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DISEASE PROFILE AND OUTCOME OF NEONATES ADMITTED TO NICU IN SVRRGGH, TIRUPATI – A TERITIARY CARE CENTRE

Paediatrics

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ABSTRACT

Introduction: Neonatal morbidity and mortality rates reflect a nation's socioeconomic status as well as the efficiency of their health care services. The objective of this study is to identify the disease spectrum and the commonest causes of morbidity and mortality in this group of babies.

Methods: The study was a retrospective study of all the newborns admitted in the neonatal intensive care unit of the Department of Pediatrics, SVRRGGH, Tirupathi.

Results: A total of 1289 newborns were admitted to NICU during the study period of which 696 (56.5%) were term, 537 (43.5%) were preterm. The most common disease was sepsis (35.5%) followed by birth asphyxia (31.5%), neonatal jaundice (10.2%), hyaline membrane disease (12.6%), meconium aspiration syndrome (11%), congenital malformations (4%) and hypoglycemia (5%). Out of 1233 patients, 276 expired (22.3%). The common causes of mortality were sepsis (35.5%), hyaline membrane disease (27.6%) and hypoxic ischaemic encephalopathy stage 3 (23.1%).

Conclusion: Neonatal period is a very vulnerable period with a high risk of morbidity and mortality which is preventable with good obstetric care and subsequent neonatal care.

KEYWORDS

INTRODUCTION:

The neonatal period is only the first 28 days of life and yet accounts for 40% of all deaths in children under five [1]. Even within the neonatal period there is wide variation in mortality rates, with 75% of all neonatal deaths occurring in the first week of life including 25% to 45% in the first 24 hours after birth [2]. One of the Millennium Development Goals is to reduce the number of deaths in children under 5 years to two third by the year 2015, and to achieve this goal a substantial reduction in neonatal deaths will be required especially in the developing countries [3]. In the developed countries, the main cause of mortality and morbidity in the neonatal period are non-preventable causes such as congenital anomalies but in the developing countries the preventable causes such as infections, pneumonia, birth asphyxia, low birth weight predominate [4]. For applying the preventive strategies we have to have the data on morbidities claiming the neonatal life. So, this study has been done to assess the commonest causes for admission, disease pattern and outcome of neonates admitted to the NICU.

MATERIALS AND METHODS:

This was a retrospective study carried out in the neonatal intensive care unit (NICU) of the Department of Pediatrics, SVRRGGH, Tirupathi from March 2015 to August 2015. Our NICU is a tertiary care centre with Level III care having facilities for mechanical ventilation, phototherapy units and facilities for exchange transfusion. All babies admitted to the NICU were included in the study and were analyzed and categorized on the basis of intramural or extramural deliveries, sex, gestational age, weight for gestation, referral centre, age at presentation, indications for admission, duration of hospitalization, complications encountered, procedures done during hospitalization, mortality rate and its causes. Diagnosis was mainly clinical with specific laboratory or radiological findings. Sepsis and meningitis were diagnosed on clinical grounds along with C-reactive protein (CRP), complete blood count (CBC), positive blood culture and cerebrospinal fluid (CSF) examination. Birth Asphyxia was diagnosed clinically staging done by Sarnat and Sarnat staging. Diagnosis of prematurity was clinical or based on WHO definition for prematurity and using new Ballard scoring. Neonatal jaundice was diagnosed by clinical examination and assessing serum bilirubin.

RESULTS:

During the study period 1289 neonates were admitted in NICU of which 56 left against medical advice and were excluded from the study. Of the total 1233 neonates studied, 728 were males and 505 were females. Among the total neonates studied 328 babies (26.6%) were inborn; rest (73.3%) were outborn (Table 1). 640 babies (51.9%) were admitted on the first day of life; whereas 428 babies (34.7%) were admitted between second to fifth days of life and the rest after fifth day. Majority of the babies 696 (56.4%) were term, 537 (43.5%) were preterm (Table 2). Prematurity with complications was seen in 489 while 48 babies were admitted only for prematurity

TABLE 1: Mode of admissions

Admissions	Number	Percentage
Inborn	328	26.6%
Outborn	905	73.3%
Total	1233	100

TABLE 2: Distribution of cases according to gestational age

Gestational age	Number	Percentage
Term (>37 weeks)	696	56.4%
34 – 37 weeks	236	19.1%
<34 weeks	301	24.5%
Total	1233	100

Low birth weight was seen in 731(59.3%) babies of which 56 were extremely low birth weight babies (Table 3).

TABLE 3: Distribution of cases according to birth weight:

Birth weight	Number	Percentage
>/= 2500 gms	502	40.7%
1500-2499 gms	342	27.7%
1000-1499 gms	333	27.1%
<1000 gms	56	4.5%
Total	1233	100%

The most common disease was sepsis in 456 neonates (35.5%), followed by birth asphyxia in 389 neonates(31.5%), neonatal jaundice in 126 neonates (10.2%), hyaline membrane disease in 156 neonates (12.6%), meconium aspiration syndrome in 138 neonates (11.1%), congenital malformations in 52 neonates (4.2%) and hypoglycemia in 62 neonates (5%). The following figure shows the disease spectrum in the study group (figure 1).

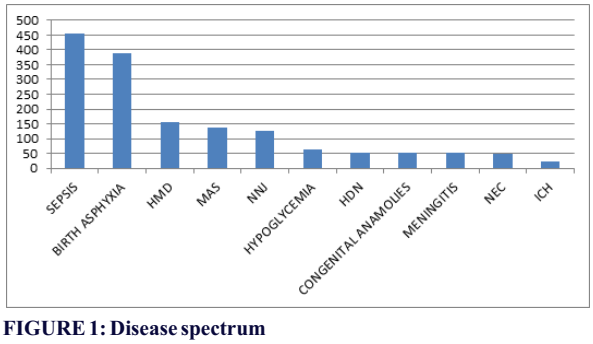


FIGURE 1: Disease spectrum

Of the 456 cases with sepsis 54 were complicated with meningitis. Among the cases with sepsis 372 cases were admitted only with sepsis at admission and the remaining were complicated with some other problem like prematurity or low birth weight or birth asphyxia or HMD apart from sepsis. Of the 389 cases with birth asphyxia 102 were HIE

stage III (26.2%), 196 HIE stage II (50.3%) and 91 HIE stage I (23.3%). Among the 126 cases with neonatal jaundice 18 cases required exchange transfusion and the rest were treated with phototherapy. 486 babies required ventilator support out of which 210 babies (43%) survived.

Out of 1233 patients, 276 expired (22.3%). Mortality rate was seen more in the male sex as compared to the female sex (65% and 35%) (Table 4). Most of the deaths were seen in outborn babies (71.2%).

TABLE 4: Distribution of neonatal deaths according to sex and mode of admission:

	Inborn	Outborn	Total
Males	42(15.2%)	137(49.7%)	179 (65%)
Females	36(13%)	61(22%)	97 (35%)
Total	78(28.2%)	198(71.2%)	276(100%)

Among the total deaths about 71.3% babies were preterms and the rest were term newborns. Amongst the preterm deaths nearly 60% belonged to gestational age <34 weeks. Mortality rate is high among low birth weight babies (82.65%). The figures shown below demonstrate the distribution of deaths according to gestational age and birth weight. (Figure 2).

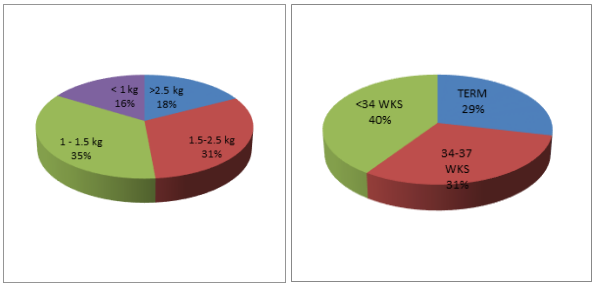


FIGURE 2: Distribution of deaths according to birth weight and gestational age:

Most of the deaths were due to sepsis (35.5%) followed by hyaline membrane disease (27.6%) and birth asphyxia (23.1%). The other minor causes of deaths were meconium aspiration syndrome, NEC and congenital malformations. Commonest cause of mortality in preterms is hyaline membrane disease whereas in term babies it was sepsis. Most of the cases which did not survive among the outborns were brought in shock with impending respiratory failure. Among the birth asphyxia cases which were referred from outside were brought in status epilepticus with resistant seizures. Early referral of these cases from the peripheral centres could have improved the chances of their survival.

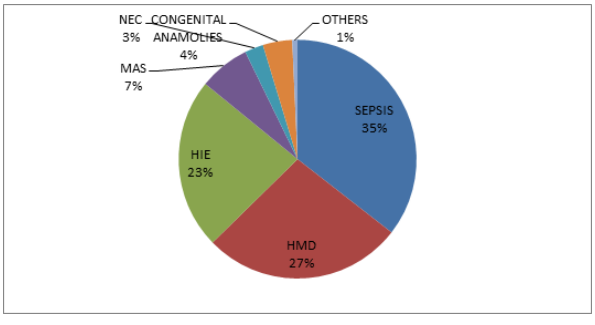


FIGURE 3: Distribution of deaths according to diagnosis:

DISCUSSION:

During the period of the done over six months about 1233 newborns admitted were studied. Among the total neonates studied 26.6% were inborn and the rest 73.3% were outborn referred from different hospitals in the city and government and private hospitals in sub district level around Tirupathi. In our study pattern of admissions indicates that bulk of the problems encountered by the neonates are on the 1st day of life (51%) and then there is a gradual decline in admission rate with increasing age of the baby. This finding is similar to other studies Abbasi KA in Larkhana[5]. In our study 56.4% were term newborns and 43.5% were preterm which is similar to that of a study done by Patil Ravindra B et al in Karnataka[6]. In other study by Gouri Shankar et al the proportion of premature admissions was 23.2%[7]. In our study low birth weight was seen in 59.3% babies which is similar to study done by Garg P et al. in New Delhi[8].

In this study preterm, low birth weight babies, septicemia, birth asphyxia account for the largest number of cases. The results of our study are comparable to a similar study done at National Institute of Child Health (NICH), Karachi in 2005 which shows low birth weight babies topping the list (55.4%), followed by septicemia (30.64%)[9]. Low birth weight (LBW) is one of the leading problems in almost all the developing countries. Immaturity tends to increase the severity but reduces the distinctiveness of the clinical manifestation of most neonatal diseases. In our study neonatal sepsis is seen in about 37% of babies which is similar to that of study done by Vasudevan et al.[10]. Neonatal sepsis is a significant cause of neonatal morbidity and mortality in the newborn, particularly in preterm, low birth weight infants[11,12]. The incidence of neonatal sepsis in the developed countries is 1-10/1000 live births, where as it is roughly three times more in developing countries[13]. In our study birth asphyxia is seen in 31.5% cases of which 102 were HIE stage III, 196 HIE stage II and 91 HIE stage I. These findings were similar to that of studies done from Sri Gangaram Hospital which is 34.6% and in Peshawar with 26.9%[14]. The important risk factors for birth asphyxia reported from a study conducted in Hyderabad include the lack of antenatal care, poor nutritional status, APH, maternal toxemia and home delivery[15].

In our study incidence of neonatal jaundice is 11% of which only 18 cases required exchange transfusion. Another study done by Gauchan E et al. lists jaundice as an important cause of neonatal admissions[16]. Neonatal hyperbilirubinaemia resulting in clinical jaundice is a common problem among infants[17]. Information about the incidence of NNJ in developing countries is lacking, as the vast majority of births occur at home. The majority of the data is from tertiary care or intensive care nurseries with no population denominator [18]. NNJ was responsible for 11.3% of neonatal admissions to the AKMCC neonatal unit[19], in comparison to 15% in a study done in Karachi[20] and 8.3% in Lahore[21]. Higher incidences of jaundice in neonates have been reported from other developing countries, such as Bangladesh and Nigeria (30.71% and 17.25% respectively)[22,23].

The mortality rate in our study was 22.3% which is comparable with that of other studies like Veena Prasad et al. done in Uttarakhand[24]. Mortality rate was seen more in the male sex as compared to the female sex (65% vs 35%) which is similar to that of study done by Gauchan et al. (68%) and another study done in South Africa[25]. In our study most of the deaths were seen in outborn babies (71.2%). Among the total deaths about 71.3% babies were preterms and the rest were term newborns. Amongst the preterm deaths nearly 60% belonged to gestational age <34 weeks. In our study mortality rate in term newborns is 11.3% and 36.6% in preterms. In another study by Gauchan et al. mortality was seen in 29.8% of preterm babies as compared to 7.3% of term newborns. This is again similar (35%) to a study done in Saudi Arabia[26]. Similarly mortality rate in our study is high among low birth weight babies (82.65%) compared to normal birth weight babies.

In our study most of the deaths were due to sepsis (35.5%) followed by HMD (27.6%) and HIE stage 3 (23.1%). The major causes of neonatal deaths globally were estimated to be infections (35%), preterm births (28%) and asphyxia (23%)[27]. In our study commonest cause of mortality in preterms is hyaline membrane disease (58%) which is comparable with that of a study done in Nepal (47%). The commonest cause for mortality in term and preterm babies combined was septicemia (35.5%) where as other studies done by Jan AZ et al[28] and Gauchan et al list birth asphyxia as major cause of death. Neonatal sepsis has a significant contribution in neonatal mortality rate. Its clinical manifestations vary from being specific to subtle, testing the very skills of the pediatrician. The inability to be certain of infection, coupled with nonspecific signs of the life threatening illness in neonates have resulted in widespread use of antibiotics aggravating the problem of antibiotic resistance. Neonatal septicemia is responsible for 1.5 to 2.0 million deaths per year or between 4000 to 5000 deaths per day in the less-developed countries of the world. In relation to underlying disease, mortality was seen in 48% cases of hyaline membrane disease, 21% cases of sepsis and 17% cases of birth asphyxia.

CONCLUSION:

According to our study prematurity, low birth weight, sepsis and perinatal asphyxia are some important and leading causes of morbidity

in newborn babies. Commonest causes of mortality were sepsis, hyaline membrane disease and asphyxia. Most of the morbidities and subsequently the mortalities can be minimized by improving the antenatal care of pregnant women, timely interventions and timely referral to tertiary care centres for delivery of high risk pregnancies. Another factor which must be addressed is the potential risks of prematurity and low-birth weight and the management of their complications. Creating awareness among health personnel especially of district hospitals about the importance of handwashing and use sterile technique for delivery has to be emphasized to minimize the risk of sepsis.

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