life in term infants, has been variably defined as occurring up to the age of 90 or 120 days, and may be caused by vertically or horizontally acquired pathogens.⁴

The most common pathogens found in EONS are Group B Streptococcus (50%) and Escherichia coli (20%).⁵ Other primary pathogens include Listeria monocytogenes, Enterococcus, and other Gram-negative bacilli (e.g., Haemophilus influenzae, Klebsiella pneumoniae). In developed countries, bacterial infections in neonates are commonly due to E. coli, other enterobacteriaceae, L. monocytogenes, and coagulase negative staphylococci (CONS) and Group B Streptococcus.⁶ Late-onset (LONS) sepsis (sepsis presenting after 5-7 days postnatal age) usually is caused by these primary organisms or by nosocomial pathogens, such as CONS, particularly Staphylococcus epidermidis, Staphylococcus aureus, Pseudomonas species, Anaerobes, and Candida species.⁷ The present study was conducted to assess clinical outcome of neonatal sepsis.

Materials & Methods

The present study comprised of 120 neonates diagnosed of neonatal sepsis in both genders. Parental consent was obtained before starting the study.

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Data such as name, age, gender etc. was recorded. Parameters such as antenatal care (ANC), duration of labour (DOL), gestational age (GA), mode of delivery (MOD), total white blood cells (TWBC), types of antibiotics used etc. was recorded. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

Results**Table 1: Distribution of patients**

Total- 120		
Gender	Boys	Girls
Number	70	50

Table 1 shows that out of 120 neonates, boys were 70 and girls were 50.

Table 2: Assessment of parameters

Parameters	Number	P value
Age (Days)		
0-7	90	0.01
8-28	30	
DOL		
<6	20	0.02
6-12	40	
12-24	50	
>24	10	
ANC		
Yes	80	0.02
No	40	
GA		
Pre-term	50	0.09
Term	70	
MOD		
Vaginal	85	0.02
Caesarean	35	
TWBC (/mm ³)		
<5000	30	0.05
5000-12000	25	
>12000	65	

Table 2 shows that age of patients was 0-7 days in 90 and 8-28 days in 30, DOL was <6 hours in 20, 6-12 hours in 40, 12-24 hours in 50 and >24 hours in 10. ANC was seen in 80, GA was pre- term in 50

and term in 70, MOD was vaginal in 85 and caesarean in 35, TWBC count was <5000/ mm3 in 30, 5000-12000/ mm3 in 25 and >12000 /mm3 in 65 patients. The difference was significant (P< 0.05).

Table 3:Type of antibiotics used

Antibiotics	Percentage	P value
Ampicillin+ Gentamicin	62%	0.01
Benzyl Pencillin	20%	
Cloxacillin	14%	
Ciprofloxacin	4%	

Table 3, Fig. 1 shows that type of antibiotic used was Ampicillin+ Gentamicin in 62%, Benzyl Pencillin in 20%, Cloxacillin in 14% and Ciprofloxacin in 4%. The difference was significant (P< 0.05).

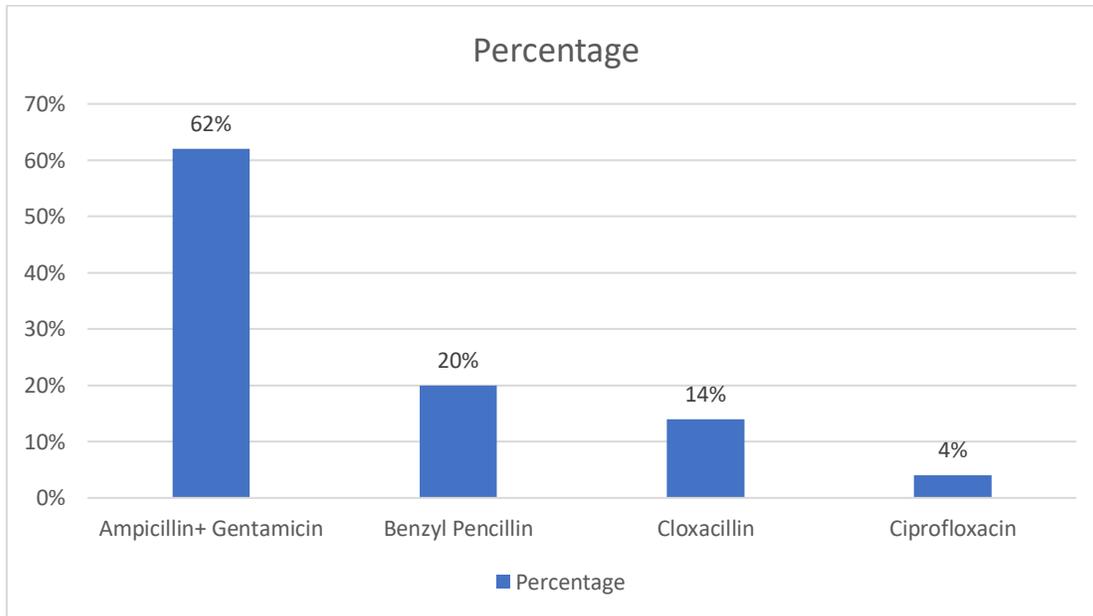


Fig. 1: Type of antibiotics used

Discussion

Neonatal sepsis defines the systemic condition that arises from the bacterial, viral or fungal origin, associated with hemodynamic changes and clinical findings and causing severe morbidity and mortality.^{8,9} Its incidence varies depending on the definition of the case and the population studied and is between 1 and 5 in 1000 live births. The clinical manifestations range from subclinical infection to severe focal or systemic disease.¹⁰ While the infectious agent may arise from intrauterine or maternal flora, it may also be of the hospital or community origin. The incidence of culture-proven early-onset neonatal sepsis in the United States is estimated to be 0.77 to 1 per 1,000 live births (10–12).¹¹ The incidence and mortality are higher when very-low birth-weight (VLBW) infants are considered exclusively; for infants with a body weight of 1,000 g, the incidences are estimated to be 26 per 1,000 and 8 per 1,000 live births in premature infants with a birth weight of between 1,000 and 1,500 g.¹² The present study was conducted to assess clinical outcome of neonatal sepsis.

In present study, out of 120 neonates, boys were 70 and girls were 50. Woldu et al¹³ examined the risk factors, antimicrobial use pattern and clinical outcomes of neonatal sepsis. Among the total 306 neonates (0-28 days of age) recruited, 249 (81.4%) were age ≤7 days, 169 (55.23%) were male, 251 (82%) were attended antenatal care, 136 (44.44%) were low in birth weight (≤2.5 kg) and 155 (50.7%) had total of white blood cell count ≥12000/mm3. 221 (72.2%) of the neonates diagnosed as sepsis received antibiotics while 74 (24.2%) received antibiotics for other diagnosis. The most frequently prescribed antibiotic was the combination of ‘ampicillin +

gentamicin’ prescription 67 (21.9%) followed by the single antibiotic prescriptions of benzyl penicillin 33 (10.8%) and cloxacillin 8 (2.6%). A significant number of neonates (p = 0.000) with 95% confidence interval of (1.934-8.967) were born in health center and developed sepsis. This value is 4.2 times higher when compared with the neonates born in the home. A significant number of neonates using instrument in hospitals also developed sepsis (p = 0.26). The risk of acquiring sepsis in neonates born using instrument was almost 6.2 times more common than children born vaginal in the natural way. A significant number of neonates born from mothers’ with urinary tract infections (UTI) developed sepsis (p = 0.02) and this figure was almost 2.9 times higher compared to neonates born from mothers’ with no UTI diagnosis.

We observed that age of patients was 0-7 days in 90 and 8-28 days in 30, DOL was <6 hours in 20, 6-12 hours in 40, 12-24 hours in 50 and >24 hours in 10. ANC was seen in 80, GA was pre- term in 50 and term in 70, MOD was vaginal in 85 and caesarean in 35, TWBC count was <5000/ mm3 in 30, 5000-12000/ mm3 in 25 and >12000 /mm3 in 65 patients. Xiao et al¹⁴ included one hundred and six healthy neonates were used as the control group. Logistic regression was used to analyzed the risk factors and ROC curve analysis performed in laboratory which indicated a significant correlation. The results of univariate analysis showed that postnatal age, body weight, and parity were significantly related to neonatal sepsis. Logistic regression analysis demonstrated that postnatal age and parity are independent risk factors for neonatal sepsis. The maximum area underneath the curve () of soluble CD14, which was the most indicative biomarker of sepsis diagnostically, was 0.953 with sensitivity and specificity of

93.8% and 84.9%, respectively. *Escherichia coli*, *Staphylococcus aureus*, and *Streptococcus agalactiae* were the main bacterial strains causing neonatal sepsis, while postnatal age was an independent risk factor for the onset of disease. sCD14-ST could be a potential useful diagnostic marker for pediatric sepsis.

Conclusion

Authors found that neonates with sepsis were mostly managed with Ampicillin+ Gentamicin combination. Boys were affected more than girls.

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