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Clinical Profile of Perinatal Asphyxia in a Special Newborn Care Unit at a District Hospital in South India

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Abstract: ***Objective: To define the clinical profile of perinatal asphyxia in a in a Special Newborn Care Unit at a District Hospital in South India Methods: All babies admitted in SNCU, Government District Headquarters Hospital, Namakkal from January 2018 to December 2018 with a diagnosis of birth asphyxia (5 min Apgar<7 or those with no spontaneous respirations after birth) were included in the study (n=106). This was a descriptive observational study. Clinical information was collected (gravida, hour at presentation, mode of delivery, sex of baby, gestational age of the baby, requirement of resuscitation). Neonates were admitted to NICU, observed for complications and managed as per hospital protocol. Results: Among the 1213 neonates admitted to SNCU, 106 had perinatal asphyxia (8.73 %). Babies with Hypoxic ischemic encephalopathy(HIE) Grade I had a very good outcome but HIE III was associated with a poor outcome. Outborn neonates had higher grades of perinatal asphyxia as compared to inborns. Term gestation, Males and Multigravida were associated with a higher rate of birth asphyxia. Conclusions: Birth asphyxia was one of the commonest causes of admission NICU. Babies with HIE Grade III had a very poor prognosis. Outborn neonates with birth asphyxia had a higher mortality. Males were frequently affected than females.Measures should be taken to prevent neonatal mortality with great emphasis on skilled attendance at birth and appropriate care of preterm and low birth weight neonates.***

Keywords: Birth asphyxia; HIE; Fetal distress

1. Introduction

Perinatal asphyxia is one of the major causes of early neonatal mortality in India. Among the institutional births, incidence is 5% and accounts for 24.3% of neonatal deaths [1]. Over 9 million children die each year during the perinatal and neonatal periods, and nearly all of these deaths occur in developing countries [2].Birth asphyxia remains a major cause of global mortality, contributing to almost one quarter of the world's 3 million neonatal deaths and almost half of 2.6 million third-trimester stillbirths [3]. Every year approximately 4 million babies are born asphyxiated; this results in 1 million deaths and an equal number of serious neurological consequences ranging from cerebral palsy and mental retardation to epilepsy [4].

Perinatal asphyxia is an insult to fetus or newborn due to lack of oxygen (hypoxia) or lack of perfusion (ischemia) to various organ of sufficient magnitude and duration. In term infants, 90% of insults occur in the ante partum or intrapartum periods as a result of placental insufficiency. The remainder is postpartum usually secondary to pulmonary, CVS or neurologic abnormalities. The proportion of postpartum events is higher in premature neonates, especially in ELBW infants [5]. According to a study conducted at Thailand, inappropriate antenatal care, vacuum extraction, male sex, prolapsed cord and 1 and 5-minute low Apgar scores, were significant risk factors for hypoxic ischemic encephalopathy (HIE) [6]. Outcome of birth asphyxia depends on apgar score at 5 minutes, heart rate at 90 seconds, time to first breath, duration of resuscitation arterial blood gases and acid –base status at 10, and 30 minutes of age [7]. Although apgar score does not exactly predict the neurodevelopmental outcome it is still the most feasible and practical to perform. The early outcome is either death/or presence of hypoxic ischemic encephalopathy (HIE) stage I, II or III, according to Sarnat and Sarnat staging. Most of the HIE cases presented with depressed neonatal reflexes, seizures, lethargy, and papillary abnormalities. The common acid base disturbance was metabolic acidosis, observed mainly in babies with HIE stage III [8-10]. The major difficulty in collecting accurate epidemiological data is lack of a common definition of the diagnostic criteria of perinatal asphyxia [4]. This is demonstrated by the difference in occurrence according to different studies, where the incidence ranges from 5.4/1000 live births in a Swedish study [11] to 22/100 live hospital births in an Indian study [5,6]. Means of assessment include umbilical pH, 1-hour post-delivery blood gas, Apgar scores, and neurological changes ranging from twitching to hypotonia and seizures. When resources are lacking in developing countries, perinatal asphyxia can be crudely assessed by use of the Apgar score [12]. In spite of improvements in the obstetric and neonatal care, the incidence of birth asphyxia is similar in the developing countries. The neonatal mortality is comparatively decreased but morbidity after birth asphyxia in the form of neurologic damage is same or even increased due to survival of asphyxiated babies [13, 14]. The aim of this study was to study the clinical profile and the outcome of asphyxiated babies.

2. Methodology

This was a retrospective, observational study. In our hospital 106 admitted newborn babies who fulfilled selection criteria

for perinatal asphyxia, from January 2018 to December 2018, were included in the study. Term asphyxiated newborns, including hospital births and those born elsewhere who were referred to our hospital within the first hour, were included in the study. Newborns with any dysmorphic features, congenital neuromuscular disorders, cardiovascular, central nervous system and pulmonary congenital disorders and those babies who were discharged against medical advice were excluded from the study.

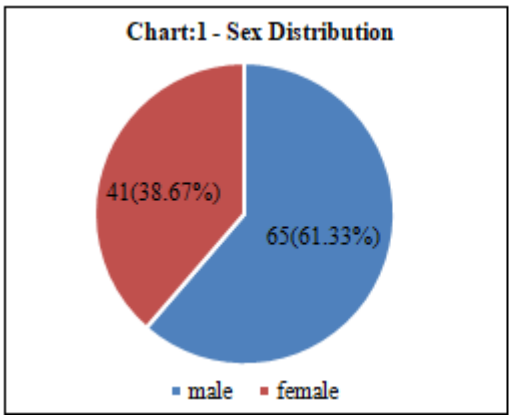
Infants were identified of having perinatal asphyxia when three of the following were fulfilled,

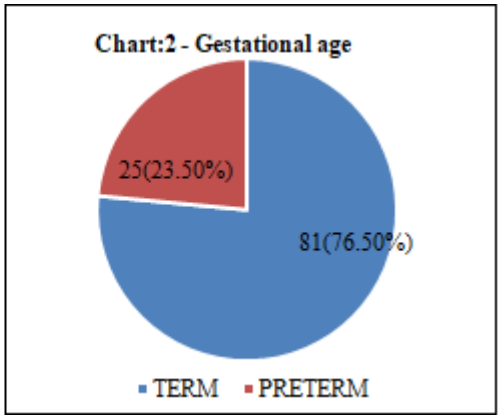
1) Apgar score< 7 at 5 minute
2) Requirement of > 1 minute of positive pressure ventilation
3) Signs of fetal distress (heart rate of less than 100 beats per minute, late decelerations, or an absence of heart rate variability)

Detailed obstetric history was obtained and examination of babies was performed at the time of admission. Detailed neurological examination of asphyxiated newborns was performed.The staging of encephalopathy was assessed by Sarnat and Sarnat staging.

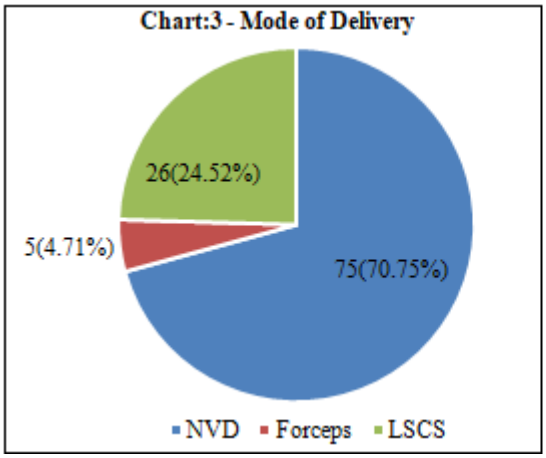
3. Results

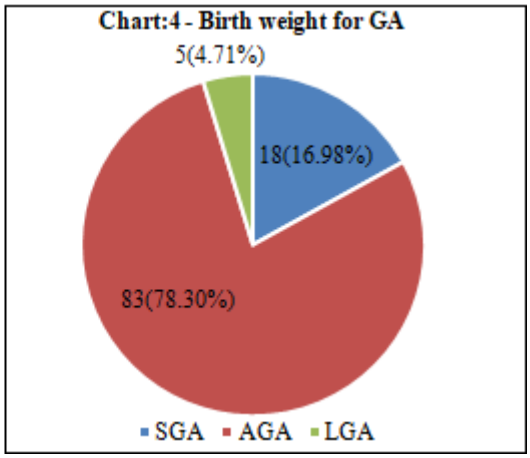
Among the 1213 neonates admitted to SNCU, 106 had perinatal asphyxia (8.73 %) withAPGAR score of <7 at 5 minutes. Out the 106 cases, 42 babies (39.62%) were inborn and 64 babies (60.37%) were out born. Of the 106 babies, 65 (61.33%) were found to be males and 41 (38.67%) were females (Chart-1). Out of 106 babies, 81(76.50%) babies were term and 25(23.50%) were preterm (chart-2).



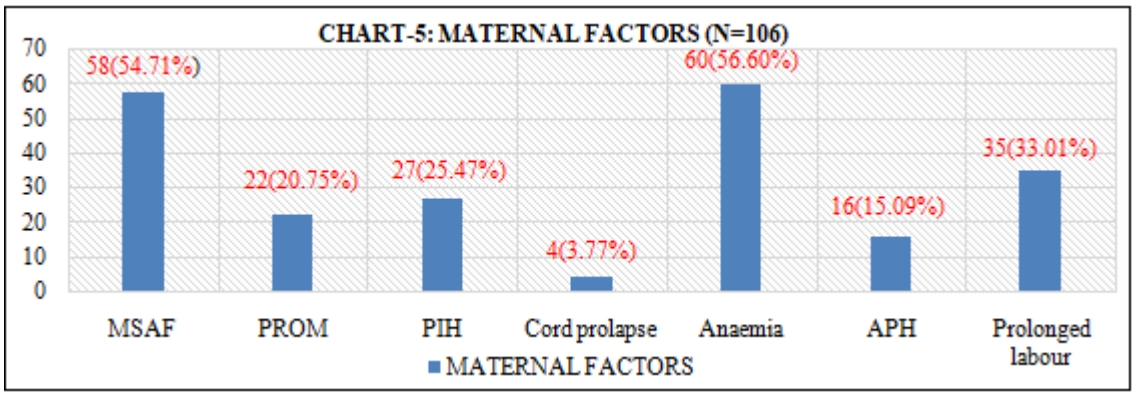


Of the total, 75 babies (70.75%) were delivered vaginally, 26 babies (24.52%) were delivered by caesarian section and 5 babies (4.71%) underwent instrumental delivery (chart-3). Of the 106 babies, 78.30% (83 babies) were appropriate for gestational age, 16.98% (18 babies) were IUGR babies and 4.71% (5 babies) were large for gestational age (chart-4).

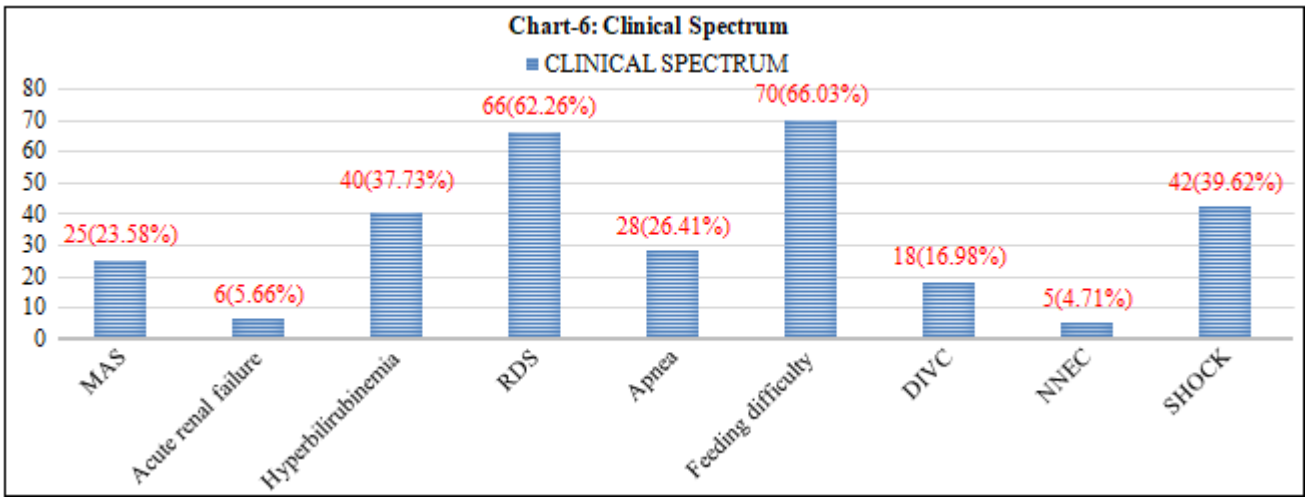




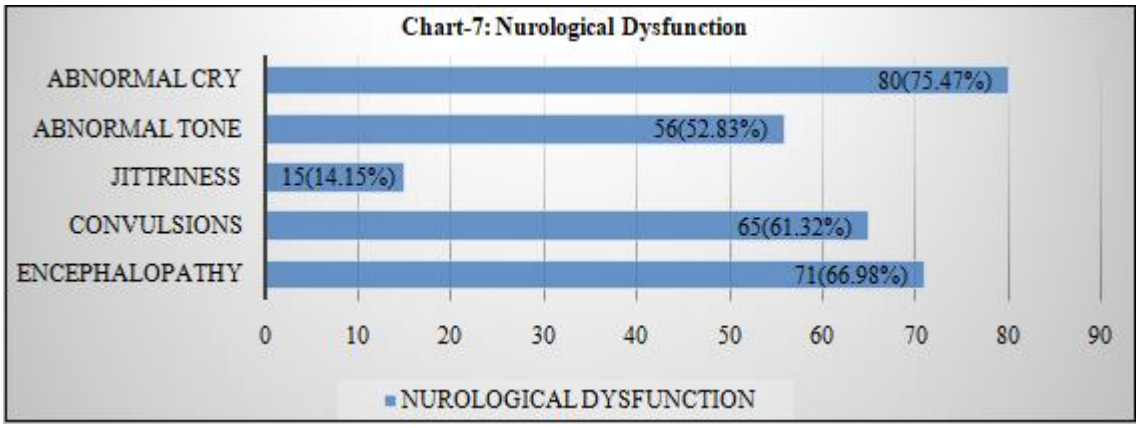
Out of the total, 58 babies (54.71%) had maternal history of MSAF, 22 babies (20.75%) had PROM, 27 babies (25.47%) had maternal PIH, 4 babies (3.77%) has cord prolapsed, 60(56.60%) babies had maternal anemia, 16(15.09%) babies had maternal APH and 35(33.01%) had prolonged labour (chart-5).



Of the total cases, 25(23.58%) babies had meconium aspiration syndrome, 6(5.66%) babies had acute renal failure, hyperbilirubinemia was noted in 40(37.73%) cases, RDS was present in 66(62.26%) babies, apnea was observed in 28(26.41%) babies. Feeding difficulty, DIVC, Necrotizing enterocolitis and shock were observed 70(66.03%), 18(16.98%), 5(4.71%) and 42(39.62%) cases (chart-6).



While observing the neurological function of these babies encephalopathy, convulsions, jitteriness, abnormal tone and abnormal cry were noted in 71(66.98%), 65(61.32%), 15(14.15%), 56(61.32%) and 80(75.47%) cases (chart-7).



4. Discussion

This study mainly determined the immediate outcome of asphyxiated babies. Frequency of perinatal asphyxia was 12.99% in our study while it varies from 9% to 22% in different studies. According to the World Health Organization (WHO), incidence of birth asphyxia is around 3% that is from 130 million newborns each year globally, around four million develop birth asphyxia, and from asphyxiated babies around 1.2 million die and the same number develop severe consequences, such as epilepsy, cerebral palsy, and developmental delay [15]. This variation in different studies was due to different operational definitions for birth asphyxia adopted by different researchers; apgar score at 1 minute or 5 minute apgar score, duration of resuscitation, breathing effort at 1 minute etc.

Although apgar score does not exactly predict the neurodevelopment outcome the 5 minute Apgar score is still the most practical, feasible and valid index for assessing the effectiveness of resuscitation and vitality of newborn [16]. This study found that perinatal asphyxia is one of the commonest causes of admission and mortality. In our study, males were affected more than females which are similar to a study done by Azam Multan [17]. In this study, majority (78.30%) was appropriate for gestation age. Post maturity has been noted to be an important risk factor of birth asphyxia by earlier workers like Azam Multan which was not seen in this study [17].

Among the maternal risk factors associated with perinatal asphyxia, MSAF was the major contributing factor, accounting for 54.71% of the cases. This study is comparable with the study done by Lalsclottir et al [18] in Iceland where 50% of the women of asphyxiated babies had meconium stain amniotic fluid.

Regarding the mode of delivery, majority was delivered by spontaneous vaginal delivery of which all the instrumental deliveries went for birth asphyxia. And in this study majority of the caesarian sections were due to prolonged rupture of membrane, MSAF and obstructed labour. Timely recognition and intervention with caesarian section could have saved many of those unfortunate babies from being asphyxiated at birth.

The overall mortality rate was 7.6% which was lesser when compared to the study done by Etuk and Etak [19] in Nigeria where mortality rate was 14.3%.

5. Conclusion

Inspite of advances in the management of the various associated risk factors and the availability of NICU care, perinatal asphyxia still contributes to majority of the admissions in NICU and remains one of the commonest causes of neonatal deaths. Strict guidelines for early detection of risk factors, early referral of these high risk pregnancies in-utero, timely intervention of these high risk pregnancies and advanced NICU care can help in reducing the occurrence of birth asphyxia and hence mortality and morbidity in neonates. Involvement of other systemic organs shows early detection and proper management of these dysfunction as well as advanced life support can improve the outcome of birth asphyxiated babies.

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