Original Research Article

Clinical profile of hypoglycemia among newborn babies in a private medical college and hospital

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Abstract

Background: Glucose is a major energy source for fetus and neonate. Hypoglycemia during the first few days after birth is defined as blood glucose <40 mg/dL.[1] Hypoglycemia is recognized as a common problem in newborn babies, but its incidence is difficult to ascertain due to the controversy over definition.[2] Najati *et al.* study, the incidence was 6.1 p.c among newborns admitted to neonatal intensive care unit (NICU) during the first 24 hours of life.[3] **Aim and Objectives:** To estimate the proportion of hypoglycemic cases among newborn babies admitted to neonatal intensive care unit and to study the clinical profile of neonates with hypoglycemia. **Material and Methods:** A hospital based, analytical cross-sectional study was conducted in Department of Pediatrics at Shadan Institute of Medical Sciences, Teaching hospital and research center, Hyderabad, Telangana for a period of 6 months from 1st April 2019 to 30 September 2019. Prior to the initiation of the study, ethical clearance was obtained from the Institutional Ethics Committee and written consent was taken from the parents of the respective newborns. The study subjects included all newborns who were admitted in the NICU with blood glucose less than 40 mg/dL during the study period. **Results:** In the present study, a total number of 489 cases were admitted to NICU among them 8.3 p.c newborns were with hypoglycemia. **Conclusion:** Neonates with Pregnancy Induced Hypertension and Prematurity as risk factors should be identified and their blood glucose levels should be carefully monitored to prevent neurological damage by initiation of early treatment.
Keywords: Hypoglycemia, Newborn.

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INTRODUCTION

Glucose is a major energy source for fetus and neonate. Hypoglycemia during the first few days after birth is defined as blood glucose <40 mg/dL.[1] In preterm infants, repeated blood glucose levels below 50 mg/dL may be associated with neurodevelopmental delay.[1] Hypoglycemia is recognized as a common problem in newborn babies, but its incidence is difficult to ascertain due to the controversy over definition.[2] Najati *et al.* study, the incidence was 6.1 p.c among newborns admitted to neonatal intensive care unit (NICU) during the first 24 hours of life.[3] Hypoglycemia in the neonate can be described as transient or persistent (recurrent) and in either or both of these cases as symptomatic or asymptomatic.[4] Risk factors for neonatal hypoglycemia include maternal factors (Diabetes, Hypertension/eclampsia, Dextrose infusion, Beta agonists, Sulfonylureas); fetal factors (Prematurity, Small for gestational age, Large for gestational age, Congenital heart disease, Microphallus); perinatal/postnatal factors (Prolonged fasting, Cold stress, Sepsis, Asphyxia, Polycythemia).[5] A variety of signs may be seen in cases of severe or prolonged hypoglycemia that include jitteriness, lethargy, weak suck, temperature instability, seizures and most of the findings are non-

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specific. Many of these signs can result from other common neonatal disorders including hypocalcemia, sepsis, intra cranial haemorrhage.[6] Neonatal glucose concentrations decrease after birth, to as low as 30 mg/dl during the first 1 to 2 hours after birth, and then increase to higher and relatively more stable concentrations, generally above 45 mg/dl by 12 hours after birth.[7] Blood glucose should be routinely estimated during high risk conditions like Small-for-date babies, smaller of the discordant twins, Infants of diabetic mother or those with a birth weight of above 90th percentile for their period of gestation, Preterm infants <35 weeks of gestation, Rhesus hemolytic disease of the newborn, babies with prolonged hypoxia, hypothermia, polycythemia, septicemia, cardiac failure and suspected metabolic disorders, Infants born to mothers receiving therapy with terbutaline, propranolol and oral hypoglycemic agents, Infants on IV fluids or total parental nutrition, babies with symptoms suggestive of hypoglycemia. The World Health Organization and the American Academy of Pediatrics recommend that early and exclusive breastfeeding is safe to meet the needs of healthy term infants, for not to develop symptomatic hypoglycemia which is implied as a result of underfeeding.[8]

MATERIAL AND METHODS

A hospital based, analytical cross-sectional study was conducted in Department of Pediatrics at Shadan Institute of Medical Sciences, Teaching hospital and research center, Hyderabad, Telangana for a period of 6 months from 1st April 2019 to 30 September 2019. Prior to the initiation of the study, ethical clearance was obtained from the Institutional Ethics Committee and written consent was taken from the parents of the respective newborns. The study subjects included all newborns who were admitted in the NICU with blood glucose less than 40 mg/dL during the study period. Newborns with a history of maternal drug intake like Oral hypoglycemic agents, beta sympathomimetics; Babies with Congenital malformations; History of Maternal glucose infusions during delivery; Neonatal cord injuries; Inborn errors of metabolism were excluded from the study. All babies who were admitted to neonatal intensive care unit (NICU), both inborn and referred babies were subjected to estimation of Random Blood Glucose initially by a strip method using a Glucometer. For babies who had blood sugar levels less than 40 mg/dl, a second blood sample (venous) was drawn and sent to laboratory immediately, for whole blood sugar level estimation by an oxidase method using autoanalyzer. Babies with whole blood sugar levels < 40 mg/dl in both the samples are taken up for study. These babies were subjected to detailed history taking, clinical examination and investigations; findings were recorded in the proforma. After taking a detailed history, various associated maternal risk factors like gestational diabetes mellitus, pregnancy induced hypertension, antepartum hemorrhage, twin pregnancy and neonatal risk factors like prematurity (Assessed by Ballard's score), IUGR (Assessed by growth charts), sepsis (Septic screen and blood culture and sensitivity), birth asphyxia (APGAR score <7) were recorded. These babies were managed and treated as per the protocol of the institute. The babies were observed for signs and symptoms of hypoglycemia. The data was collected, entered in Microsoft excel-2013 and analyzed using SPSS version-22 (trial). Data was presented in percentages, proportions and figures etc.

RESULTS

In the present study a total number of 489 cases were admitted to NICU among them, the newborns with hypoglycemia were 41 (8.3 p.c). Among the forty one study subjects with hypoglycemia, 24 (58.5 p.c) were females and 17 (41.5 p.c) were males. In figure-1 the distribution of cases with gestational age reports that 58.54 p.c (24) of hypoglycemic babies were in preterm, 39.02 p.c (16) were term babies and 2.44 p.c (1) was post term baby respectively. In figure-2 the distribution of cases with gestational age and symptoms reports that asymptomatic hypoglycemia was present among 66.67 p.c (16) preterm babies and in case of term babies, symptomatic hypoglycemia was present among 68.75 p.c (11) respectively. In figure-3 distribution of cases according to symptoms of hypoglycemia reports that out of 20 symptomatic cases, about 14 (70 p.c) cases had a symptom of jitteriness, 12 (60 p.c) cases had convulsions, 10 (50 p.c) cases had apneic spells and 7 (35 p.c) cases had lethargy respectively. Table-1 reports that the mean blood sugar level in symptomatic cases was 26.17 ± 4.004 mg/dL and asymptomatic cases was 30.64 ± 5.113 mg/dL, there exists a statistically significant difference between the mean blood sugar levels of symptomatic and asymptomatic cases. Table-2 reports that the among maternal risk factors, PIH was the major maternal risk factor that accounts for 26.8 p.c (11) cases followed by twin pregnancy 17.07 p.c (7), antepartum hemorrhage 12.1 p.c (5) and diabetes mellitus in 7.31 p.c (3) of cases respectively. Table-2 also reports that the among neonatal risk factors, prematurity was the major maternal risk factor that accounts for 53.6 p.c (22) cases followed by IUGR 43.9 p.c (18), birth asphyxia 19.5 p.c (8) and sepsis in 4.8 p.c (2) of cases respectively.

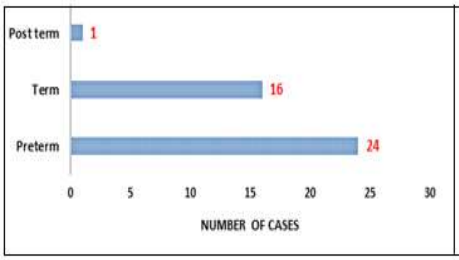

Figure 1

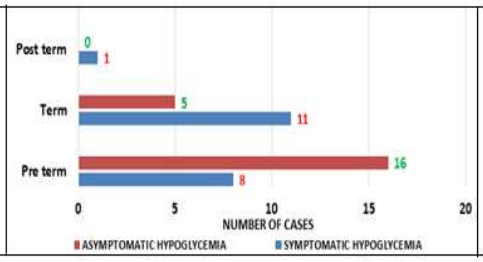

Figure 2

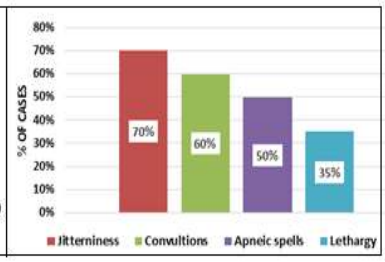

Figure 3

Figure 1: distribution of cases according to gestational age; **Figure 2:** Distribution of cases presenting with and without symptoms according to gestational age; **Figure 3:** Distribution of cases according to symptoms of hypoglycaemia

Table 1: Comparison of mean blood sugar levels with standard deviations between symptomatic and asymptomatic cases

NUMBER OF CASES (n = 41)	MEAN BLOOD SUGAR LEVELS (mg/dL) WITH STANDARD DEVIATIONS	t	p- value
Symptomatic (n = 20)	26.17 ± 4.004	3.100	**<0.005**
Asymptomatic (n = 21)	30.64 ± 5.113		

Table 2: Distribution of cases according to maternal and neonatal risk factors

MATERNAL RISK FACTORS	NUMBER OF CASES	%
Diabetes mellitus	3	7.31
Antepartum hemorrhage (APH)	5	12.19
Pregnancy induced hypertension (PIH)	11	26.82
Twin pregnancy	7	17.07
NEONATAL RISK FACTORS	**NUMBER OF CASES**	**%**
Birth asphyxia	8	19.51
Intra uterine growth restriction (IUGR)	18	43.90
Prematurity	22	53.65
Sepsis	2	4.87

DISCUSSION

Neonatal hypoglycemia is a common metabolic disorder which occur due to inability to maintain glucose homeostasis. Overall prevalence of hypoglycemia among newborn depends on the definition, diagnostic criteria, diagnostic methods and other factors. Due to this reason there exists a wide range of difference in incidence of hypoglycemia ranging from 4 to 15 p.c respectively. Hypoglycemia may be symptomatic, asymptomatic and undiagnosed. In the present study, majority of the newborn were preterm babies followed by term babies, then post term babies. These results were similar to the study done by Dorina Rodica Burdan *et al.*.[11] In the present study, majority of the newborns were with asymptomatic hypoglycemia. These results were similar to the study done by CK Sasidharan *et al.*[12]

Table 3: Comparision of incidence of hypoglycaemia among newborns with various studies

STUDY	NO. OF BABIES ADMITTED TO NICU	NO. OF BABIES WITH HYPOGLYCEMIA	INCIDENCE
Present study	489	41	8.38%
Dhananjay CD and Kiran B *et al.*[9]	366	38	10.38%
N. Najati *et al.*[10]	852	52	6.1%

CONCLUSION

Neonatal hypoglycemia constitutes about 8.3 p.c of total neonatal intensive care unit (NICU) admissions. Neonatal hypoglycemia is associated with various maternal and neonatal risk factors. Pregnancy Induced Hypertension and Prematurity are the most commonly occurring risk factors. Hence neonates with these risk factors should be identified and

their blood glucose levels should be carefully monitored. To prevent neurological damage, initiation of early treatment is must.

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