

Research Article

A PROSPECTIVE STUDY OF PRESCRIBING PATTERN OF DRUGS IN NICU AT BASAVESHWAR TEACHING AND GENERAL HOSPITAL, GULBARGA, KARNATAKA

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ABSTRACT

Objective:A modern NICU (Neonatal Intensive Care Unit) is a microcosm of its own. A greater number of infants at smaller gestational age and weight require high-dependancy care at a tertiary care hospital with a good NICU setup. This calls for critical review of the drugs prescribed in NICU. The objective of this study was to evaluate the prescription pattern in terms of rationality of prescription in the NICU of a tertiary care hospital. It is also intended to monitor the adverse drug reactions during the study.**Materials and methods:**A prospective analysis was performed for in-patient cases of neonates (aged 1-28days) admitted to the NICU (from April2014 to June 2014) in Basaveshwar Teaching Hospital, Gulbarga, Karnataka. The total number of neonates studied was 100. The data was analyzed for the demographics, indications for admission, average duration of NICU stay, various drugs prescribed and outcome of therapy.**Results:**In the present study 34% of the neonates were preterm whereas 35% were low birth weight and 16% were very low birth weight babies. Commonest cause of admission to NICU was hyperbilirubinemia followed by neonatal sepsis and RDS (respiratory distress syndrome). Intravenous fluids (94%) and antibiotics (94%) were the most common groups of drugs utilized. Netilmicin (65%) was the most common antibiotic used. 44% of neonates received oxygen whereas 30% received phototherapy. Average number of drugs prescribed per patient was 5.3. In our study 74% of the neonates improved while 8% were referred to higher center, 2% were readmitted 9% left against medical advice and 7% expired. One neonate had IUGR (intrauterine growth retardation) as an adverse effect of maternal prednisolone intake and one neonate had acute renal failure due to maternal amikacin (aminoglycoside antibiotic) intake. Four neonates had generalized rash due to phototherapy.

Conclusion:Polypharmacy is a common entity in pediatric prescription. Evidence based antibiotic prescribing is helpful in prevention of resistance and decrease therapeutic failure. Safe use of oxygen and intravenous fluids remains as the need of the hour to enhance survival rate and decrease infant mortality rate. Further studies are required to assess the cause for mortality in neonates and pharmacoeconomics of the drugs used in NICU.

Key Words:Prescribing pattern, NICU, Hyperbilirubinemia, Polypharmacy, IUGR.

INTRODUCTION

A modern NICU (Neonatal Intensive Care Unit) is a microcosm of its own. 'Neonates' is a vulnerable group for dosing and dispensing errors because neonates have a rapidly changing body surface area and weight; a rapidly developing system of drug absorption, metabolism and excretion; an inability to communicate with the provider; and off-label or unlicensed drug usage.¹ Doing 'the five rights (right drug to the right patient, at the right dose, route and time)' of medication management remains a huge challenge especially for prescribers.² More than 1/3rd of deaths in the under-5 age-group occur during the 1st month of life, and the majority of neonatal deaths occur in the first few days of birth. Hospital care of seriously ill neonates should focus first on high-dependency care, including evidence-based antibiotic prescribing, prevention of nosocomial infections, enteral nutrition, safe use of oxygen and intravenous fluids, staff training, audit and management.³ A greater number of infants at smaller gestational ages and weight are now surviving to discharge, but this is only one step in a long journey for these small and often medically fragile infants.⁴

A prescription order is an important document between the physician and the patient. Prescription writing is an important aspect, which needs to be continuously assessed and refined suitably and it reflects the physician's skill in the diagnosis and attitude towards selecting the most appropriate cost effective treatment.⁵ The study of prescribing patterns seeks to monitor, evaluate and if necessary, suggest modifications in prescribing patterns so as to make medical care rational and cost effective.⁶

Hence the study of prescription pattern of NICU serves us better to evaluate and rationalize the prescriptions.

MATERIALS AND METHODS

A prospective analysis was performed for in-patient cases of neonates (aged 1-28days) admitted to the NICU (from April 2014 to June 2014) in Basaveshwar Teaching Hospital, Gulbarga, Karnataka. The total number of neonates studied were 100. The data was analyzed for the demographics, indications for admission, average duration of NICU stay, various drugs prescribed and outcome of therapy.

RESULTS

In the present study 56% were male babies and 44% female.

66% were full-term neonates while 34% were preterm.

49% had normal weight, 35% had low birth weight whereas 16% had very low birth weight.

Table 1: Indication for admission to NICU

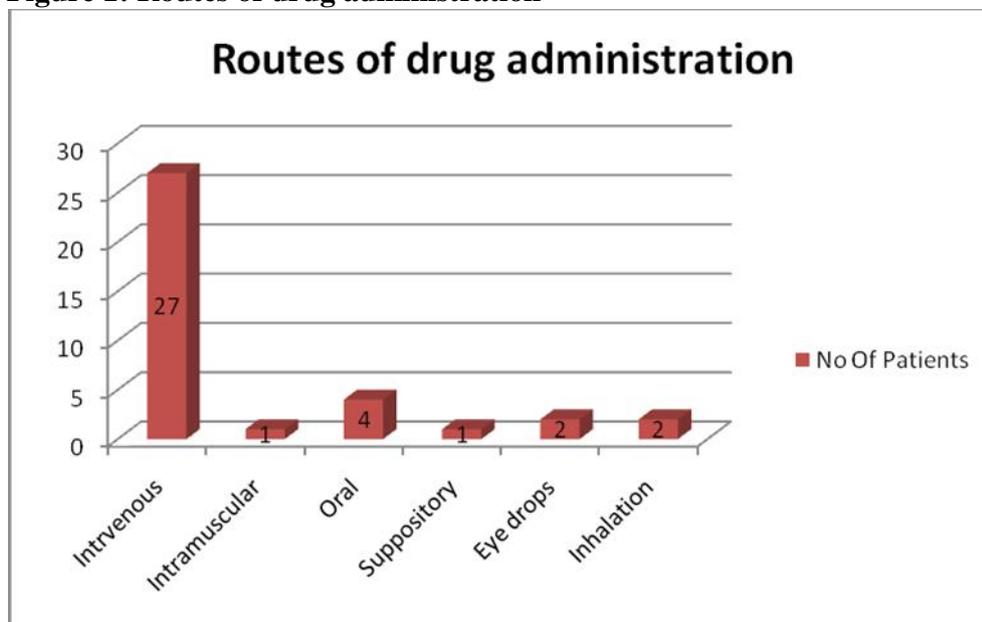
Indication for admission	Percentage of patients
Hyperbilirubinemia	30%
Neonatal sepsis	28%
Respiratory distress syndrome	28%
Birth asphyxia	23%
Hypoxic Ischemic Encephalopathy	22%
Meconium aspiration syndrome	21%
Intra Uterine Growth Retardation	5%
Pneumothorax	5%
Pneumonia	4%
Pulmonary hemorrhage	4%
Acute renal failure	3%
Disseminated intravascular coagulation	3%
Convulsions	3%
Congenital heart disease	2%
Cystic abdominal malformation	2%
Intestinal obstruction	2%
Acute renal failure	2%
Infant of diabetic mother	1%

Table 2: Various drugs prescribed

Drugs prescribed	Percentage
10% Dextrose	73%
Isolyte-P	52%
Normal saline	7%
Netilmicin	65%
Cefoperazone	33%
Capreomycin	21%
Crystalline penicillin	18%
Piperacillin+Tazobactam	17%
Meropenam	17%
Gentamycin	16%
Ofloxacin	16%
Metronidazole	13%
Cefotaxime	7%
Aztreonam	7%
Vancomycin	6%
Amikacin	6%
Ciprofloxacin	3%
Moxifloxacin	2%
Ceftazidime	2%
Linezolid	2%
Dopamine	23%
Dobutamine	16%
Phenobarbital sodium	17%
Phenytoin	7%
Midazolam	1%
Sildenafil	11%

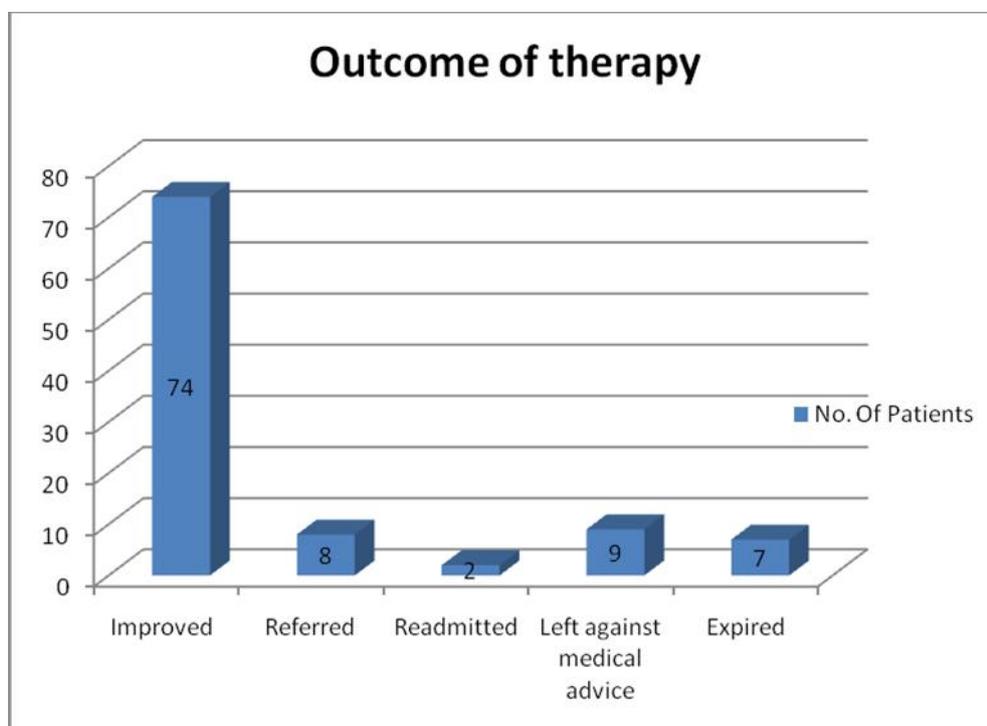
Xylometazoline	3%
Furosemide	10%
Vitamin K	11%
Calcium gluconate	13%
Bisacodyl	12%
Ranitidine	10%
Domperidone	6%
Acetylcysteine	6%
Paracetamol	6%
Dexamethasone	2%
Heparin	2%
Oxygen	44%
Phototherapy	30%

Figure 1: Routes of drug administration



The average duration of admission was 4.7 days. The range varied from a minimum of 1 day to a maximum of 20 days.

The average number of drugs per patient was 5.3. The range varied from a minimum of 3 drugs to a maximum of 12 drugs per neonate.

Figure 2: Outcome of therapy**Adverse drug event**

One neonate had IUGR (intrauterine growth retardation) as an adverse effect of maternal intake of prednisolone.

One neonate had acute renal failure due to maternal amikacin (aminoglycoside antibiotic) intake. Four neonates had generalized rash due to phototherapy.

Discussion

In our study, 49% of neonates had normal birth weight, 35% had low birth weight while 16% had very low birth weight. Hence dosage calculation was done based on weight.

$$\text{CLARK'S RULE}^7: \quad \text{Dose} = \frac{\text{Adult dose} \times \text{weight (kg)}}{70}$$

The commonest cause of admission was hyperbilirubinemia (30%) followed by neonatal sepsis and respiratory distress syndrome(28%).

Hyperbilirubinemia (Neonatal jaundice) occurs when the rate of bilirubin production exceeds the rate of elimination. The mainstay of treatment is phototherapy.⁸

The uncertainty surrounding the clinical approach to treatment of neonatal septicemia can be minimized by periodic epidemiological surveys of aetiological agents and their antibiotic sensitivity patterns leading to recognition of the most frequently encountered pathogens in a particular geographical area.⁹

In our study, intravenous fluids (94%) and antibiotics (94%) were the most common groups of drugs utilized. Netilmicin was the most common antibiotic used based on the culture and sensitivity report. This is in concordance with other studies.¹⁰ Netilmicin (Aminoglycoside) has

to be used precariously since it is excreted renally, and at birth renal function is limited due to the anatomical and functional immaturity of the kidney.¹¹

44% of neonates received oxygen whereas 30% received phototherapy.

The average number of drugs per patient was 5.3. This reflects the growing trend of current medical practitioners regarding the practice of polypharmacy. This practice needs to be reduced because it can cause economic burden on patients as well as it increases the risk of adverse drug reactions and drug interactions.¹²

CONCLUSION

Polypharmacy is a common entity in pediatric prescription. Evidence based antibiotic prescribing is helpful in prevention of resistance and decrease therapeutic failure. Safe use of oxygen and intravenous fluids remains as the need of the hour to enhance survival rate and decrease infant mortality rate. Further studies are required to assess the cause for mortality in neonates and pharmacoeconomics of the drugs used in NICU. The focus has to move forward from simply 'survival till discharge' to 'intact complete life survival'. Simultaneously, the NICU care has to stay available and affordable for the people of all the sectors.

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