J Nepal Health Res Counc 2016 May - Aug;14(33):77-80

Immediate Outcome of Hypoxic Ischaemic Encephalopathy in Hypoxiate Newborns in Nepal Medical College

Shrestha S,[1] Shrestha GS,[1] Sharma A[1]
[1]Department of Paediatrics, Nepal Medical College and Teaching Hospital, Jorpati, Kathmandu, Nepal.

ABSTRACT

Background: Birth asphyxia is the fifth major cause of under-five child deaths after pneumonia, diarrhoea, neonatal infections and complications of preterm birth. It is one of the important causes of neonatal mortality and morbidity accounting up to 30% of neonatal death in Nepal. It is also an important cause of long-term neurological disability and impairment. The mortality rate due to birth asphyxia is considered a good guide to the quality of perinatal care. This study was conducted to assess the rate of birth asphyxia, risk factors and outcome of the babies who were asphyxiated at birth.

Methods: : A prospective study was conducted during the period of one year from April 2013 to March 2014 in Nepal Medical College. All the term babies born during the period with APGAR score at 5 minutes of < 7 were considered to have birth asphyxia and included in the study. Details of maternal risk factors during pregnancy and labor were analyzed. The newborn babies were assessed for clinical features of hypoxic ischemic encephalopathy (HIE) and its immediate outcome.

Results: Out of 2226 live births, 47 (15.9%) newborns had birth asphyxia with the rate of 21.1/1000 live births. The mortality rate due to birth asphyxia was 4.25%. Meconium stained liquor was present in 31(65.96%) cases during delivery and prolonged rupture of membrane in 7(14.89%).

Conclusions: Early identification and close monitoring of high-risk mothers with maintaining partograph during labor help to reduce birth asphyxia.

Keywords: Birth asphyxia; hypoxic ischaemic enecphalopathy; newborn.

INTRODUCTION

Birth asphyxia is referred as the full-term baby who is not breathing and in poor condition at birth due to acute intrapartum events.[1] It is generally understood as the failure to establish breathing at birth. It may be moderate when Apgar score is between 4-6 or severe when the score is ≤ 4 at birth or 1 minute.[2] Abnormal neuro behaviour state following birth asphyxia is referred as hypoxic ischemic encephalopathy (HIE).[3] It is the fifth largest cause of under-five child deaths.[4] Global estimate for birth asphyxia related neonatal deaths varies from 0.7 to 1.2 million.[5] Although birth asphyxia is a major cause of early neonatal death, it is not featured on most lists of childhood killer.[6] A study done in Southern Nepal showed 30% of neonatal death is due to birth asphyxia.[7] The incidence was 19% in a previous study done in Nepal Medical College Teaching Hospital (NMCTH).[8]

METHODS

It is a prospective cohort study conducted in the Neonatal Intensive Care Unit of Nepal Medical College Teaching Hospital during the period of one year from April 2013 to March 2014. All the full term neonates who had APGAR score of <7 at 5 minutes were considered to have birth asphyxia and included in the study. The neonates who fulfilled the inclusion criteria were observed for the clinical signs and symptoms of HIE. The outcome of birth asphyxia in respect to different stages of HIE was determined as mild, moderate and severe according to Sarnat and Sarnat staging.[2]

The detailed antenatal and natal history of the mothers was taken including maternal age, gravida, antepartum

Correspondence: Dr Sabina Shrestha, Department of Paediatrics, Nepal Medical College & Teaching Hospital, Jorpati, Kathmandu, Nepal. Email: sabinajoshi1234@hotmail.com, Phone: +977-9841248583.

hemorrhage, eclampsia, prolong rupture of membrane, meconium stained liquor, the mode of delivery, mal-presentation, prolonged labour; which are considered as the risk factors for birth asphyxia .

The preterm babies and the babies with congenital anomalies were excluded from the study as they can be born with low apgar score even when they are not asphyxiated.

Ethical approval was obtained from Nepal Medical College Institutional Research/Ethical Sub-Committee. Data collection was done in the preformed data entry sheet. Proportion of various parameters were calculated manually.

RESULTS

During the period of study there were 2226 live births. Among them 295 (13.25%) babies were admitted to neonatal intensive care unit for various reasons. The most common causes for neonatal admissions were neonatal sepsis, respiratory distress, prematurity, and birth asphyxia. The numbers of babies admitted with birth asphyxia were 47, which accounts for 15.9% of total admissions in the neonatal unit. The babies who had birth asphyxia, 38 (80%) developed HIE I, 7(14.98%) developed HIE II and 2(4.26%) developed HIE III. One each died in HIE stage I and III (Table 1).

Table 1. Outcome of babies with HIE (n=47)

Stage of HIE	Recovered	Died	LAMA	Referred
I	34 (89.50%)	1 (2.60%)	2 (5.20%)	1 (2.60%)
II	4 (57.14%)	0 (0%)	2 (28.57%)	1 (14.20%)
III	0 (0%)	1 (50.00%)	1 (50.00%)	0 (0%)

Table 2. Obstetric profile associated with birth asphyxia

Determinants	Category	Number (%)
Maternal age	< 18 yrs	2 (4.26)
	18-35 yrs	43 (91.48)
	> 35 yrs	2 (4.26)
ANC visit	Yes	43 (91.48)
	None	4 (8,51)
Gestational age	37-42 wks	37 (78.72)
	> 42 wks	10 (21.27)
Gravida	Primi	21 (44.68)
	Multi	26 (55.31)
Mode of delivery	Normal	31 (65.95)
	Caesarean section	16 (34.04)
Birth weight	< 2500 gm	5 (10.64)
	2500-4000 gm	32 (68.09)
	> 4000 gm	10 (21.28)
Sex	Male	27 (57.45)
	Female	20 (42.55)
Complications during pregnancy	PROM	7 (14.89)
	MSL	31 (65.96)

DISCUSSION

Birth asphyxia is an important cause of neonatal mortality and long-term neurological disability and impairment. It is an important problem in developing countries accounting for more deaths than measles or malaria, yet receiving much less policy and programmatic attention.[1] Three important causes of perinatal deaths in Nepal are birth asphyxia, infection and premature birth/ low birth weight.[9] There is no gold standard test for birth asphyxia. Fetal distress, acidemia, APGAR score are other clinical markers of the process of potential intrapartum injury which have low positive predictive values.[10] One study done in Tanzania showed that approximately 50% of the asphyxiated infants were assigned a 5 minute APGAR score ≥ 7, which supports a long held notion that the Apgar score is an unreliable indicator of birth asphyxia.[11] The asphyxia rate in this Tanzanian study was 21.1/1000 live births. The result is similar to a study done at Dhulikhel Hospital where the rate of birth asphyxia was 26.95/1000.[12] In our study, birth asphyxia accounted for 15.9% of neonatal admission which is similar to the study done in a teaching hospital where 9% of the babies were born ashpyxiated.[13] In the studies done in Tanzania birth asphyxia rate varied from 26.8% to30.9%.[14,15] In another study the rate was as low as 3.97%.[16]

Neonatal death due to birth asphyxia was 4.25% in our study which is comparatively less than other studies done in Nepal where the rate varied from 6% to 15.67%.[12,13] Mortality rate due to birth asphyxia was apparently less in our study as 5 (10.63 %) of the patient who were critically ill left against medical advice. In some studies, mortality rate due to birth asphyxia was quiet high ranging from 27.2% to 61%.[11,14,15]

Mortality rate due to intrapartum asphyxia is generally considered as a guide to the quality of perinatal care. Using a routine system of surveillance six- fold difference in mortality rate due to intrapartum asphyxia was found depending on the hospital of birth.[17]

Risk factors of birth asphyxia has been divided into antepartum, intrapartum and fetal. Risk factors include

increasing or decreasing maternal age, prolonged rupture of membranes, meconium stained liquor, multiple births, non-attendance for antenatal care, low birth weight infants, malpresentation, augmentation of labour with oxytocin, ante-partum hemorrhage, severe eclampsia and pre-eclampsia, antepartum and intrapartum anemia.[18,19]

In our study most of the mothers (9 out of 10) whose newborn developed birth asphyxia were between 18 to 35 years. Other study also showed mothers at age of 20-25 years were at higher risk of developing birth asphyxia as compare to younger or elder mothers.[20] Premature rupture of membrane was present in 7 (14.89%) in this study which is comparable to other study where the incidenece was 20.58%.[12]

Meconium stained liquor seemed to be one of the important risk factors for birth asphyxia in our study, which was present in 31 (65.96%). Another study also showed meconium stained liquor as the major risk factor for birth asphyxia where it was present in 65% cases.[13] In one of the study all deliveries associated with thick meconium stained liquor developed meconium aspiration syndrome and meconium aspiration syndrome was associated with high incidence of low APGAR score at 1 and 5 minute.[21]

CONCLUSIONS

Neonatal mortality rate was relatively low in study.

REFERENCES

1. 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;5:4.

2. Singh M. Care of the newborn. 5th ed. New Delhi: Sagar Publications; 2002.

3. Adcock LM, Papile L. Perinatal asphyxia. In: Cloherty JP, Eichenwald EC, Stark AR, editors. Manual of neonatal care. Philadelphia: Lippincott Williams and Wilkins; 2008. p. 518-28.

4. Bryce J, Boschi-Pinto C, Shibuya K, Black RE. WHO Child Heatlh Epidemiology Reference Group. WHO estimates of the cause of death in children. Lancet 2005;365:1147-52.

5. Lawn J, Shibuya K, Stein C. No cry at birth: global estimates of intrapartum stillbirths and intrapartum-related neonatal deaths. Bull World Heatlh Organ. 2005;83:409-17.

6. World Health Organization. The world health report 2003: shaping the future. Geneva: World Health Organization; 2003. Available at: URL: http://www.who.int/whr/en/

7. LeClerq SC, Adhikari RK, Shrestha SR, Darmstadt GL. Risk factors for neonatal mortality due to birth asphyxia in Southern Nepal. Pediatr J. 2008;121:1381-90.

8. Shrestha S, Sharma A, Upadhyay S, Rijal P. Pernatal mortality audit. Nepal Med Coll J. 2010;12:257-9.

9. Manandhar DS. Perinatal death audit. Kathmandu Univ Med J. 2004;2:375-83.

10. Anon. Use and abuse of the Apgar score. Committee on fetus and newborn, American academy of pediatrics, and committee on obstetric practice, American college of obstetricians and gynecologists. Pediatrics. 1996;98:141-2.

11. Ersdal HL, Mduma E, Svensen E, Perlman J. Birth asphyxia: a major cause of early neonatal mortality in a Tanzanian rural hospital. Pediatrics. 2012;129:e1238-43.

12. Dongol S, Singh J, Shrestha S, Shakya A. Clinical profile of birth asphyxia in dhulikhel hospital: a retrospective study. J Nepal Paediatr Soc. 2010;30:141-6.

13. Shrestha M, Shrestha L, Shrestha PS. Profile of asphyxiated babies at Tribhuvan university teaching hospital. J Nepal Paediatr Soc. 2009;29:3-5.

14. Mmbaga BT, Lie RT, Olomi R, Mahande MJ, Kvale G, Daltveit AK. Cause-specific neonatal mortality in neontal care unit in northern Tanzania: a registry based cohort study. BMC Pediatr. 2012;12:116.

15. Juma A. Prevalence and Immediate Outcomes of Hypoxic Ischaemic Encephalopathy (HIE) Among Infants with Birth Asphyxia Admitted at the Neonatal ward of Muhimbili National Hospital in Dar es Salaam, Tanzania. Official publication of the Tanzania Medical Students' Association. 2007:17-9.

16. Boubkraoui ME, Kabiri M, Mrabet M, El-hassani A, Barkat A. Perinatal morbidity and mortality at Souissi Maternity Hospital, Rabat, Morocco. AIR. 2015;4:45-52.

17. Thomas SC, Guildea ZES, Stewart JH, Cartlidge PHT.

Responding to variations in mortality due to intrapartum asphyxia. Clinical Governance: An International Journal. 2003;8:296-9.

18. Kaye D. Anetnatal and intrapartum risk factors for birth asphyxia among emergency obstetric referrals in Mulago Hospital, Kampala, Uganda. East Afr Med J. 2003;80:140-3.

19. Majeed R, Memon Y, Majeed F, Shaikh NP, Rajar UD. Risk factors of birth asphyxia. J Ayub Med Coll Abbottabad. 2007;19:67-71.

20. Aslam HM, Saleem S, Afzal R, Iqbal U, Saleem SM, Shaikh MW, et al. Risk factors of birth asphyxia. Ital J Pediatr. 2014;40:94.

21. Swain P, Thapalia A. Meconium stained amniotic fluid – a potential predictor of meconium aspiration syndrome. J Nepal Paediatr Soc. 2008;28:3-6.