

Original article:

Study of clinical manifestations and complications of perinatal asphyxia : Observational study

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Abstract:

Introduction: Perinatal Asphyxia—oxygen deficit at delivery—can lead to severe hypoxic ischaemic organ damage in newborns followed by a fatal outcome or severe life-long pathologies. The severe insults often cause neurodegenerative diseases, mental retardation and epilepsies.

Methodology: This was Descriptive Longitudinal Prospective study conducted in Neonatal Intensive Care Unit at Paediatric Department during the period of six months.. In our period 30 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: The mean gestational age was 36.12 weeks \pm SD 1.29 wks. The median gestation age was 37.2 weeks. The incidence of perinatal asphyxia was 1.33%.

Conclusion: The incidence of perinatal asphyxia was 1.33%.

Introduction:

Perinatal Asphyxia—oxygen deficit at delivery—can lead to severe hypoxic ischaemic organ damage in newborns followed by a fatal outcome or severe life-long pathologies. The severe insults often cause neurodegenerative diseases, mental retardation and epilepsies.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:

This was Descriptive Longitudinal Prospective study conducted in Neonatal Intensive Care Unit at Paediatric Department during the period of six months.. In our period 30 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.

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 <100 beats/minute or fetal tachycardia >160 beats/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:

- Neonates with major congenital malformations e.g.- anencephaly, open neural tube defects, diaphragmatic hernia etc.
- Neonates who are extremely low birth weight (<1000 gms)
- 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.

Results:

Table 1: Distribution of asphyxiated neonates according to Gender.

Number (n=30)		Percentage
Male	15	50
Female	15	50

Table 2: Distribution of perinatal asphyxia by Gestation

Maturity (Gestational age)	Perinatal asphyxia	Percentage
28-36 weeks	10	33.40
≥ 37 weeks	20	66.60
Total	162	100

Gestational age

The mean gestational age was 36.12 weeks \pm SD 1.29 wks. The median gestation age was 37.2 weeks.

Table 3: Distribution of asphyxiated neonates according to Mode of delivery

Mode of delivery	No. of neonates (n=30)	Percentage
LSCS	5	25
Vaginal	15	50
VACCUM	5	25
TOTAL	30	100

Table 4: Seizure presentation among birth asphyxia neonates.

Seizure	
Term	5
Preterm	2
Total	7

The incidence of perinatal asphyxia was 1.33%.

Discussion:

Although birth asphyxia is not always distinguishable as the cause of perinatal and postnatal death, its pronounced impact for the mortality in newborns is well-documented, representing profound deficits in current healthcare systems worldwide. Secondary to birth asphyxia, a postnatal manifestation of hypoxic-ischaemic encephalopathy (HIE) is frequently observed being associated with either mild or severe organ damage in asphyxiated newborns, both leading to the development of chronic pathologies. The severe insults often cause neurodegenerative diseases, mental retardation and epilepsies. The mild insults lead to so-called “minimal brain-damage disorders” such as attention deficits and hyperactivity, but can also be associated with the development of schizophrenia and life-long functional psychotic syndromes.

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}

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

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

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

Shaver DC et al in 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:

The incidence of perinatal asphyxia was 1.33%.

References:

- [1] Peeva V, Golubnitschaja O. Birth asphyxia as the most frequent perinatal complication. In: Golubnitschaja O, editor. Predictive diagnostics and personalized treatment: dream or reality? New York: Nova Science Publishers; 2009. pp. 499–507.
- [2] Low JA, Wood SL, Killen HL. Peter EA et al. Intrapartum asphyxia in the preterm fetus less than 2000 grams. *Am J Obstet Gynecol* 1990; 162: 378-382.
- [3] Gerda van Wezel-Meijler. *Cranial Ultrasonography: Advantages and Aims Part 1, Neonatal Cranial Ultrasonography*, 1st edn. Berlin: Springer, 2007: Pg 3-4.
- [4] Moore KL. *The developing Human: Clinically Oriented Embryology*, 4th edition. Philadelphia: W. B. Saunders, 1988: Pg. 364-401.
- [5] Kostovic I, Judas M. Prenatal development of the cerebral cortex. In: Chervenek FA, Kurjak A, Comstock CH, eds. *Ultrasound and the Fetal Brain*. New York: Parthenon Publishing, 1995; Pg. 1-26.
- [6] Hansen PE, Ballesteros MC, Soila K, et al. MR imaging of the developing human brain. *Radiographics* 1993; 13: 21-36.
- [7] Ballesteros MC Hansen PE, Soila K, et al. MR imaging of the developing human brain. Part 2: Postnatal development. *Radiographics* 1993; 13: 611-22.
- [8] Sameshima H, Ikenoue T, Miyazaki Perinatal Data Group Risk factors for perinatal deaths in Southern Japan: population-based analysis from 1998 to 2005. *Early Hum Dev.* 2008;84:319–23. doi: 10.1016/j.earlhumdev.2007.08.004.
- [9] Gerda van Wezel-Meijler. *Cranial ultrasonography: Advantages and Aims part 1, Neonatal Cranial Ultrasonography*, 1st edn. Berlin: Springer, 2007: Pg 91-101.