Research Article

Pattern of Drug Utilisation in Neonatal Intensive Care Unit in a Tertiary Care Hospital

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Abstract

Background: Every year millions of babies are born and a large proportion of them are admitted to the neonatal ward for various indications. Neonate's particularly preterm and very preterm neonates are the most vulnerable population. There is paucity of information to guide rational prescribing in children and newborns.

Objectives: The objective of this study was to determine the patterns of drug use in newborns in tertiary care NICU, VIMS, Bellary, Southern India.

Materials and Methods: Data from 100 Case records of newborns admitted in NICU from Jan 2013 - June 2013 was collected. Information regarding gender, gestational age, birth weight, length of hospital stay, survival status at discharge, and details of all drugs used was collected in the prestructured proforma and subjected to statistical analysis.

Results: Among 100 study subjects 57% were females and 43% were males. Only 51% of them completed term. Majority of them were admitted with Perinatal asphyxia complicated by HIE (48%). The most common drugs used were Ceftriaxone(75%) and Amikacin(75%), Phenobarbitone sodium(39%), Vitamin–K(19%) and Aminophylline(11%).73% of newborns were recovered. The relation between gestational age, birth weight, indications and the type of drugs used was found to be statistically significant.

Conclusion: Ceftriaxone and Amikacin are most commonly used drugs. Appropriate care was given to all the neonates to improve the outcome.

Keywords: NICU, Amikacin, Gestational Age, Birth Weight.

1. Introduction

Every year millions of babies are born and a large proportion of them are admitted to the neonatal ward for various indications[1]. Neonate's particularly preterm and very preterm neonates are the most vulnerable population. Older neonates are admitted to NICU because of congenital diseases and peri and post natal complications.[2] Neonatal septicemia is one of the commonest cause of neonatal mortality and morbidity throughout the world. It is estimated that 20% of all neonates develop sepsis and is responsible for 30-50% of total neonatal death in developing countries.[3]

Newborns, which are products of high-risk pregnancies, premature infants, or those with both risk factors, are at greater risk for medication exposure. Fetal maturity also plays a role in determining the pharmacokinetics of drugs. This is due to developmental factors affecting (1) drug absorption (in the case of orally administered drugs); (2) drug distribution such as body compartment sizes/total body water content, protein binding, hemodynamic factors, and so on; and (3) drug metabolism/clearance (either renal or hepatic) due to differences in blood flow through the metabolising organs as well as drug-metabolizing enzyme activity.[4]

Many advances have been made in the area of pediatric clinical pharmacology, yet a paucity of information to guide rational prescribing in children and newborns remains.[5]

This prompted us to take up the present study. To determine Patterns of drug use in newborn in a tertiary care neonatal intensive care unit.

2. Material and Methods

Case records of 100 newborns admitted in neonatal intensive care unit from Jan 2013-June 2013 are assessed .Data regarding gender, gestational age, birth weight, length of hospital stay (number of days from date of birth until date of discharge), Health status at discharge, and all pharmacological agents used were collected in the prestructured proforma and subjected to statistical analysis.

3. Results

Among 100 Newborns included in the study, the most common age at presentation was on the day of birth (57%), around 34% were presented 2-7 days after birth as shown in figure 1.

Figure 1; Age at presentation to NICU
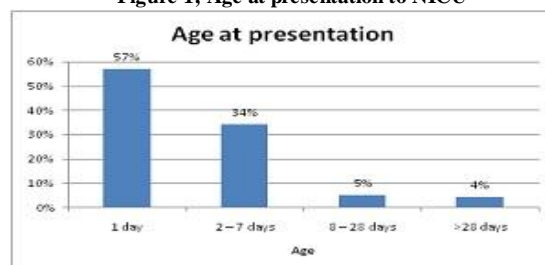
Among them 57% were females and 43% were males. 51% of them completed term and 32% were in hospital for more than 7 days. Around 48% of them were admitted with Perinatal asphyxia complicated by HIE, 20% MAS and 8% of them suffered from septicaemia.

The most common drugs used were Ceftriaxone (75%) and Amikacin (75%), Phenobarbitone sodium (39%), Vitamin – K (19%) and Aminophylline (11%).The most commonly used antibiotics are shown in Fig 2 and other drugs used are shown in Table1.
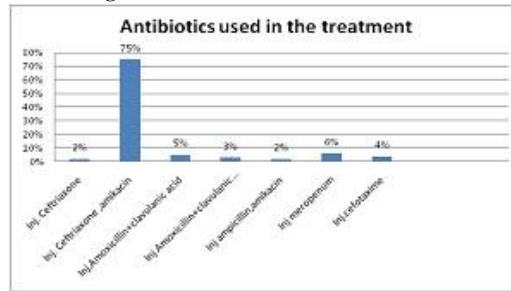
Figure 2: Antibiotics used in treatment

Table.no.1: Others drugs used in management are

| Drugs	Frequency	Percentage
Vitamin K (vitamin)	19	19%
Inj. Aminophylline (Res.agent)	11	11%
O2 (Res.agent)	35	35%
Inj. Phenobarbitone sodium (Cns)	39	39%
Syp. Phenobarbitone sodium (Cns)	02	02%

35% of them received oxygen support, 63% were supported with other modes of treatments like Nasogastric feed, phototherapy and warming as shown in fig 3.

Fig 3: Shows other modes of treatment.
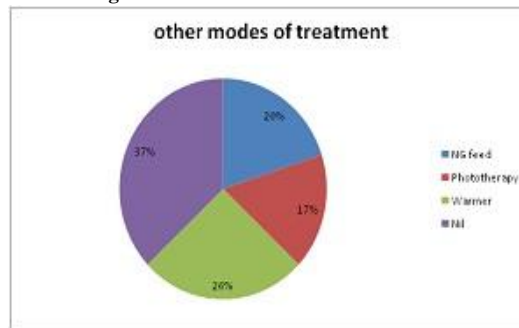
Among the total newborns 73% of newborns were recovered and discharged, 18% went against medical advice and 9% were referred to higher centers as shown fig 4.

Fig 4: Shows out come
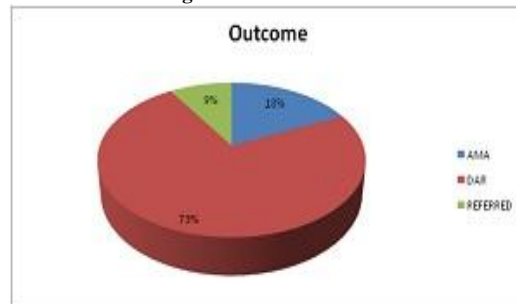
The relation between gestational age, birth weight, indications and the type of drugs used was found to be statistically significant. The relation between gender and outcome come was found to be statistically significant. The factors gender, gestational age is found to have significant association with outcome as shown in table 2, 3 & 4.

Table No.2: Relation b/w age and drugs

Age	Drugs		
	Vitamin K	Resp.Agent	Cns.Agent
1 day	15 (78.9%)	32 (69.5%)	11 (28.2%)
2 – 7 days	02 (10.5%)	07 (15.2%)	28 (71.8%)
8 – 28 days	02 (10.5%)	03 (06.5%)	00
>28 days	00	04 (08.6%)	00
Total	19 (100%)	46 (100%)	39 (100%)

Chi square value -43.37   df- 9   p value-0.001

Table No.3: Relation b/w sex and outcome

Sex	Outcome			Total
	AMA	DAR	REFERRED	
Male	04 (22.2%)	32 (43.8%)	07 (77.8%)	43 (43%)
Female	14 (77.8%)	41 (56.2%)	02 (22.2%)	57 (57%)
Total	18 (100%)	73 (100%)	09 (100%)	100 (100%)

Chi square value - 7.63   df- 2   p value-0.02

Table No.4: Relation b/w Gestation and drugs

Gestation	Drugs			
	Vitamin K	Res.Agent	Cvs.Agent	Cns.Agent
Appropriate for GA	17 (89.4%)	28 (60.9%)	00	36 (92.3%)
Small for GA	02 (10.5%)	18 (39.1%)	00	03 (07.7%)
Total	19 (100%)	46 (100%)	02 (100%)	39 (100%)

Chi square value -32.42   df-12   p value-0.001

4. Discussion

Advances in medical technology have resulted in improved survival rates in both preterm and term infants including high-risk, low birth weight infants[6].There is general appreciation that neonates especially preterm have high drug utilization rates ,System evaluation is needed to see the trend of medication use ,define the group that are high risk for adverse events[7]. Among the 100 neonates admitted male: female ratio was 1:1.3 most of them (57%) were admitted within 24hrs of the birth which was consistent with other studies[8,9]. Which may be explained by fact many of them could be reffered from outside. Most of them 48% admitted with diagnosis of perinatal asphyxia, second most common cause MAS(20%) and followed by septicemia 8% which was in contradiction to studies done in Nepal where jaundice being the commonest cause followed by sepsis and perinatal asphyxia. This could be attributed to the poor intranatal and perinatal care or due to the delay in the transit to the hospital of mothers during labour time which causes the fetal distress and majority of them are exposed to perinatal asphyxia. Another study in Nigeria showed sepsis being the commonest cause .But results consistent with study done in Pakistan showed asphyxia being common cause followed by jaundice, prematurity and sepsis[3].The most common drugs used in our study were Ceftriaxone(75%) and Amikacin (75%) compared to study done in Michigan showed most common antibiotic used was Ampicillin and cefotaxime[10].This could be related to the availability of the drug in the centre ,but still the rationale of using antibiotic at such high rate compared to the diagnosis need to be established which may be a precautionary measure to prevent septicaemia. Among 100 newborns 73% of them recovered and discharged, 18% of them went against medical advice and 9% were referred. Compared to study in Nepal where 76.9% of them discharged after improvement, 6.5% left against medical advice and 1.62% referred to higher centre, Indicates the better neonatal care with predominant antibiotic treatment with other modes and also explains the need of better intranatal and perinatal care which would avoid many neonates suffering from perinatal asphyxia.

5. Conclusion

Out of 100 newborn cases admitted and treated in NICU of VIMS, majority of cases were females and admitted on the day of birth with the complaints of Perinatal Asphyxia, MAS, Septicaemia etc. They were treated with standard treatment, 73% cases recovered and discharged only 9% of the cases were referred to the higher centers and 18% went against medical advice. In our study the relation between gestational age, birth weight, indications and the type of drugs used was found to be statistically significant. This indicates the drug usage and the neonatal care is provided efficiently inspite many of them being due to improper intranatal management and delay in seeking treatment.

Acknowledgement

I would like to thank Dr. Srinivasa V, Former HOD, Department of pharmacology and Dr. Ramesh, Incharge Medical Records Department and staff of MRD for their kind support for the data collection required for study.

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