

Prescribing Pattern of Antibiotics in Neonatal Sepsis at Tertiary Teaching Hospital of Birgunj, Nepal



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ABSTRACT

Background:

Neonatal sepsis has been a major cause for mortality, morbidity in neonates especially in developing countries. It needs prompt diagnosis and treatment. Antibiotics have been the mainstay for the treatment. So this study was conducted to evaluate the prescribing pattern of antibiotics in neonatal sepsis at tertiary teaching hospital of Birgunj, Nepal.

Methods:

An observational study was carried for four months in Neonatal intensive care unit of tertiary health center, Birgunj. A Performa was prepared which contained demographic details of patient, drugs used, drugs prescribed by generic name, route of administration and duration of hospital stay.

Results:

Out of 124 data analyzed in neonates male preponderance was in 64.51%. The cases of EONS was 45 (72.58 %). There was increased risk for sepsis in preterm (58.06%), LBW (46.77%) and vaginal delivery (61.29%). The average no of antibiotics per patient was 2.51 ± 0.79 . Most of the neonates received two antibiotics (66%). Amikacin and Cefotaxime was the most frequently prescribed antibiotics. The percentage of prescriptions which contained prescribing by generic name was 58.62. The

Mean \pm SD duration of NICU stay was 9.23 ± 4.36 . There was good survival rate yet the percentage of death was 6.45%.

Conclusion:

This study provides a glimpse of antibiotic used in tertiary health center, Birgunj. This study might help in preparing guidelines for rational antibiotic prescribing in neonatal sepsis so that the emergence of antibiotic resistance can be prevented and the cost of treatment can be reduced.

Keywords: Antibiotics, Neonatal sepsis, Prescription

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INTRODUCTION

Neonatal sepsis is a clinical syndrome with signs and symptoms of infection which may or may not accompany bacteremia in the first 28 days of life. It incorporates septicaemia, meningitis, pneumonia, arthritis, osteomyelitis and urinary tract infections.¹ It is basically classified as Early onset neonatal sepsis (EONS) and Late onset sepsis (LOS). EONS means sepsis occurring within 72 hrs of life whereas LOS refers to sepsis

presenting after 72hrs and prior to 90 days of life.²

It has been estimated that about 2.8 million neonatal deaths occurred in 194 countries in 2013 among which 15.6% of deaths was due to sepsis.³ In Nepal, neonatal mortality rate was 21 deaths per 1000 Live birth in 2016 according to annual health reports given by Ministry of health. The leading causes for neonatal mortality were preterm delivery, low birth weight, birth asphyxia and sepsis.⁴

Neonatal sepsis is one of the leading causes of neonatal mortality, morbidity and hospital admission. The deaths due to neonatal sepsis can be prevented by early diagnosis, using antimicrobial agents rationally and providing good supportive hospital care.⁵ A standard guideline has been set by WHO (model formulary for children, 2010) which can help the treating pediatrician in prescribing rationally wherever indicated.⁶ Non-adherence to the standard treatment guidelines is also one of the major factor in causing antibiotic resistance, a global burden. Therefore prescribing rationally is important for the prevention of drug resistance, treatment failure, decreasing the cost of treatment and reducing incidence of adverse effects.⁷

Its challenging to prescribe in neonates as most of the pharmacodynamic and pharmacokinetic studies are done in adults and their organs are immature making them vulnerable for adverse drug reactions and drug- drug interactions.⁸ Hence, the present study was undertaken in neonatal intensive care unit (NICU) of National medical college teaching hospital (NMC) to observe and evaluate the antibiotics prescribing pattern in neonatal sepsis as it is one of the the largest teaching hospital in Narayani zone of Nepal and also serves as a referral center for neonates.

MATERIALS AND METHODS

A descriptive observational study for 4 months (November, 2018- February 2019) was carried out in NICU of pediatric department of NMC, Birgunj. A performa was prepared and recorded which contained name, age, sex, birth weight, gestational age, diagnosis, method of delivery, name of drugs used, drugs prescribed by generic name, duration of hospital stay. Full verbal and written explanation of the procedure was

provided to parents. A written informed consent was obtained from parents for the participation of their children in study.

Ethical clearance was obtained from the Institutional Ethics Committee.(No F-NMC/302/074/075)

Inclusion criteria:

Neonates (0-28 days) admitted to the NICU with confirmed neonatal sepsis were included in the study.

Exclusion criteria:

The parents of the neonate who did not give their written consent for participation. The neonates older than 28 days, baby of AIDS infected mother, healthy baby, congenital abnormality, physiological jaundice, premature baby without sepsis, hypoxic ischemic encephalopathy and metabolic disorders without sepsis were excluded.

Statistical Analysis:

The collected data were analyzed by Microsoft Office Excel 2007 using descriptive statistics. The results were depicted in the form of percentages and graphs wherever necessary.

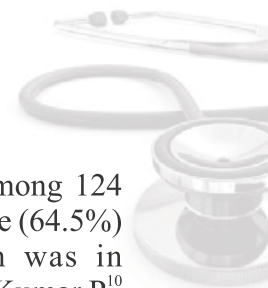
RESULTS

Out of 124 neonates admitted in NICU male were 80 (64.51%). The occurrence of EONS was 90 (72.58%) and LONS was 34 (27.42%). The number of preterm, term and post term neonates admitted in NICU were 72 (58.06%), 44 (35.48%) and 8 (6.45%) respectively. The number of cases according to birth weight was VLBW 20 (16.12%), LBW 58 (46.77%) and normal 46 (37.09%). The neonates who had vaginal delivery 76 (61.29%) were more susceptible to sepsis than Caesarean delivery 48 (38.70%). [Table 1]

Table 1: Demographic characteristics of neonates with sepsis

Demographic characteristics	No of cases	% of cases
Male patients	80	64.51
Female patients	44	35.48
EONS	90	72.58
LONS	34	27.41
Preterm	72	58.06
Term	44	35.48
Post term	8	6.45
Normal birth weight (NBW)	46	37.09
Low birth weight(LBW)	58	46.77
Very low birth weight (VLBW)	20	16.12
Vaginal delivery	76	61.29
Caesarean delivery	48	38.70

The average no of antibiotics per patient was

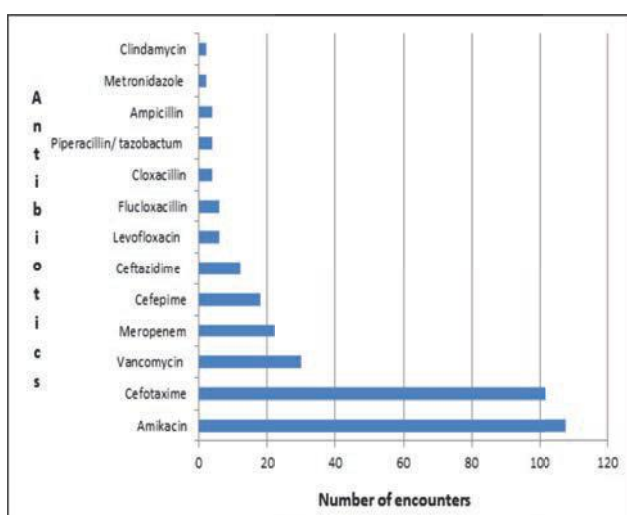


2.51±0.79. Most of the neonates were prescribed two antibiotics (66%). The most commonly prescribed antibiotics was Amikacin (108) and Cefotaxime (102) in combination. All the antibiotics were given by parenteral route. The drugs prescribed by generic name were 58.62% and brand name were 41.38%. Among 13 antibiotics used in NICU 7 drugs were prescribed from WHO Model List of Essential Medicines for children April 2013.⁹

Table 2: Total no of Antibiotics per encounter

No of Antibiotics/ patient	No of encounters	% of encounters
2	82	66.12
3	22	17.74
4	18	14.51
5	2	1.61

Figure 1: Commonly Used Antibiotics



The Mean ± SD duration of NICU stay was 9.23 ± 4.36. The neonates who were admitted in NICU for 2-4 days was 12.90%, 5-9 days was 48.38%, 10-15 days was 27.41% and 16-20 days was 11.29%. Out of 62 neonates the outcome for survival was 112 (90.32%), death 8 (6.45%) and leave against medical advice was 4 (3.22%). (Table 3)

Table 3: Duration of NICU stay

NICU stay	No of cases	% of cases
2-4 days	16	12.90
5-9 days	60	48.38
10-15 days	34	27.41
16-20 days	14	11.29

DISCUSSION

This observational study conducted among 124 neonates at NICU of NMC showed male (64.5%) preponderance over female which was in accordance with studies carried out by Kumar P¹⁰ et al (57%), Vaniya HM⁵ et al (62.9%) and Sharma CM¹¹ et al (62.08%). The basis for male prevalence for sepsis is unknown but might be due to linkage of X-linked immunoregulatory gene for the host's susceptibility to infections.¹² The cases of EONS (72.58%) was greater than that of LONS. Similar findings have been found out by authors such as Afsharpaiman S¹³ et al (52.3%), Arowosegbe AO et al¹⁴ (63.5%) as well as in a study done in Nepal by Jain et al (68%).¹⁵ The basis for this is ascending infections following rupture of membrane, infected birth canal and during resuscitation of newborns.¹⁶ The percentage of neonatal sepsis was greater in preterm (58.06%) and low birth weight (46.77%) neonates. Several studies have supported this result.^{17,18} The basis for this is low maternal transfer of IgG and inherent susceptibility for infections.¹⁶ The cases of VLBW was very less in our study so this might be the cause for disparity in lesser percentage of neonatal sepsis. The percentage of vaginal delivery in our study was 61.29. The cause for greater incidence of neonatal sepsis in vaginal delivery is due to colonization of microbial flora in birth canal.¹

The average number of drugs prescribed per encounter was 2.77 which is higher than that of WHO prescribing indicators¹⁹ (1.6- 1.8) indicating polypharmacy which is quite common in private set up. International as well as national report values are as follows Germany (11.1), Uttar Pradesh, India (6.9) and Kathmandu (5.01).^{20,21,22}

Polypharmacy leads to increased risk of drug interaction, adverse effects and noncompliance. The average number of antibiotics prescribed per prescription was 2.51 in our study which is in accordance to study done by Vaniya et al (3.74).⁵ Most of the neonates were prescribed 2 (66.12%) to 3 (17.74%) antibiotics. Among antimicrobial agents (AMAs) the most commonly prescribed were Cefotaxime (82.25%), Amikacin (87.09%) and Vancomycin (24.19%). The frequent use of Cefotaxime and Amikacin has been supported by various Indian studies such as Patel et al²³ and Choudhary et al.²⁴ The increased use of 3rd generation of Cephalosporin in our study might

be due to lack of serious toxicity, ability to cross Blood Brain Barrier and emerging resistance of penicillin. Cefotaxime was preferred antibiotic over Ceftriaxone in neonates because Ceftriaxone can displace bilirubin from albumin leading to hyperbilirubinaemia.²⁵ The dose and frequency of administration of AMAs used was in accordance to the standard guidelines. In our study, the initial treatment was empirical (80.1%) based on the site and severity of infection, clinical judgment and likely pathogen involved in it. Other studies have also suggested this result.^{26,27} The antibiotics were changed if the clinical response was inadequate and lab reports showed resistance to AMAs. The percentage of drugs prescribed by Generic name was 58.62 % which is consistent with findings to Chatterjee et al.²⁸ There is more trend of prescribing by brand name in our study so strict policies should be made to promote generic name prescribing as it rationalizes the use and also reduces the cost of drugs. All the drugs were given by parenteral route as this route has vital role till neonates can tolerate oral route and this complies with the study done by Chatterjee et al. Out of 13 antibiotics used in NICU seven (53.8%) were prescribed from WHO Model List of Essential Medicines for children April 2013. This could be due to clinician preference as well as shortage of supply.

In our study, the Mean \pm SD duration of NICU stay was 9.23 ± 4.36 which is comparable to study done by Vaniya et al where the duration of NICU stay was 7.59 ± 5.66 days.⁵ Out of 124 neonates the outcome for survival was 112 (90.32%), death 8 (6.45%) and leave against medical advice was 4 (3.22%). The cause of death might be referral from other institutes or delay in seeking medical attention.

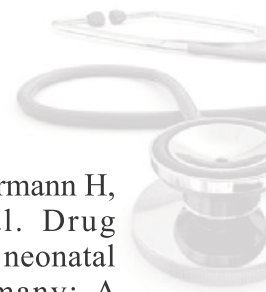
CONCLUSION

Prescribing irrationally exists throughout the world leading to many side effects, drug interactions, drug resistance, increase in the cost of therapy etc. As limited studies are available from Nepal on this topic therefore our study despite of having small sample size not only provides a glimpse of prescribing pattern of antibiotics in tertiary center of Birgunj but also about need of monitoring and improvement. For the promotion of rational use of drugs every nation should develop and follow standard guidelines. Antibiotic policies should be made to

prevent drug resistance. Drug utilization is a dynamic process which should be upgraded according to time.

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