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Original Research Article

Evaluation of the immediate outcomes of perinatally asphyxiated newborns in a tertiary care hospital in rural Bangalore: a retrospective study

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ABSTRACT

Background: Perinatal asphyxia is a condition resulting from deprivation of oxygen to a neonate that lasts long enough to cause damage to the brain. Perinatal asphyxia is one of the major causes of early neonatal mortality in India. The goal was to evaluate outcomes of asphyxiated babies.
Methods: One hundred consecutive neonates with birth asphyxia (Apgar 0-3 at 5-minute of age) were studied. Data from medical records of all babies with perinatal asphyxia admitted were retrieved and documented for the study.
Results: Majority of the neonates are inborn (57%). Male to female ratio was 1.5:1. Spontaneous vaginal delivery constitute 32% and lower segment caesarean section (LSCS) 36%. Mortality was highest in hypoxic ischemic encephalopathy (HIE) stage 3 with 11%. Mean duration of hospitalization is directly related to Sarnat and Sarnat staging of HIE. 22% babies were having neurological sequelae and discharged on anti-convulsant. 21% mortality, majority were outborn.
Conclusions: Despite advances in the management of neonates, perinatal asphyxia is still the leading cause of morbidity and mortality. Perinatal asphyxia is still prevalent despite medical advances. Babies with HIE stage III had poor outcome. Appropriate strategies required to minimize the neuro-developmental sequelae.

Keywords: Perinatal asphyxia, HIE, Prematurity

INTRODUCTION

Infant mortality is an everyday tragedy of enormous scale. Birth asphyxia accounts for 23% of neonatal deaths and about 10% of all deaths in children less than 5 years of age.[1-3] According to the WHO, around 4 million babies develop birth asphyxia, and asphyxiated newborn may develop severe consequences such as epilepsy, cerebral palsy, developmental delay and mental retardation. Furthermore of 1.2 million neonatal deaths in India, 300,000-350,000 babies die due to perinatal asphyxia mostly within first 3 days of life.[4]

India is the leader of world's neonatal mortality with every fourth dying newborn of the world being Indian.[5,6] In term infants, 90% of insults occur in the antepartum or intrapartum periods as a result of placental insufficiency and the remaining occur in the postpartum period.

The neonatal mortality has decreased but morbidity after birth asphyxia in the form of neuro-developmental sequelae is same or even increased due to survival of asphyxiated babies.[7] So not only mortality, even morbidity is also very significant and worrisome.

Worldwide more than one million children surviving birth asphyxia annually go onto suffer its long-term consequences-cerebral palsy, learning disorders and other disabilities.[8] Birth asphyxia is the most significant preventable cause of cerebral insult in the newborn.[9] This

creates a burden psychologically, socially and economically for both family and society.

The objective of this research was to study the outcomes of birth asphyxia in babies requiring resuscitation**.** Study was intended to evaluate immediate outcomes of perinatally asphyxiated newborn.

METHODS

The study conducted at department of paediatrics, Sapthagiri institute of medical sciences and research centre, Bangalore. The present study was observational retrospective study on babies delivered in the hospital and requiring active resuscitation from January 2018 to March 2020.

100 consecutive asphyxiated neonates who were admitted in the neonatal unit and fulfilled the inclusion criteria were studied. Clinical information was collected retrospectively from maternal records, NICU records and referral notes. Both inborn and outborn babies were included.

One hundred consecutive neonates with birth asphyxia during that period (Apgar 0-3 at 5-minute of age) were studied. Detailed history and examination of babies was performed at the time of admission. Detailed neurological examination of asphyxiated newborns including staging of HIE was done. HIE was assessed according to Sarnat and Sarnat staging i.e. mild (HIE stage I), moderate (HIE stage II) and severe (HIE stage III). Complications like hypoxic ischemic encephalopathy (HIE), convulsions, jaundice, apnoea, septicaemia, respiratory distress, necrotizing enterocolitis (NEC), feeding intolerance, and cardiac arrest and were managed according to NNF protocol.

Inclusion criteria included Apgar score<3 at 5 minutes of life, babies with gestational age>34 weeks and weight>1.5 kg.

Exclusion criteria excluded neonates if they are suffering from major congenital anomalies or syndromes, e.g., anencephaly, cleft palate with cleft lip, encephalocele, omphalocele, gastroschisis, spina bifida, incomplete documentation (no maternal or fatal measurement parameters), mothers who took general anaesthesia, neonates less than 34 weeks and neonates less than 1500 gm.

Clinical information was collected retrospectively from maternal records such as maternal age, antenatal check-up, place of delivery, gravida, person who conducted delivery, type of delivery, presence of meconium, induced or spontaneous labour, pregnancy complications, type of resuscitation and mode of delivery were documented. Referral notes were considered.

Ethical clearance was obtained from the institutional ethics committee and the results obtained were tabulated and analysed using appropriate statistical method.

RESULTS

Majority of the neonates are inborn (57%), and rest of them are from private nursing homes (14%), community health centre (12%), primary health centre (11%), home (4%) and 2 newborns got delivered via hospital in ambulance (Table 1).

Table 1: Place of delivery.

Place	N (%)
Inborn	57
Private nursing homes	14
Community health centre	12
Primary health centre	11
Home	4
Ambulance	2

Table 2: Distribution of neonates according to birth weight.

Birth weight (kg)	N (%)
1.5-2.49	52
2.5-4	33
>4	15

Majority were low birth weight (LBW) (52%) and 15% were macrosomic babies and rest 33% were in normal range (Table 2).

Table 3: Neonates distribution according to gestational age.

Gestational age (weeks)	N (%)
34-37	33
38-42	58
<42	9

33% babies are early preterm and 9% babies are post term babies. 58% babies are term babies (Table 3).

Table 4: Distribution of neonates according to mode of delivery.

Mode of delivery	N
Normal vaginal delivery (NVD)	32
LSCS	36
NVD with vacuum assisted	12
NVD with forceps assisted	11
LSCS with vacuum assisted	5
LSCS with forceps assisted	4

Mode of delivery in this study was shown in Table 4.

Table 5: Sarnat stage of HIE distribution of neonates and mortality.

HIE status	N	Deaths (21%)
HIE 1	38	5
HIE 2	39	5
HIE 3	33	11

According to ACOG, HIE staging was done. Mortality was highest in HIE stage 3 with 11% and comparable in HIE 1 and HIE 2 in this study (Table 5).

Table 6: Outcome of perinatal asphyxia.

Results	N (%)
Discharged with no sequelae	52
Discharged with neurologic sequelae	22
Death	21
Discharged against medical advice	3
Referred	2

52% of the babies had no sequelae at the time of discharge. 22% babies were in HIE 2 and HIE 3 and discharged on anti-convulsant. 21% mortality of which majority were outborn (Table 6).

Table 7: Duration of hospital stay and its relationship with HIE staging.

HIE status	Mean duration of hospital stays (Days)
HIE 1	4
HIE 2	9
HIE 3	12

Mean duration of hospitalization is directly related to Sarnat and Sarnat staging shown in (Table 7).

DISCUSSION

WHO estimates that 4 million neonatal deaths occur yearly due to birth asphyxia, representing 38% of deaths of children under 5 years of age. Fatalities from perinatal asphyxia remain high in developing countries, and continually assessing its risk factors will help improve outcomes in these settings.[10,11]

In spite of major advances, HIE remain a significant condition causing mortality and morbidity. It is the commonest cause of hospital admission of a newborn.[12]

A total of 100 newborns with perinatal asphyxia were enrolled into our study. Most of the population was from the lower, lower middle and upper lower socioeconomic status according to modified Kuppuswamy classification.

In this study male to female ratio was 1.5:1, other studies have also shown similar ratio.[13-15] 57% babies with birth asphyxia were delivered in hospital, followed by private nursing homes (14%), community health centre (12%) and primary health centre (11%). Same findings seen in study done by Rana et al where 90.5% babies were delivered at same hospital where study was conducted.[16]

Regarding the mode of delivery 32% babies were delivered by spontaneous vaginal delivery, 36% by caesarean section and rest by assisted instrumental delivery. This is in contrast to study done by Memon et al because majority of the babies were referred in utero in view of fetal distress.[17]

Among the total 100 newborns of birth asphyxia 21 (21%) newborns died. This result is similar with the result shown in one study done by Ladakhi in India.[18] In developing countries, rates of birth asphyxia are higher and case fatality may be 40% or higher.[19]

Hospital based studies in Nepal and South Africa estimated that birth asphyxia accounted for 24% and 14% of perinatal mortality rate respectively, which is similar to this study (21%).[20,21]

Overall, 52% cases were recovered without apparent sequelae and 22% had neurological sequelae. As reported by other authors recovery rate was higher in stage-I (91.8%) and stage-II (60.9%) compared to stage-III (22.2%).[22-24]

Limitations

Limitation of the study is small sample size of the study.

CONCLUSION

The burden of perinatal asphyxia is enormous and worrisome. Babies with HIE stage III had poor outcome. Its mortality is decreased but morbidity and associated risk factors unchanged.

In this study, 22% babies developed neurological sequelae with a mortality rate of 21%. HIE 3 constituted the majority with almost 50% of total mortality in our study. Appropriate strategies required to minimize the neuro-developmental sequelae.

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