



STUDY OF INCIDENCE, CLINICAL PROFILE AND RISK FACTORS OF HYPOGLYCEMIA IN BREASTFED LATE PRETERM NEONATES

Pediatrics

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ABSTRACT

Background: The reported incidence of hypoglycemia varies with its definition. The clinical manifestations of hypoglycemia are nonspecific and similar to those of many disorders in newborn infants. However, its definition, clinical significance, and management remain controversial. Aim of this study is to evaluate the usefulness of regular monitoring of blood glucose in early diagnosis of hypoglycemia in breastfed late preterm neonates.

Methods: A total of 120 consecutively born breastfed late preterm neonates were studied and assessed for development of hypoglycemia against age of onset, symptom, gestational age and sex of the baby, parity and mode of delivery. Serial blood glucose was done at 0, 1, 3, 6, 12, 24, 48 and 72 hours of life to identify hypoglycemia. Blood glucose was estimated from heel prick capillary samples using glucometer. Association of both maternal and neonatal risk factors was studied in relation to hypoglycemia.

Results: The overall incidence of hypoglycemia was 15%. Out of 18 hypoglycemic babies 15(83.3%) developed symptoms and only 3(16.7%) were asymptomatic. Most (90%) of the hypoglycemia occurred on the first day of life. Babies born to primi mothers were more prone for hypoglycemia (25%). Highest incidence was seen in babies weighing less than 2 kg (66%). Symptoms of hypoglycemia included poor feeding (66%), lethargy (58%), jitteriness (41%), and weak cry (25%).

Conclusion: There is a significant incidence of hypoglycemia in late preterm babies in spite of being on breast feeds. Babies born to primiparous mothers are more prone for hypoglycemia. Also hypoglycemia was very high in babies having birth weight below 2 kg. Therefore it is very important to regularly monitor the blood glucose levels in all late preterm babies even if they are on exclusive breast feeding.

KEYWORDS

Late Preterm, Neonate, Hypoglycemia, Breast feeding.

INTRODUCTION

Neonatal hypoglycemia has been recognized for many years unfortunately, there is still no research basis or consensus regarding the definition of neonatal hypoglycemia, or who is at risk and under what circumstances, or when screening should be performed [1, 2]. But severe glucose deficiency can potentially lead to cerebral energy failure and impaired cardiac performance [3, 4, and 5]. Thus maintenance of glucose delivery to all organs is an essential physiological function. Normal term infants have sufficient alternate energy stores and capacity for glucose production from glycogenolysis and gluconeogenesis to ensure normal glucose metabolism during the transition to extra uterine life and early neonatal period. But this does not hold good for late preterm babies. The operational threshold for hypoglycemia is defined as "that concentration of plasma or whole blood glucose at which clinicians should consider intervention, based on the evidence currently available in literature"[1]. This threshold is currently believed to be a blood glucose value of less than 40mg/dl in both term and preterm babies. We therefore evaluated 120 late preterm breast fed neonates, and monitored their plasma glucose at 0, 1, 3, 6, 12, 24, 48 and 72 hours of life along with the symptoms at the onset of hypoglycemia with the aim of clarifying some of these issues.

METHODS

This study was conducted from September 2019 to February 2020 in the Department of Pediatrics Sri Krishna medical college and Hospital, Muzaffarpur. Hypoglycemia was defined as Glucometer blood sugar reading of less than 40mg/dl. 120 Late Preterm neonates born from September 2019 to February 2020 delivered by normal vaginal delivery or by caesarean section and who were on exclusive breast feed from birth were included in the study. A written informed consent was taken from either of the parents of the babies then these neonates were taken up for collecting blood samples at 0, 1, 3, 6, 12, 24, 48 and 72 hours. Samples were collected by heel prick (capillary blood). The glucose level was measured by Random Blood Glucose estimation initially by strip method using a Glucometer and in babies who show blood sugar levels <40 mg/dl, a second blood sample was sent to laboratory immediately, for estimation of whole blood sugar levels by oxidase method using autoanalyser. Neonates detected to have hypoglycemia during this study were transferred to Neonatal Intensive Care Unit (NICU) and managed according to the standard protocol. These babies

were subjected to detailed history taking, thorough clinical examination and investigations. After taking detailed history, the association of hypoglycemia against age of onset, symptom, gestational age, birth weight and sex of the baby, parity and mode of delivery were analysed. P values less than 0.05 were considered statistically significant. The statistical analyses were performed using SPSS version 10.0.

RESULTS

A total of 120 late preterm babies were assessed which included 62 boys and 58 girls. The overall incidence of hypoglycemia was 15%. Out of 18 hypoglycemic babies 15 (83.3%) developed symptoms, and 3 (16.4%) were asymptomatic. Hypoglycemia was slightly more in boys but the difference was not statistically significant [Table 1]. Majority of the hypoglycemia occurred on the first day (83.3%), and remaining 16.6% babies were hypoglycemic on 2nd day. No babies developed hypoglycemia on third day [Table 2]. Considering the intervals in hours, there was no hypoglycemia developed at birth and after 48 hours. At 1 hour 4 babies, at 3 hours 5 babies, at 6 hours 4 babies, at 12 hours 2 babies, at 24 hours 2, and at 48 hours 1 baby developed hypoglycemia. Considering the mode of delivery, out of 96 babies born by normal vaginal route, 12 (12.5%) had hypoglycemia and in 24 caesarian born babies, 6 (25%), developed hypoglycemia. [Table 3]. But this difference is statistically not significant. Out of 72 babies born to multiparous mothers, 6(8.3%) babies developed hypoglycemia and out of 48 babies born to primiparous mothers 12 (25%) developed hypoglycemia [Table 4], and this is statistically significant. In the gestational age group the highest incidence was seen in 34 week age group. There were 9(90%) out of 10 babies were hypoglycemic in this group. In the age group 35 weeks, 6 (12.5%) out of 48 babies and in 36 week age group 3(4.8%) out of 62 were hypoglycemic.

The incidence in babies weighing less than 2 kg was very high. There was 12 (50%) hypoglycemic babies out of 24 babies in this category, compared to 6 (6.25%) out of 96 babies weighing more than 2 kg [Table 5 and 6]. Majority of the hypoglycemic babies were symptomatic in our study. Out of 18 babies with hypoglycemia 15(83.3%) babies were symptomatic and out of symptomatic babies, 66% showed poor feeding, 58% were lethargic, 41% had jitteriness,

and 25% had weak cry. None had seizures or apnoea.

Table 1: Incidence Of Hypoglycemia

		Asymptomatic Hypoglycemia	Symptomatic Hypoglycemia	Total Hypoglycemic Babies
Male	62	2 (3.22%)	8 (12.90%)	10 (16.12%)
Female	58	1 (1.7%)	7 (12%)	8 (13.79%)
Total	120	3 (2.5%)	15 (12.5%)	18 (15%)

Table 2: Age Of On Set Of Hypoglycemia

Time	Hypoglycemia	
<24 hours	15 (83.33%)	P<0.01
24-48 hours	3 (16.66%)	
>48 hours	0	
Total	18 (100%)	

Table 3: Incidence In Relation To Mode Of Delivery

Type of delivery	No. of cases	Incidence of Hypoglycemia	P>0.05
Normal vaginal	96 (80%)	12 (12.5%)	
Caesarian section	24 (20%)	6 (25%)	
Total	120 (100%)	18 (15%)	

Table 4: Incidence of Hypoglycemia In Relation To Parity

Factor	No. of cases	Incidence of Hypoglycemia	P<0.05
Multiparus	72(60%)	6(8.33%)	
Primiparus	48(40%)	12(25%)	
Total	120	18	

Table 5: Incidence of Hypoglycemia in Relation to Gestational Age

Gestational Age (weeks)	Total Cases	Cases With Hypoglycemia	
		no	percentage
34	10	9	90%
35	48	6	12.5%
36	62	3	4.8%

Table 6: Incidence In Relation To Birth Weight

Birth weight	No. of cases	Hypoglycemic Babies	P<0.01
<2Kg	24	12(50%)	
>2kg	96	6(6.25%)	

DISCUSSION

In this study the incidence of hypoglycemia in late preterm newborns was 15%. The incidence of hypoglycemia shown by previous studies in preterm infants were 67% by Lubchenco and Bard [6], 4.3% by Chance & Brower [7], 15% by Fluge[8], 3-15% by Hawdon[9], 12.8% by Singhal et al[10]. Harris and Weston found 51% incident of hypoglycemia on study of high risk neonates [11]. Information on the incidence of neonatal hypoglycemia in developing countries is very limited. In 1993 Anderson et al conducted a cross sectional study of 226 full term, newborns in Kathmandu, Low birth weight and hypothermia were associated with hypoglycemia, which was present in 55% of those weighing < 2200 gms[12]. The wide variations in the incidence of hypoglycemia seen in the above studies can be attributed to variations in definitions of hypoglycemia, the frequency of blood glucose monitoring, birth weight and gestational age of the neonates as well as the feeding regimes advocated, which have evolved over the years. The incidence of hypoglycemia was highest (66%) on the first day of life. According to Hawdon et al in a study on preterm infants the mean blood glucose concentration was significantly lower on the first day than on subsequent days [9]. Likewise, in a study by MA Bhat et al on SGA babies, almost all the episodes of hypoglycemia occurred within 24 hours [13]. In our study hypoglycemia was seen only on day 1 or day 2 with no episodes afterwards, suggesting the need for constant monitoring of blood glucose values in the first 48 hours.

CONCLUSION:

The present study has shown that significant percentage of late preterm babies who are on breast feed developed hypoglycemia. Therefore it is very important to monitor regularly the blood glucose levels of late preterm babies who are on breast milk during the first 48 hours of life.

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