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Clinical profile and outcome of perinatal asphyxia in a tertiary care centre

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Abstract

The aim was to study the clinical profile and outcome of term asphyxiated newborns admitted to our hospital. This was a retrospective observational study conducted from July 2013 to August 2014. Sixty newborn babies, who fulfilled the selection criteria, were included in the study. Out of 1167 admissions, 60 cases (5.1%) were diagnosed of birth asphyxia with APGAR score of </=6 at 5 minutes. Thirty four babies (56.66%) were inborn and 26 babies (43%) were outborn. Forty two babies (70%) were found to be males and 18 (30%) were females. Majority of the babies i.e. 80% (48cases) were appropriate for gestational age, 16% (10 babies) were IUGR babies and 3% (2 babies) were large for gestational age. Majority of them (70%) were delivered vaginally, 15 babies (25%) by caesarian section and 3 babies (5%) by instrumental delivery. Out of the total, it was found that 40% had meconium stained liquor, 13.3% mothers had PIH, 11.6% had PROM and 3 (5%) had cord prolapse. Of the total, hypoxic ischaemic encephalopathy (HIE) was diagnosed in 31.7%, with stage I in 52.6%, stage II in 31.5% babies and stage III in 15.7% babies. ABG analysis showed moderate acidemia in 65% and severe in 35%. The mortality was 8% (5 babies). All the three HIE stage III cases died and the remaining 2 cases died of MAS with early onset sepsis.

Keywords: HIE (hypoxic ischaemic encephalopathy), ABG (arterial blood gases), MSAF (meconium stained amniotic fluid), PROM (premature rupture of membranes), PIH (pregnancy induced hypertension)

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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 antepartum 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 ischaemic 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 ischaemic 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.

Methodology

This was a retrospective, observational study. Sixty admitted newborn babies who fulfilled selection criteria for perinatal asphyxia, from July 2013 to August 2014, 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 atleast three of the following were fulfilled [5],

1. ph <7.2 determined by blood gas analysis within 1st hour of birth
2. Apgar score </= 6 at 5 minute
3. Requirement of > 1 minute of positive pressure ventilation
4. 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. Perinatal asphyxia was said to be severe if ph was < 7.

Results

Out of 1167 admissions, 60 babies (5.1%) were diagnosed of birth asphyxia with APGAR score of </=6 at 5 minutes. 34 babies (56.66%) were inborn and 26 babies (43%) were outborn. Of the 60 babies, 42 (70%) were found to be males and 18 (30%) were females. Of the 60 babies, 80% (48 babies) were appropriate for gestational age, 16% (10 babies) were IUGR babies and 3% (2 babies) were large for gestational age.

Of the total, 42 babies (70%) were delivered vaginally, 15 babies (25%) were delivered by caesarian section and 3 babies (5%) underwent instrumental delivery.

Table 1. *Clinical Profile of Birth asphyxia*

	Number	Percentage
Sex		
Male	42	70%
Female	18	30%
Gestational age		
SGA	10	16%
AGA	48	80%
LGA	2	3%
Mode of delivery		
Vaginal	42	70%
Instrumental	3	25%
LSCS	15	5%
Risk factors		
MSAF	24	40%
PROM	7	11.66%
PIH	8	13.33%
Cord prolapse	3	5%
HIE stages		
Stage I HIE	10	53%
Stage II HIE	6	32%
Stage III HIE	3	15%
Total	19	
Ph		
Ph 7 to 7.2	39	65%
Ph < 7	21	35%

Out of the total, 24 babies (40%) had maternal history of MSAF, 7 babies (11.66%) had PROM, 8 babies (13.33%) had PIH and 3 babies (5%) has cord prolapse.

Nineteen babies (31.66%) developed HIE. Among these 19, majority, i.e. 10 babies (52.6%) developed stage I HIE, 6 babies (31.5%) stage 2 and 3 babies (15.7%) developed stage III HIE. All the three cases which went in for HIE stage III were mechanically ventilated and later expired. ABG analysis showed severe acidemia in 21 babies (35%). Out of the 21 babies with severe acidemia, 4 babies had history of MSAF (19%), 1 baby (4.7%) had cord prolapse and the remaining had no associated perinatal factors. All the babies who expired also had severe acidemia.

The mortality was 8% (5 cases). Of these, 60% (3 cases) were those diagnosed with HIE stage III and the remaining 40% (2 cases) died of MAS with early onset sepsis. Of these 1 baby with HIE stage III and 2 babies with MAS (i.e. 60%) were outborn babies. All these 5 babies at admission had severe acidemia and were mechanically ventilated.

Discussion

This study mainly determined the immediate outcome of asphyxiated babies. Frequency of perinatal asphyxia was 5.1% 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 [8]. 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 neurodevelopmental 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 [9].

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 is similar to a study done by Azam Multan [15].In this study, majority (80%) 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[15].

Among the maternal risk factors associated with perinatal asphyxia, MSAF was the major contributing factor, accounting for 40% of the cases .This study is comparable with the study done by Lalsclottir et al [16] 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.

Among the serious neonatal complications, HIE was commonest in asphyxiated neonates and mortality was higher in these neonates. It was seen that HIE stage I was the most common followed by HIE stage II and finally HIE stage III. All Babies with HIE stage I had recovered and had a good prognosis while those with Stage III had all expired.

The overall mortality rate was 8% which was lesser when compared to the study done by Etuk and Etak [17] in Nigeria where mortality rate was 14.3%. Out of the 5 expired babies, 3 babies (60%) had HIE stage III and 2 babies (40%) had MAS with early onset sepsis. Among these expired babies majority were outborn babies (60%). All these 5 babies had severe acidemia at admission and were mechanically ventilated immediately or within few hours of birth.

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. Further prospective and case control studies will be required, to get more scientific ideas about birth asphyxia and to develop strategies for its prevention and management. 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.

References

1. Neonatal Morbidity and Mortality. Report of the National Neonatal Perinatal Database. Indian Pediatr 1999; 36: 167-169.
2. Hoque M, Haaq S, Islam R. Causes of neonatal admissions and deaths at a rural hospital in KwaZulu-Natal, South Africa. South African Journal of Epidemiology and Infection 2011; 26(1): 26-29.
3. Lawn J, Shibuya K, Stein C. No cry at birth: global estimates of intrapartum stillbirths and intrapartum-related neonatal deaths. Bull World Health Organ. 2005; 83: 409-417.
4. Lawn JE, Manandhar A, Haws RA, Darmstadt GL. Reducing one million child deaths from birth asphyxia – a survey of health systems gaps and priorities. Health Res Policy Syst 2007; 5(1): 4.
5. Chandra s, Ramji s, Thirupuram S. Perinatal asphyxia. Multivariate analysis of risk factors in hospital births. Indian pediatr 1997; 34: 206-212
6. Futrakul S, Praisuwanna P, Thaitumyanon P. Risk factors for hypoxic ischemic encephalopathy in asphyxia-

ted newborn infants. J Med Assoc Thai 2006 89(3): 322-328.
7. Begum HA, Rahman A, Anowar S, Mortuza A, Nahar N. Long term outcome of birth asphyxiated infants. Mymensingh Med J 2006; 15(1): 61-65.
8. Chishty AL, Iqbal MA, Anjum A, Maqbool S. Risk factor analysis of Birth Asphyxia at the Children`s Hospital, Lahore. Pak Paediatr J 2002; 26: 47-53.
9. Black RE, Kelley L. Reducing perinatal and neonatal mortality. Child Health Research Project. Special Report 1999; 1-48
10. Shah GS, Singh R, Das BK. Outcome of newborns with birth asphyxia. JNMA J Nepal Med Assoc 2005; 44(158): 44-46.
11. Thornberg E, Thiringer K, Odeback A, Milson I. Birth Asphyxia; incidence, clinical course and outcome in a Swedish population. Acta Paediatr 1995; 84: 927-932
12. World Health Organization. Birth Asphyxia – Summary of the previous meeting and protocol overview. 11 June 2007.
13. Nizamani MA, Nizamani SM. Mortality in hospitalized neonates and young infants at pediatrics department Peoples Medical College Nawabshah. Pakistan Paediatrc J 2004; 28: 87-94.
14. Bhutta ZA, Ali N, Hyder AA, Wajid A. Perinatal and newborn care in Pakistan: seeing the unseen. In: Bhutta ZA, ed. Maternal and child health in Pakistan: challenges and opportunities Karachi: Oxford University Press; 2004.
15. Azam M, Malik F, Khan P. Birth asphyxia risk factors.The professional.2004; 11(4): 416-423.
16. Lalsclottir K, Dagbjartsson A, Thorkellsson T, Hardottric H; Birth asphyxia and Hypoxic Ischemic encephalopathy, incidence and obstetric risk factors. Laeknabladid 2007; 93(9): 595-560.
17. Etuk SJ, Etuk IS. Relative risk of birth asphyxia in babies of booked women who deliver in unorthodox health facilities in Calabor, Nigeria.Acta Tropica 2001; 79(2): 143-147.

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