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Prevention of Neonatal Hypoglycaemia with Early and Exclusive Breast Feeding

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Abstract

Concern about hypoglycaemia in the new born infant is a common issue. Subsequent neurologic development may be affected in children experiencing hypoglycaemia in the neonatal period. This observational study enrolled 150 healthy term neonates who did not require admission to Neonatal Intensive Care Unit and were kept in post natal wards with mother. All neonates of mothers with complicated pregnancy such as diabetes, Hypertension and infections were excluded from the study. Glucose levels were monitored at 1, 2, 6, 12, 24 and 48 hrs of life. Hypoglycaemia was defined as blood glucose levels ≤ 46mg/dl. 24% of the screened neonates developed hypoglycaemia in 1st hour of life, which was corrected with immediate breast feeding only. 6% of the neonate and 3% of the neonate developed hypoglycaemia in 2nd and 6th hour of life respectively which was corrected with immediate breast feeding only. No formula feed supplementation was needed at any hour of life to correct hypoglycaemia. All mothers were assisted in positioning and attaching babies to the breast and were motivated to breast feed on demand. All neonates were able to maintain blood glucose levels in normal range at 12th, 24th and 48th hour of life with exclusive breast feeding only. We therefore concluded that with early and exclusive breast feeding healthy term neonates can maintain normal glucose levels with decreased risk of hypoglycaemia. Formula feed supplementation should be avoided to correct hypoglycaemia.

Keywords: *Neonatal Hypoglycaemia, Exclusive Breast feeding, Formula feed.*

Introduction

Concern about hypoglycaemia in the new born infant is a common issue. Subsequent neurologic development may be adversely affected in children experiencing hypoglycaemia in the new born period. During intrauterine life there is a continuous supply of glucose to foetus from mother through placental transfer. When the umbilical cord is cut at birth, this supply of maternal glucose ceases abruptly. Hence, the neonate must maintain its own supply of glucose during periods of fasting and when feedings are interspersed intermittently.(1) During the transition from continuous transplacental supply of glucose to the intermittent oral supply postnatally, episodes of hypoglycaemia can occur. (2)The developmental immaturity of adaptive mechanisms like gluconeogenesis, glycogenolysis and ketogenesis may further accentuate the occurrence of hypoglycaemia. (3)Healthy, full-term babies are functionally equipped to make the transition from their intrauterine into their extrauterine existence. Term neonates have homeostatic mechanisms which help to preserve enough energy substrate to vital organs like brain. (4) The American Academy of Pediatrics recommends that blood glucose screening be done for at risk or symptomatic neonates. They conclude that universal hypoglycemia screening is not required, inappropriate and may also be potentially harmful. (2)However, there have always been concerns that hypoglycemia without clinical signs might also lead to neuro developmental sequelae.(5,6)Some studies have reported that long term neurological sequelae may be seen to the extent of 35% of newborns with

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symptomatic hypoglycemia and upto 20% in those with asymptomatic hypoglycemia.[5,7]Therefore early detection of hypoglycemia in infants at risk is of utmost value to prevent the sequelae arising from neonatal hypoglycaemia.[8,9]Various factors influence newborn blood glucose concentrations even in healthy term newborns, such as birth weight, gestational age, presence or absence of disease, perinatal complications, mode of delivery and feeding behavior.[10,11]

Many hospital nurseries have the clinical practice of routine early glucose screening in healthy term neonates. This inappropriate glucose screening leads to misdiagnosis of pathological neonatal hypoglycaemia with aggressive treatment interventions harmful to successful establishment of positive maternal infant relationship.[12] So the present study was done to evaluate

1. The Incidence of hypoglycaemia with early and successful establishment of breast feeding in healthy term neonates,
2. Correlation between mode of delivery and blood glucose levels.
3. Need of formula feed supplementation to correct hypoglycaemia, if detected.

Material and Method

The prospective cohort study was conducted at JNU hospital from 15.08.17 to 31.10.18. Ethical clearance was obtained from the Institutional ethical board.

Inclusion criteria: term, normal birth weight, healthy, asymptomatic singleton neonates delivered by vaginal route or Caesarean section in JNU Hospital. All babies were exclusively breastfed as per the BFHI (baby friendly hospital initiative) hospital policy and roomed in with their mothers, with good sucking reflex and latching and had an uneventful neonatal course. Informed consent was taken from the parents of babies included in the study. Babies were selected prospectively using a random number table. The following neonates were excluded from the study: small for gestational age, babies with evidence of foetal malnutrition, large for gestational age, preterm, neonates with birth asphyxia, sepsis (proven/suspected), and neonates requiring admission in NICU / parenteral fluids / other modes of feed, neonates born to mothers with PIH / Diabetes. Counselling as well as assistance for exclusive breast feeding was done in all cases by nurses and treating doctors. Distribution of pamphlets and display of posters to promote breast feeding was also done in nurseries and post natal wards. Breast feeding was ensured within 30 minutes of birth in vaginal delivery and as soon as mother is comfortable after caesarean delivery(not later than 4 hrs) and there after every 2-3 hrs., including 2 night time feeds.[13] Under aseptic precautions heel prick was made and capillary blood glucose was screened using reagent strips and Glucometer(ACCU-CHEK Active, Germany) at 1, 2, 6, 12 and 48 hours of life, independent of feeding time.[14]For the study purpose hypoglycaemia was defined as blood glucose <46mg/dl.[15]Confirmation of blood glucose by sending the sample to the laboratory was done in case the blood glucose levels were below 46 mg/dl and the baby was treated with a trial of additional breast milk and glucose levels were monitored. The data was analysed using the SPSS (version 19 IBM). All the data was calculated applying descriptive statistics such as mean, percentage and Pearson correlation.

Results

We enrolled 150 new borns in our study. All the episodes of hypoglycaemia were seen in glucose values recorded at 1st, 2nd and 6th hours of life. There were no episodes of Hypoglycaemia documented in glucose values recorded at 12th, 24th and 48th hours of life. The average documented blood glucose levels at respective hours is documented in Table 1 and graph 1.

Breast feeding was initiated at the earliest possible time in all the neonates. 23% of the screened new-borns developed hypoglycaemia in 1st hour of life. 6% and 3% of the screened new-borns developed hypoglycaemia in 2nd and 6th hour of life. This documented hypoglycaemia was corrected with breast feeding alone. Intervention in form of formula feeds or intra venous glucose solution was not needed.

Though the P value was not significant, it was observed that there was influence of mode of delivery on the neonatal blood glucose levels. The mean blood glucose levels were high in babies delivered vaginally, at all the time points compared to the babies delivered by LSCS(table 2)

Table 1: Mean, Maximum and minimum Blood glucose levels at respective hours after birth

Variable	Mean	Standard deviation	Minimum	Maximum	Confidence Interval
1st Hr	57.09701	14.43972	34	107	57.1 ± 2.45
2nd Hr	67.58209	15.39107	34	110	67.59 ± 2.61
6th Hr	72.35075	15.13287	30	121	72.35 ± 2.56
12th Hr	78.90299	14.39676	48	147	78.90 ± 2.44
24th Hr	83.58209	15.29672	56	161	83.58 ± 2.59
48th Hr	87.10448	12.80349	53	128	87.11 ± 2.17

Graph 1

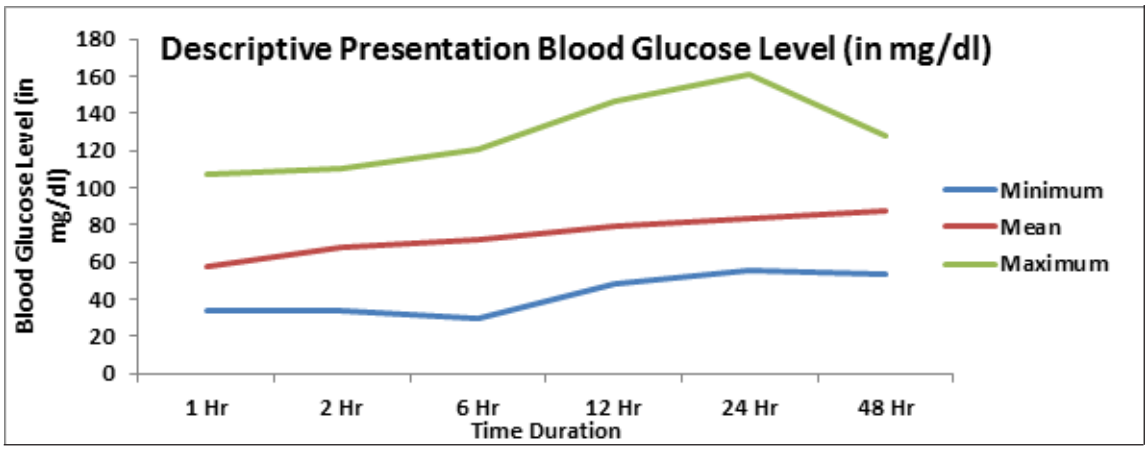

Table 2: (NVD –Normal Vaginal Delivery, LSCS –Lower Segment Caesarean Section)

Variables	Mean		Confidence Interval		P - Value
	NVD	LSCS	NVD	LSCS	
1st Hour	59.54	54.58	59.54 ± 3.44	54.58 ± **3.**37	0.1334
2nd Hour	69.57	65.53	69.57 ± **3.**51	65.53 ± **3.**80	0.09853
6th Hour	75.07	69.38	75.07 ± **3.**78	69.38 ± **3.**17	0.06872
12th Hour	80.85	76.17	80.85 ± **3.**16	76.16 ± **3.**05	0.06512
24th Hour	83.46	83.18	83.46 ± 2.66	83.18 ± 4.19	0.4574
48th Hour	86.93	87.14	86.93 ± 2.92	87.14 ± **3.**13	0.4621

Discussion

In our study, though the incidence of hypoglycaemia among exclusively breastfed new-borns was23%, 6% and 3% in 1st, 2nd and 6th hour of life. There was no severe hypoglycaemia which was not corrected with breast feeding. Yamauchi et al also reported no case of symptomatic hypoglycaemia in newborns breastfed early and frequently and cared by rooming in.[16]Anderson et al., noted that 38% of term uncomplicated infants had blood glucose < 2.6mmol/l (47 mg/dl) in Kathmandu, Nepal.[17]

Many studies have shown that early initiation of exclusive breast feeding meets the nutritional and metabolic needs of healthy, term neonates. Underfeeding alone does not cause symptomatic hypoglycaemia in these neonates. Establishment of normal breast feeding may be interfered, when unnecessary supplementation of healthy term neonates with water, glucose water or formula is done. [18,19,20] Healthy, term new-borns experience normal, self-correcting physiologic blood glucose nadir around 1-3 hours of life. This physiologic nadir may be misidentified by early routine glucose screening in these neonates and aggressive treatment of this hypoglycaemia is unnecessary and inhibits the establishment of maternal-infant interactions.[21]

Though the P value was not significant, it was observed that there was influence of mode of delivery on the neonatal blood glucose levels. The mean blood glucose levels were high in babies delivered vaginally, at all the time points compared to the babies delivered by LSCS (Lower Segment Caesarean Section). The caesarean section involves less stress for the baby and the possible impact of perinatal anaesthesia and shifting of mother from operation theatre may further delay breastfeeding and result in lower plasma glucose levels in babies delivered by LSCS compared to babies delivered vaginally as they are breastfed immediately or within half an hour after birth.[9,22] And also the babies delivered vaginally undergo stress which releases catecholamine which in turn increases the blood glucose.

Mothers those who deliver by LSCS have many factors that may interfere with the early initiation of breast feeding and lactation like pain, discomfort, post operative sedation and delayed intake of full oral feeds. These may contribute to hindrance with early effective latching and breast feeding. With motivation for early breast feeding, the blood glucose levels were maintained in normal range in newborns born by caesarean section.

Current guidelines of some forums recommend formula milk or dextrose infusion in asymptomatic hypoglycaemia only after single unsuccessful trial of feeding over 1 hr.[23,24] on the contrary, our study points out that most of the term neonates can be managed by supervised and repeated breast feeding rather than top feeding.

We conclude that newborns delivered either by vaginal delivery or caesarean section can maintain normal blood glucose levels with early and exclusive breast feeding alone. Top feeding supplementation in a routine should be discouraged as it is associated with increased risk of infections in newborns and also interferes with the development of positive mother child bonding.

Recommendation

Transient hypoglycaemia in the early neonatal period is a common adaptive phenomenon as the new born changes from the foetal state of continuous transplacental glucose transport to intermittent nutrient supply following cessation of maternal nutrition at birth. Subsequent to this misdiagnosis, further surveillance and unnecessary aggressive treatment interventions will follow that are potentially harmful to establishment of the love bonding between mother and the baby and leads to poor breast feeding experience.

Ethical Clearance- Taken from institutional Ethics committee, JNU Institute of Medical Sciences and Research Center, Jaipur.

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References

1. Jain V, Chen M, Menon RK. Disorders of carbohydrate metabolism. In: Gleason CA, Devaskar SU eds. Avery's Diseases of the newborn. 9th ed. Philadelphia: Saunders; 2012. pp. 1320-21. Haninger NC, Farley CL. Screening for hypoglycemia in healthy term neonates:
2. Stanley CA, Baker L .Effects on breastfeeding. J Midwifery Women's Health. 2001;46(5):292-01.
3. Eidelman AI. Hypoglycemia and the breastfed neonate. N Engl J Med. 1999;340(15):1200-01.

4 . Williams AF.Hypoglycemia in newborns: a review. Pediatr Clin North Am. 2001;48(2):377-87.

5. Bull. WHO. 1997;75(3):26190. Lubchenco LO, Bard H. Incidence of hypoglycemia in newborn infants classified

6. Singhal P.K,. Singh M, Paul V.K, et al. Neonatal hypoglycemia-clinical profile. Pediatrics 1971,47(5):831-38.

7. Glucose requirements. Indian. Pediatrics. 1992;29(2):167-71.

8. Cornblath M, Schwartz R, Aynsley-Green A, Lloyd JK. Hypoglycemia in infancy: The need for a rational definition. A Ciba Foundation discussion meeting. Pediatrics. 1990;85:834–7.

9. Kalhan S, Parimi P. Gluconeogenesis in the fetus and neonate. Semin Perinatol. 2000;24:94–106.

10. Kayıran SM, Gürakan B. Screening of blood glucose levels in healthy neonates. Singapore Med J. 2010;51:853–5.

11. Schaefer-Graf UM, Rossi R, Bührer C, Siebert G, Kjos SL, Dudenhausen JW, et al. Rate and risk factors of hypoglycemia in large-for-gestational-age newborn infants of nondiabetic mothers. Am J Obstet Gynecol. 2002;187:913–7.

12. Nancy C. Haninger, Cynthia L. Farley. Screening for hypoglycaemia in healthy term neonates: Effects on Breast Feeding. Journal of Midwifery and Women's health. 2001;46: 292 -301.a

13. Government of India. National guidelines on infant and young child feeding. Ministry of Human Resource Development, Department of Women and Child Development(Food and Nutrition Board) 2004; 11.

14. Chloherty JP, Lee-Parritz A. Diabetes Mellitus. In: Chloherty JP, Eichenwald EC, Hansen AR, Stark AR, editors. Manual of Neonatal Care. 7thed. Wolters Kluver, Lippincott Williams and Wilkins; 2011.p-17.

15. UNICEF. Guidance on the development of policies and guidelines for the prevention and management of hypoglycaemia of the newborn, 2011.

16. Yamauchi Y. Hypoglycaemia in healthy, full term, breastfed neonates in early days of life: preliminary observation. Acta Paediatr Jpn 1997;39(supple 1) s44-7.

17. Anderson S, Shakya KN, Shreshtha LN, Costello AM. Hypoglycemia : a common problem among uncomplicated infants in Nepal. Journal of Tropical Pediatrics. 1993,39(5): 273-77.

18. Eidelman AI. Hypoglycemia and the breastfed neonate. Pediatr Clin North Am. 2001;48(2):377-87.

19. Wight N, Marinelli KA. ABM clinical protocol#1: guidelines for glucose monitoring and treatment of hypoglycemia in breast fed neonates. Breast feeding medicine. 2006; 1(3): 178-84.

20. Metcoff J. Clinical assessment of nutritional status at birth. fetal malnutrition and SGA are not synonymous. Pediatr Clin North Am.1994;41(5):875-91.

21. Haninger NC, Farley CL. Screening for hypoglycemia in healthy term neonates: effects on breastfeeding. J Midwifery Women's Health. 2001;46(5):292-01.

22. Hawdon JM, Ward Platt MP, Aynsley-Green A. Patterns of metabolic adaptation for preterm and term infants in the first neonatal week. Arch Dis Child. 1992;67:357–65.

23. Narayan S, Aggarwal R, Deorari AK, Paul VK. Hypoglycaemia in the newborn. Indian J Pediatr. 2001;68:963-5.

24. Narayan S, Wazir S, Mishra S. Management of Neonatal Hypoglycaemia. NNF Clinical Practice Guidelines 2011; 66-67.