Original article:

Study of clinical manifestations and complications of perinatal asphyxia

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Abstract:

Introduction: The incidence of birth asphyxia reported from developing countries varies from 9.4 to 299 per 1000 live births. Although many organ systems can be affected by hypoxia-ischemia, it is the nervous system that bears the brunt of perinatal asphyxia in the long run

Methodology: This was a Descriptive Longitudinal Prospective study conducted in Neonatal Intensive Care Unit at Paediatric Department of Pravara Rural Hospital, Loni, which is a tertiary care hospital for surrounding districts, during the period of two years. In our period 162 neonates having perinatal asphyxia was studied to evaluate the usefulness of Cranial Ultrasonogram in diagnosis of various lesions in symptomatic neonates with history of birth asphyxia.

Results: Out of 9458 deliveries 186 had perinatal asphyxia, of these 24 were excluded due to ELBW babies and congenital malformation .The incidence of perinatal asphyxia was 1.96%.

Conclusion: Out of 9458 deliveries 186 had perinatal asphyxia, of these 24 were excluded due to ELBW babies and congenital malformation .The incidence of perinatal asphyxia was 1.96%.

Introduction:

The incidence of birth asphyxia reported from developing countries varies from 9.4 to 299 per 1000 live births. Although many organ systems can be affected by hypoxia-ischemia, it is the nervous system that bears the brunt of perinatal asphyxia in the long run.[1]

The incidence of intrapartum fetal asphyxia in term fetus is about 2% while in the preterm fetus it is about 6%.[2]

There are two types of lesions: Intra ventricular hemorrhage and hypoxic-ischemic encephalopathy, incidence of same is about 43% and 25% respectively. This depends on the gestational age at the time of delivery, birth weight, immediate resuscitation measure, good neonatal setup to manage a complication and early diagnosis of lesions.

Early recognition is important for the proper management and prevention of further damage to developing brain. Currently many imaging modalities are available like USG, CT and MRI for diagnosing various brain lesions.

Methodology:

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Inborn Term and Preterm neonates with perinatal asphyxia admitted to Neonatal Intensive Care Unit during the study period at Pravara Rural Hospital, Loni.

All cases of Birth asphyxia fulfilling inclusion criteria were included in the study.

INCLUSION CRITERIA

A. All Inborn term and preterm neonates with features suggestive of perinatal asphyxia.

B. Criteria for asphyxia includes

1. Apgar score of ≤ 3 at 1min.

2. Positive pressure ventilation for more than 1 min at resuscitation.

3. Fetal heart rate abnormalities (Fetal bradycardia <100beats/minute or fetal tachycardia>160beats/minute) and/or presence of meconium stained amniotic fluid.

4.Abnormal neurological findings including altered muscle tone, altered sensorium and seizures.

5. Need for chest compression during resuscitation.

EXCLUSION CRITERIA:

 Outborn neonates.

 Neonates with major congenital malformations e.g.- anencephaly, open neural tube defects, diaphragmatic hernia etc.

 Neonates who are extremely low birth weight (<1000gms)

 Neonates of extreme prematurity (less than 28 weeks of gestation)

 Neonates which failed resuscitation.

Informed consent was obtained from the parents/guardian regarding inclusion of the neonate in the study.

All babies received standard care during and after resuscitation.

The relevant maternal and neonatal data was recorded in the proforma.

Gestational age in completed weeks was assessed on basis of mother‘s last menstrual period and confirmed where necessary by routine early antenatal USG examination. In some cases where LMP was not available and antenatal USG was not done, then gestational age was assessed by New Ballard‘s score.

Results:

Table 1: **Distribution of asphyxiated neonates according to Gender.**

Number (n=162)	**Percentage**
Male	90	55.5
Female	72	44.4

Table 2: Distribution of perinatal asphyxia by Gestation

Maturity (Gestational age)	**Perinatal asphyxia**	**Percentage**

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28-36 weeks	38	23.4
≥37 weeks	124	**76.5**
Total	162	100

Gestational age

The mean gestational age was 36.73 weeks ± SD 3.34 wks. The median gestation age was 37.5 weeks. The shortest gestational age was 29 weeks and longest was 42 weeks.

The mean gestational age of pre-term cases was 31.36 weeks ± SD 1.97 wks. The mean gestational age of the term cases was 38.37 ± SD 1.37 wks.

Table 3: Distribution of birth asphyxia cases by birth weight

Birth weight (g)	**Term neonates ≥37 wks (n=124)**		**Pre-term Neonates 28-36 wks(n=38)**	
Cases (n=124)	**Percentage**	**Cases (n=38)**	**Percentage**	
1000-1499	0	0	**30**	**78**
1500-1999	20	16.1	4	10.5
2000-2499	42	33.8	4	10.5
2500-2999	**46**	**37**	0	0
>3000	16	12.9	0	0
Total	124		38	

Among the study group, 30 (18.5%) of the babies were born to PIH mothers, 76 (46.9%) were born to anemic mothers. PROM was associated with 36 (22.2%) of the asphyxiated babies. There was presence of **Meconium Stained Amniotic Fluid (MSAF) in 86 (53%)** of the asphyxiated neonates. II stage of labor was prolonged in 26 (16%), and cord around neck was seen in 6 baby (2.43%).

Table 4: Distribution of asphyxiated neonates according to Mode of delivery

Mode of delivery	**No. of neonates (n=162)**	**Percentage**
LSCS	70	43.2
Vaginal	82	50.6
VACCUM	10	6.17
TOTAL	162	100

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Table 5: Distribution of neonates according to level of consciousness.

LEVEL OF CONSCIOUSNESS	TERM (n=124)	PRETERM (n=38)	PERCENTAGE (%)
ALERT	24	26	**30.8**
HYPERALERT	44	0	27.1
LETHARGY	34	2	22.2
STUPOR	6	4	6.1
COMA	16	6	13.5
TOTAL	**124**	**38**	**100**

Table 6: Tone presentation among asphyxiated neonates.

TONE	TERM (n=124)	PRETERM (n=38)	TOTAL(%)
NORMAL	68	26	**94 (58.02%)**
HYPOTONIA	38	2	40 (24.6%)
FLACCIDITY	18	10	28 (17.2%)

Table 7: Seizure presentation among birth asphyxia neonates.

Seizure	
Term (n=124)	**56**
Preterm (n=38)	**7**
Total	**63**

Discussion:

Birth asphyxia has remained a major contributor to perinatal and neonatal mortality in developing countries including India. World Health Organization (WHO) states that about 9 million neonates develop birth asphyxia every year. Of them 1.2 million die and same number develop severe consequences such as cerebral palsy, epilepsy and developmental delay. [3]

A relatively unique modality of neuroimaging is available to neonates in the form of cranial ultrasonography (CUS). Technologic advances and ever-increasing experience with obtaining and interpreting CUS images have led to its widespread acceptance. Cranial ultrasonography has become an essential diagnostic tool in modern neonatology for depicting normal anatomy and pathological changes in neonatal brain. [4,5,6]

Out of 9458 deliveries 186 had perinatal asphyxia, of these 24 were excluded due to ELBW babies and congenital malformation .The incidence of perinatal asphyxia was 1.96%.

In developing countries, the incidence of birth asphyxia varies between 0.5 - 8.5% in different studies due to the difference in the study population and lack of uniform standard definition.[7]

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In developed countries, the incidence of perinatal asphyxia is about 1 to 1.5% of live births in most centers and is inversely related to gestational age and birth weight, lowering considerably in later gestation..[8]

Out of total 162 asphyxiated neonates 90 (55.5%) were males followed by females which were 72 (44.4%).

The overall male: female sex ratio of the birth asphyxia cases is **1.25:1**.

Azhar Munir Qureshi et al in their study of 181 neonates 144(79.6%) were male and 37 (20.4%) were female who had birth asphyxia. In this study male preponderance was noted with 4:1 ratio. This is not consistent with our study although there is male gender predominance.[3]

Out of 162 asphyxiated neonates 38(23.4%) were preterm gestation and 124(76.5%) were term (≥37 wks gestation).

The gestational age varied from 29 weeks to 42 weeks with mean gestational age of 36.73 weeks with standard deviation (SD) of 3.34 weeks. The median gestation age was 37.5 weeks compared to study done by K. Sridhar et al.,172 were mean gestational age was 31.57 weeks with SD of 2.05 weeks.

Of the total 162 asphyxiated babies, 82 (50.6%) were delivered by spontaneous vaginal delivery, 70 (43.2%) were born by LSCS and 10 (6.17%) of them were by vacuum delivery.

Shaver DC et alin their study of 230 infants finds overall incidence of hemorrhage was similar between vaginal and caesarean deliveries (41 and 44%, respectively).This study is consistent with our study.[9]

Conclusion:

Out of 9458 deliveries 186 had perinatal asphyxia, of these 24 were excluded due to ELBW babies and congenital malformation .The incidence of perinatal asphyxia was 1.96%.

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