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# CLINICAL PROFILE OF BIRTH ASPHYXIA IN NEWBORN

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**Abstract**

***Background*** *Perinatal asphyxia is an insult to the fetus and newborn due to lack of oxygen or a lack of perfusion to the various organs.[1] Available datas indicate that perinatal asphyxia continues to be one of the major causes of preventable perinatal mortality and morbidity, especially in the developing countries.* ***Material and methods,*** *this study aims to describe various clinical features and severity of birth asphyxia with their outcome in newborns. .120 neonates with birth asphyxia admitted to the neonatal intensive care unit, formed the basis of study. 40 newborns who were normal or faced mild asphyxia were taken as control for comparision.* ***Results,*** *out of 120 newborns, 28(23.33%) expired. Recovery rate in moderate asphyxiated babies was 8% and in severely asphyxiated was 65%.* ***Conclusion,*** *proper antenatal care,early detection and appropriate management involving advanced life support can reduce morbidity and mortality due to birth asphyxia.*

**Keywords** birth asphyxia,hypoxic encephalopathy

## INTRODUCTION

Birth asphyxia continues to form one of the five leading causes of perinatal death allover the world and contributes to various forms of physical and mental retardation and the less well appreciated behavioural problems and learning disabilities in later childhood.

Since the condition could have been preventable, an urgent need to develop a clearer understanding of pathophysiology has been widely recognized. The problem has therefore

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evoked considerable concern from a wide field of researchers including physiologists, obstetricians, perinatologists, neonatologist, anesthesiologists, radiologist, neonatal surgeons, child psychologists, neurologists and many others.

There are not many reliable estimates of neonatal morbidity in our country due to lack of facilities to monitor and record morbid events clearly in all births. But the available data indicate that perinatal asphyxia continues to be one of the major causes of preventable perinatal mortality and morbidity, especially in the developing countries. The incidence of asphyxia varies from 1%-3.5% in different studies probably due to difference in the study population and the various clinical definitions of birth asphyxia that have been used by different authors. The NNF guidelines defines moderate asphyxia at minute apgar score of 4 to 6 and severe asphyxia at 1 minute apgar score of 3 or less, and are indications of immediate, resusciatation steps to be taken. 1 minute apgar score of 7 or more is taken as mild or no asphyxia.[2]

Diagnosis of asphyxia is usually made on the clinical criteria. The most frequent abnormalities involed are found in kidneys (50%) followed by CNS (28%), cardiovascular (25%) and pulmonary system (23%). The spectrum of disorders to which neonate is exposed as a result of asphyxia includes hypoxic ischemic encephalopathy, acute renal failure, necrotizing enterocolitis, systemic hypotension, cardiogenic shock, congestive cardiac failure, DIC, meconium aspiration and wide variety of metabolic problems including hyponatremia, hypoglycemia, hypocalemia and metabolic acidosis. The objectives of the study are to see :-

1. Various clinical features of birth asphyxia.

2. Severity and outcome of birth asphyxia.

## MATERIAL AND METHODS

The present study was carried out in the neonatal intensive care unit of department of pediatrics MLN Medical College, Allahabad from June 2005 to Dec. 2006.

120 neontes with birth asphyxia admitted to the neonatal intensive care unit, formed the basis of study. 40 newborns taken as control group who had no or mild asphyxia for comparison. Criteria of selection for study group was apgar score less than or equal to 6 at 1 minute or 5 minute after birth (for neoborns born in our hospital) and delayed cry with or without cyanosis (for neoborns born in others hospital or apgar score is not known). An antenatal and perinatal records are maintained for all patients. Complete clinical examination was performed in each patient with special

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emphasis on the neurological examination. Severity and outcome were recorded.

**Results**

During our study period from June 2005 to Dec. 2006. we selected 120 newborns with moderate to severe birth asphyxia in our pediatric department. The significant presence of certain antenatal and natal factors were severe anemia (23%, p value <0.01) PIH, eclampsia (10%, p value <0.05) drug intake in mothers (10%, p value <0.05), Obstructed labour (10%, p value <0.05) and fetal distress (58%, p value <0.001). Higher incidence of birth asphyxia were found in babies born to primigraravida mothers. In our study incidence of birth aspxia is more common in male babies. 65% of asphyxiated babies faced assisted delivery and 54% out of them had severe birth asphyxia while only 35% of asphyxiated babies were born through normal delivery. In our study group incidence of moderate asphyxia was 57% while of severe asphyxia was 43%. Various kinds of neurological dysfunctions are present in study group and these were encephalopathy (58%) abnormal cry (66%), convulsion (46%), abnormal muscle tone (26%), full antenor fantanelle (11%),and jitteriness (6%). Various other clinical spectrum in these babies were feeding difficulties (65%) hyperbilirubinemia (40%), respiratory distress (33%), apnea (23%) shock (20%), DIC (13%), Cyanosis (13%) meconium aspiration syndrome (10%) acute renal failure (6%) and necrotizing enterocolitis (6%). Mortality was 34% in severe and 14% in moderate birth asphyxia.

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**TABLE 1**

**ANTENATAL & PERINATAL RISK FACTORS FOR ASPHYXIA (MATERNO-FETAL FACTORS IN ASPHYXIATED & CONTROL GROUP)**

| Various (risk factors) | Asphyxia GRP (n=120) | Control (n=40) | p value |
|---|---|---|---|
| Severe anemia | 28 (23.33%) | 2 (5%) | <0.01 |
| Cardiopulmonary ds | 4 (3.333%) | 2 (5%) | NS |
| PIH Eclampsia | 12(10%) | - | <0.05 |
| Alcohol/tobacco abuse | 4 (3.33%) | - | NS |
| Drug intake | 12 (10%) | - | <0.05 |
| Antepartum haemorrhage | 8 (6.66%) | - | NS |
| Premature rupture of memb. | 8 (6.66%) | 2 (5%) | NS |
| Prolonged labor | 16(13.33%) | - | NS |
| Obstructed labor | 12 (10%) | - | <0.05 |
| Umbilical cord accident | 6 (5%) | - | NS |
| Fetal distress | 70 (58.33%) | 2 (5%) | <0.001 |
| Meconium stained liquor | 28 (23.33%) | - | NS |
| Twin Delivery | 4 (3.33%) | - | NS |

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**TABLE -2**

**CORRELATION OF MODE OF DELIVERY WITH SEVERITY OF BIRTH ASPHYXIA IN STUDY GROUP**

| Severity of asphyxia | Normal delivery n=42 | Assisted delivery n=78 |
|---|---|---|
| Moderate asphyxia (Apgar score 4-6) n=68 | 32 (76.19%) | 36 (46.15%) |
| Severe Asphyxia (Apgar score ≤3) n=52 | 10 (23.8%) | 42 (53.84%) |

**TABLE – 3**

**INCIDENCE OF MODERATE & SEVERE BIRTH ASPHYXIA IN STUDY GROUP**

| Total no. of cases | Moderate asphyxia (Apgar score 4-6 ) | Severe Asphyxia (Apgar score ≤3) |
|---|---|---|
| N=120 | 68 (56.66%) | 52 (43.33%) |

**TABLE – 4**

**NEUROLOGICAL DYSFUNCTION IN THE STUDY GROUP (1st WEEK OF LIFE)**

| Variable | No. of Cases (%) |
|---|---|
| Encephalopathy | 70 (58.33%,100% in term babies) |
| Convulsion | 56 (46.66%) |
| Jitteriness | 8 (6.66%) |
| Abnormal; Muscle Tone | 32 ( 26.66%) |

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| | |
|---|---|
| Abnormal Cry | 80 (66.66%) |
| Full Anterior Fontanelle | 14 (11.66%) |

**TABLE – 5**

**CLINICAL SPECTRUM OF BIRTH ASPHYSXIA** (1st week of life)

| Clinical profile | No. of Cases | Percentage |
|---|---|---|
| Meconium aspiration syndrome | 12 | 10% |
| Acute renal failure | 8 | 6.66% |
| HYperbilirubinemia | 42 | 40% |
| Respiratory distress | 40 | 3.33% |
| Apnea | 28 | 23.33% |
| Feeding difficulties | 78 | 65% |
| DIC | 16 | 13.33% |
| NEC | 8 | 6.66% |
| Shock | 24 | 20% |
| Cyanosis | 16 | 13.33% |

**TABLE – 6**

**CORRELATION OF MORTALITY WITH SEVERITY OF BIRTH ASHPHYXIA IN STUDY GROUP**

| Severity asphyxia n=120 | Survival<br><br>n= 92 (76.67%) | Death<br><br>n=28( 23.33%) |
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| | | |
|---|---|---|
| Moderate n=120 | 58 (85.24%) | 10 (14.28%) |
| Severe n=52 | 34 (65.38%) | 18 (34.61%) |

## Discussion

Despite tumultuous advancement and a deluge of interestt in the subject, the pediatricians still see birth asphyxia to be a major cause of neonatal morbidity and mortality.

Mechanical ventilation in neonates has revolutionized the outcome of sick newborn and it is the single most important advancement in neonatal medicine, which has reduced neonatal mortality.[3] Although apgar scoring system has been widely used over the years for making the clinical diagnosis of perinatal asphyxia, there has been a difference of opinion regarding the apgar score below which we can consider the neonate to be asphyxiated to a degrees which requires resuscitation.[2] James described that neonates having apgar score of 3 or less have been found to have consistent biochemical evidence of asphyxia.[4] In our study various materno-fetal risk factors were involved in 95% of neonates in study group. Singh et al had found the association of one or more high risk materno fetal and birth asphyxia.[5] Chandra et al had similarly correlated prolonged labour, PIH and APH with asphyxia neonatorum.[6]

Singh et al have reported that risk for birth asphyxia following abruption placental is 5-13 times.[5]

In our study 65% of cases had assisted delivery and out of them 54% had birth severe asphyxia. SIngificant association (p value<0.01) was found between caesarian section (54%) and severe birth asphyxia. Vaginal breech and vaccum extraction delivery also played a role in causing birth asphyxia in our study while only 24% cases born of spontaneous vaginal delivery had severe birth asphyxia. Chandra et al also observed caesarian section and breech delivery to be significantly associated with asphyxia.[6] A higher association of vaginal breech deliveries with asphyxia has been reported by Chaturvedi et al.[7] According to them this association between obstetric intervention and birth asphyxia could either be due to the underlying state responsible for obstetrical interference or the procedure itself. Batra et al reported higher incidence of asphyxia (38.5%) in caesarian deliveries and attributed if to higher number of unbooked cases and high risk indication for caesarian section.[8] Macdonald et al found that there was an increase in the incidence of asphyxia in caesarian birth but when this was

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broken down into risk category based on primary indication for caesarian section only the high risk category was associated with birth asphyxia which indicates that the procedure itself was not causative in producing asphyxia.[9]

In our study the incidence of moderate and severe asphyxia was 57% and 43% respectively. In study of MH Haidary et al the incidence was 21% and 60% for moderate and severe birth asphyxia respectively.[10] Study group showed various neurological manifestation out of them encephalopathy was most common manifestation and found in all term newborns Sarnat and Sarnat had published a combined clinical and EEG study of 21 term infants who displayed evidence of fetal distress following birth asphyxia from then the Sarnat and Sarnat classification has been utilized for defining the clinical stages of hypoxic ischemic encephalopathy. Sarnat & Sarnat found that 33% neonates were in stage I, 50% in stage II while 28% had progressed to stage III.[11] While a retrospective analyse of 56 asphyxiated neonates by Daga et al revealed stage I in 2.5%, stage II in 7% and stage III in 2.7% of cases.[12] In our study in term neonates maximum number of neonates had features of stage II (54%) while 31% and 14% with in stage I & III respectively.

In the present study seizures were noted in 47% of the babies within the first week. These included tonic clonic and subtle seizures Finer et al had observed convulsions in 68.4% of cases with severe birth asphyxia.[13] Kumar et al had observed convulsions within 2 days of life in 100% of birth asphyxia in their study.[14] Besides neurological dysfunctions, other associations included meconium aspiration syndrome (10%), hyperbilirubinemia (40%) respiratory distress (30%), feeding difficulties (65%), DIC (13%), NEC 7%) apea (23%) and ARF (7%). Batra et al also recorded RDS meconium aspiration synchronic, hyperbilirubinemia DIC in their study of asphyxia neonatorum.[8] Periman et al had evaluated the systemic manifestations of asphyxia as renal (40%), CNS (31%), CVS (11%), Pulmonary (23%) and rare GIT involvement.[15] Few studies reported higher incidence of acute renal failure in asphyxiated babies as Jayshree et al observed incidence of ARF in 16% of asphyxiated babies while Finer et al observed Oliguria in 25% of cases.[16]

In moderate cases mortality was 14% while in severe asphyxia it was 35%. Overall mortality in study group was 23%. In study of Macdonald and Chowdhary mortality was 44% and 40% respectively in perinatal asphyxia.[9,3] A hospital based study by Adamson showed 15% and another study by MH Haidary showed 26% mortality among asphyxiated newborns.[17,10] Another study by Suguna reported significant decline in neonatal mortality with asphyxia from

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46% to 28% during 1981-1988 respectively.[18] Our study showed lower mortality because our neonatal intensive care unit is fully equipped with advanced mechanical ventilators.

## Conclusion

Significant presence of certain antenatal and natal factors suggest the need for better obstetrical care and careful intrapartum monitoring to decrease the high incidence of birth asphyxia in our country.

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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