



Clinical Profile of Asymptomatic Hypoglycemia in Newborn Babies

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Abstract

INTRODUCTION: Hypoglycemia in neonates can be symptomatic and asymptomatic. Hypoglycemia is known to be associated with brain dysfunction and neuromotor developmental retardation in both symptomatic and asymptomatic cases. So this study was conducted to identify the relationship between babies more than 2 kg weight and incidence of Hypoglycemia and correlate it with maternal factors & with neonatal illness.

METHODOLOGY: This study was conducted at NICU of C.U.Shah medical college and hospital during the period March 2017 to August 2018. A total of 102 patients were included in the study. **RESULTS:** Overall incidence of hypoglycemia was 16.66%. Incidence was highest 14.7% at first hour of life followed by 7.8% at 6th hour of life. On 6th HOL hypoglycemia was higher in neonates delivered by LSCS as compared to neonates delivered by vaginal delivery. On 1st HOL primiparous mother delivered newborns had more incidence of hypoglycemia than multiparous mother delivered neonates. The most common neonatal risk factor associated with hypoglycemia was Large for gestational age (LGA) in 41.66% neonates. In antenatal risk factors the most common risk factors associated with neonatal hypoglycemia were gestational diabetes in 44.44% mothers.

CONCLUSION: The incidence of hypoglycemia clearly varies with definition chosen, population studied. The earliest marker for predicting hypoglycemia in first few hours of life would be cord blood sugar. The maximum risk for hypoglycemia is in first 24 hours and definitely not after 72 hours except, in persistent hypoglycemia due to rare causes like inborn errors of metabolism and hyperinsulinism.

Keywords: Clinical Profile, Asymptomatic Hypoglycemia, Newborn Babies More Than 2kg, neonatal hypoglycemia, neonatal risk factor, persistent hypoglycemia

Introduction

Glucose is essential for normal brain cell function. Normal blood glucose levels in the newborn period ensure proper neurological development. Therefore early detection of hypoglycemia in infants at risk is of utmost value to prevent the sequelae arising from neonatal hypoglycemia [1]. During the transition from continuous transplacental supply of glucose to the intermittent oral supply postnatally, episodes of hypoglycemia can occur. The developmental immaturity of adaptive mechanisms like gluconeogenesis, glycogenolysis and ketogenesis may further accentuate the occurrence of

hypoglycemia [2]. Blood glucose levels are frequently lower in newborn babies than in older children due to inadequate liver stores and impaired gluconeogenesis and impaired gluconeogenesis and glycogenolysis. The significance needs to be interpreted based on infant's size, gestation and clinical condition as well as availability of energy sources and ongoing energy demands [3]. Hypoglycemia in neonates can be symptomatic and asymptomatic. The most common symptoms such as jitteriness, convulsions, apathy, hypotonia, coma, refusal to feed, cyanosis, high pitched cry,

hypothermia are very nonspecific and especially in small sick infants, these symptoms may be easily missed. Therefore hypoglycemia must always be confirmed biochemically and by response to treatment. Hypoglycemia is known to be associated with brain dysfunction and neuromotor developmental retardation in both symptomatic and asymptomatic cases. [4] Hyperinsulinemic hypoglycemia is the most important cause of severe and persistent hypoglycemia after initial few days. The risk for brain injury and subsequent neurodevelopment handicap is significantly greater with hyperinsulinemic hypoglycemia. This study was conducted to identify the relationship between babies more than 2 kg weight and incidence of Hypoglycemia and correlate it with maternal factors & with neonatal illness.[5]

MATERIAL AND METHODS:

This study was conducted at C.U. Shah medical college and hospital – A tertiary care center, surendranagar, Gujarat. All New-borns more than 2kg weight admitted in NICU of CUSMC during the period March 2017 to August 2018 for cause other than hypoglycemic symptoms was taken as study population for this study. The type of the study is descriptive in nature. All newborns admitted in NICU with blood glucose level < 40 mg/dl in capillary blood collected with heel prick method, within 72hrs of life, more than 2kg weight, including newborns with respiratory distress, meconium aspiration, septicemia, hyperbilirubinemia, infant of diabetic mother, IUGR babies, infant on parenteral nutrition, large for gestational age babies were included in the study. New-borns with low birth weight (<2kg), presented with Hypoglycemia >72 hours of life and/or with symptoms of hypoglycemia within 72hrs of life were excluded from the study. Prior to the initiation of the study, a clearance was obtained from the Institutional P.G. Board of Studies. A written informed consent was obtained from the parents of each participant at enrolment. All newborn who came to NICU from day 1 to 14th day were taken into consideration. Patients' physical examination was done and under aseptic precautions heel prick was made and capillary blood glucose was screened using reagent strips and Glucometer. Statistical analysis was done by statistical software SPSS.

OBSERVATIONS

Table 1 shows incidence of hypoglycemia was 16.66%. All these episodes of hypoglycaemia were seen in the glucose value that was recorded at 1 hour, 6 hours of life. There were no episode of hypoglycaemia documented in the glucose values recorded at 24, 48 and 72 hours of life. Incidence was highest 15 (14.7%) at first hour of life followed by 8 (7.8%) at 6th hour of life

Table 2 shows that out of 102 neonates, 73 (71.56%) neonates were delivered by normal vaginal delivery (NVD) and 29 (28.44%) were born through lower segment caesarean section (LSCS). Considering the mode of delivery, on 1st HOL out of 73 babies born by normal vaginal route, 9 (12.32%) had hypoglycaemia and in caesarean section 6 (20.68%) developed hypoglycemia. The chi square test was used and p value is 0.282, so incidence of hypoglycaemia was higher in neonates delivered by LSCS as compared to neonates delivered by vaginal delivery but that is not significantly associated as p value is > 0.05. On 6th HOL out of 73 babies born by normal vaginal route, 3 (4.11%) had hypoglycaemia and in LSCS, 5 (17.24%) developed hypoglycemia. The chi square test was used and p value is 0.282, so incidence of hypoglycaemia was higher in neonates delivered by LSCS as compared to neonates delivered by vaginal delivery and that is significantly associated as p value is < 0.05.

Table 3 shows that there were 32 (31.37%) primiparous and 70 (68.62%) multiparous mothers in the study. On 1st HOL amongst the 32 primipara mothers, 8 neonates (25%) had hypoglycemia. Among neonates born to multiparous mothers, 7 had hypoglycemia (10%). So here primiparous mother delivered newborns had more incidence of hypoglycemia than multiparous mother delivered neonates. The chi square test was used between these groups and the p value was 0.047. As p value is < 0.05, so hypoglycemia significantly associated with primiparous mother. On 6th HOL amongst the 32 primipara mothers, 3 neonates (9.38%) had hypoglycemia. Among neonates born to multiparous mothers, 5 had hypoglycemia (7.14%). So here also primiparous mother delivered newborns had more incidence of hypoglycemia than multiparous mother delivered neonates. the chi square test was used between these group and the p was 0.697, as p value is > 0.05, so hypoglycemia was not significantly associated with primiparous mother.

Table 4 shows that the most common neonatal risk factor associated with hypoglycemia was Large for gestational age (LGA) in 5 (41.66%) neonates followed by IUGR in 5 (33.33%) neonates, feeding intolerance in 1 (25%), septicemia in 1 (16.66%), NNJ in 1 (16.66%) neonates, birth asphyxia in 2 (6.1%) and in cleft palate cleft lip, congenital malaria, imperforated anus, RDS, tracheoesophageal fistula, TTN there is no incidence of hypoglycemia reported.

Table 5 shows that in 14.06% neonates there is no maternal factor associated with hypoglycemia. In antenatal risk factors the most common risk factors associated with neonatal hypoglycemia were gestational diabetes in 4 (44.44%) mothers, premature rupture of membrane (PROM) in 2 (40%) mothers and there is no incidence of hypoglycemia in anemia, HBsAg reactive, herpes genitalis, malaria, obstructed labour, oligohydroamnios, pregnancy induced hypertension (PIH), preeclampsia, TORCH infection, short stature reported.

DISCUSSION

The exact incidence of NH is difficult to determine. The overall incidence of NH in present study was found to be 16.66%.while 14.7% neonates were with hypoglycemia comparing to study of Purnima Samayam et al. [2]. A higher incidence of hypoglycemia was seen in neonates in delivered to primi mothers (25%) against neonates delivered to multiparous mothers (7%) in 1st HOL , and also on 6th HOL ; in primiparous mother (9.38%) had hypoglycemia, Among neonates born to multiparous mothers, 5 had (7.14%) had hypoglycemia in our study. Also, a higher incidence of hypoglycemia was found in the LSCS group 20% & 17.24% than in the vaginal delivery group 12% & 4.11% at 1st and 6th HOL accordingly in our study; which is compared with study done by Purnima Samayam et al. [2]. Neonates delivered to primi mothers (23.07%) have higher incidence of hypoglycemia against neonates delivered to multiparous mothers (5.41%) and also a high incidence found to the LSCS group (10.7%) than in the vaginal delivery group (9.1%). Where as compared to Saifuddeen A.A et al. study [6] Incidence was 14.5% in normal vaginal delivery and 16.5% in caesarean born babies which was not significant in their study. In a study conducted by Sivaraman Thirumalaikumarasamy et al. there is a

higher incidence of hypoglycemia was seen in neonates delivered by multiparous mother (57%) against neonates delivered to the primiparous mother (43%) [3], where as in study conducted by Samayam et al in 100 neonates, higher incidence of hypoglycemia was seen in neonates in delivered to primi mothers (23.07%). [7] This observation was correlating with other studies and this may be probably because primiparous mothers are the ones who face more difficulties related to breast feeding. Hence babies born to this group of mothers should be monitored more closely for hypoglycemia.

The incidence of hypoglycemia with mode of delivery is compared with the study done by K K Divakar on neonates, where he found that the mode of delivery does not affect the blood glucose of the baby. [8] These results are also similar to a study by Hawdon et al, [9] where they did not find significant difference in the incidence of hypoglycemia between infants born by normal vaginal delivery and caesarean section in the first week of life. In study conducted by Sivaraman Thirumalaikumarasamy et al. there is a incidence of hypoglycemia 31% in normal vaginal delivered which is lesser than LSCS delivered babies hypoglycemia whose incidence was 44%. [3]

In our study, antenatal risk factors associated with neonatal hypoglycemia were gestational diabetes in 36% mothers which was highest and premature rupture of membrane (PROM) in 13% mothers. In comparison with study by Tiple Nishikant et al. the most common antenatal risk factor associated with NH were diabetes in 36%, toxemia of pregnancy in 24%, PROM in 16%, fever in 12%, dysuria in 8% and APH in 4% mothers. [10] In C.D.Dhananjayaa , B.Kiran's study Maternal risk factors the development of hypoglycemia in babies born to mother with gestational diabetes and diabetes mellitus were (40%), prolonged labour (15.35%) and eclampsia (40%).[4]

In our study, most common neonatal risk factor associated with hypoglycemia was Large for gestational age (LGA) in 41.66% neonates, followed by IUGR (SGA) in 31.25% neonates, feeding intolerance in 25%, septicemia in 16.66% neonates, birth asphyxia in 6%. In compare to P. Indira, S. Jyotsna's study septicemia 8%, birth asphyxia 5.7%,

hypothermia 3%, respiratory distress 2.5%, SGA 1.8% is seen [11]

Kitzmilller et al (1978); 15 in his study reported 30-40% of IDMs babies were hypoglycemic [12]. Singhal et al (1992); 9 in his study reported 23.8% of IDMs (infant of diabetic mother) babies were having hypoglycemia [13]. Dhananjaya et al (2011); 10 state that incidence of hypoglycemia was 40% in IDMs babies and 40% in babies with toxemia as antenatal risk factor which is comparable with our study.[14]

CONCLUSION:

Overall incidence of hypoglycaemia was 16.66%. All these episodes of hypoglycaemia were seen in the glucose value that was recorded at 1 hour, 6 hours of life. Incidence was highest 15 (14.7%) at first hour of life followed by 8 (7.8%) at 6th hour of life. Out of 102 neonates, 73 (71.56%) neonates were delivered by normal vaginal delivery (NVD) and 29 (28.44%) were born through lower segment caesarean section (LSCS). Incidence of hypoglycaemia was higher in neonates delivered by LSCS as compared to neonates delivered by vaginal delivery but that is not significantly associated as p value is > 0.05. Incidence of hypoglycemia was higher in neonates delivered by LSCS as compared to neonates delivered by vaginal delivery and that is statistically significant. (p < 0.05). On 1st HOL, there were 32 (31.37%) primiparous and 70 (68.62%) multiparous mothers in the study. Primiparous mother delivered newborns had more incidence of hypoglycemia than multiparous mother delivered neonates. And p value was statistically significant. On 6th HOL, primiparous mother delivered newborns had more incidence of hypoglycemia than multiparous mother delivered neonates. It was not statistically significant. The most common neonatal risk factor associated with hypoglycemia was Large for gestational age (LGA) in 5 (41.66%) neonates. In antenatal risk factors the most common risk factors associated with neonatal hypoglycemia were gestational diabetes in 4 (44.44%) mothers.

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TABLES

Table 1: Incidence of hypoglycemia at 1st & 6th hour of life

Hypoglycemia status (1 st hour)	Frequency	Percent (%)
Absent	87	85.3%
Present	15	14.7%
Total	102	100.0%
Hypoglycemia status (6 th hour)		
Absent	94	92.2%
Present	8	7.8%
Total	102	100.0%

Table 2: Incidence of hypoglycemia on 1st & 6th hour of life in relation to mode of delivery

Mode of delivery	Hypoglycemia status on 1 st HOL		Total	P value
	Absent	Present		
LSCS	23(79.32%)	6(20.68%)	29(28.44%)	P=0.282
NVD	64(87.68%)	9(12.32%)	73(71.56%)	
Total	87(85.3%)	15(14.7%)	102(100%)	
LSCS	24(82.76%)	5(17.24%)	29(28.43%)	P= 0.026
NVD	70(95.89%)	3(4.11%)	73(71.57%)	
Total	94(92.16%)	8(7.84%)	102(100%)	

Table 3: Incidence of hypoglycemia on 1st & 6th hour of life in relation to Parity

Parity	Hypoglycemia status on 1 st HOL		Total	P value
	Absent	Present		
Multiparus	63(90%)	7(10%)	70(68.62%)	P=0.047
Primiparus	24(75%)	8(25%)	32(31.38%)	
Total	87(85.29%)	15(14.71%)	102(100%)	
Parity	Hypoglycemia status on 6 th HOL		Total	P= 0.697
	Absent	Present		
Multiparus	65(92.86%)	5(7.14%)	70(68.63%)	P= 0.697
Primiparus	29(90.62%)	3(9.38%)	32(31.37%)	
Total	94(92.16%)	8(7.84%)	102(100%)	

Table 4: Relationship of NH with respect to neonatal risk factors

Neonatal risk factors	Hypoglycemia status		Total
	Absent	Present	
Birth asphyxia	31(93.9%)	2(6.1%)	33
Cleft palate cleft lip	3	0	3
Congenital malaria	3	0	3
Early onset septicaemia	1	0	1
Feeding intolerance	5(83.34%)	1(16.66%)	6
Imperforated anus	3(75%)	1(25%)	4
IUGR	1	0	1
LGA	10(66.7%)	5(33.33%)	15
MAS	7(58.34%)	5(41.66%)	12
NNJ	7	0	7
RDS	5(83.33%)	1(16.66%)	6
Tracheoesophageal fistula	9	0	9
TTN	1	0	1
Total	4	0	4
	87(85.3%)	15(14.7%)	102

Table 5: Relationship of NH with respect to maternal risk factors

Antenatal risk factor	Hypoglycemia status		Total
	Absent	Present	
Gestational diabetes	5(55.56%)	4(44.44%)	9
PROM	3(60%)	2(40%)	5
No risk factors	55(85.94%)	9(14.06%)	64
Anemia	8	0	8
Herpes genitalis	1	0	1
Malaria	1	0	1
Obstructed labour	2	0	2
Oligohydroamnios	1	0	1
PIH	3	0	3
Preeclampsia	2	0	2
Short stature	2	0	2
TORCH infection	2	0	2
HbsAg reactive	2	0	2
Total	87(85.30%)	15(14.70%)	102