Original Research Article

A Study to Assess the Clinic-Demographic Profile and Prevalence of Hypoglycemia among Neonates Admitted in NICU

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Abstract

Aim: The aim of the present study was to assess the clinical profile of hypoglycemia in newborn and to determine the prevalence of hypoglycemia among neonates admitted in NICU.

Methods: This study was conducted as a prospective observational study, among newborns with hypoglycemia admitted in NICU, Department of Pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India after obtaining informed consent. Sample size was 200 cases with hypoglycemia.

Results: 60% were male as compared to females and 70% were preterm babies. 40% were babied delivered by NVD and 92% had singleton babies. 60% belonged to pimipara and 80% had low birth weight. 85% had maternal risk factors and 15% had no maternal risk factors. 27% had IDM co-morbidity in neonatal. Out of 200 children with hypoglycemia 121 (60.5%) were asymptomatic and 79 (39.5%) presented with symptoms. The common symptoms were poor feeding, lethargy, jitteriness, convulsions, irritability, hypotonia and cyanosis. We found prematurity and IUGR the most associated neonatal risk factors for neonatal hypoglycaemia. Significantly low Sugar levels (p value <0.005) were noticed in symptomatic hypoglycemic babies when compared to asymptomatic hypoglycemic babies.

Conclusion: Hypoglycemia in neonates can have variable presentations indicating the need for detailed and thorough examination for evidence of hypoglycemia. Identification of risk factors of hypoglycemia and proper monitoring blood glucose levels should be done to plan early treatment and prevent neurological damage.

Keywords: Clinical profile, Hypoglycemia, Neonates, Prevalence, Risk factors

Introduction

Hypoglycaemia is the most common metabolic condition occurring in newborn. It is influenced by factors like birth weight, gestational age, perinatal complications and feeding behaviour. [1-3] Incidence of hypoglycaemia varies with the definition, population feeding and the type of glucose assay. [4,5] The overall incidences vary from 1 to 5/1000 live births and seen about 17% of babies that are hospitalised in NICU. [6] The definition of hypoglycemia in newborn has remained controversial due to lack of significant correlation between plasma glucose concentration, clinical symptoms and its long term sequelae. [7] Operational threshold for hypoglycemia is defined as the concentration of plasma or whole blood glucose at which clinician should consider intervention based on currently available evidence in literature. [8] Operational threshold has been defined as blood glucose level less than 40 mg/dl (plasma glucose level less than 45mg/dl). [9] WHO

defined hypoglycaemia as blood glucose level less than 45 mg/dl. [10]

The clinical spectrum of hypoglycaemia is not specific. It can be symptomatic or asymptomatic. Symptoms are convulsion, lethargy, hypotonia, high pitched cry, cyanosis and are non-specific and can be missed easily especially in sick neonate. [11-13] Neonatal hypoglycaemia can be easily treated if recognized early. Untreated hypoglycaemia whether symptomatic or asymptomatic results in neurological impairment and mental retardation of varied severity. [14,15] Although, the groups of babies at the highest risk of hypoglycaemia are well-defined, the optimal frequency and duration of screening for hypoglycaemia and the threshold at which treatment would prevent brain injury remains uncertain. [16] Since hypoglycaemia is common in high-risk neonates, screening of blood glucose levels along with clinical monitoring is important in the diagnosis and proper management of these

neonates to reduce morbidity and mortality. The most common sequelae of hypoglycaemia are disturbances of neurological development and intellectual function, although minor deficits, especially spasticity, ataxia and seizure disorders can also occur. A recent Indian study had concluded that neonatal hypoglycaemia was the most common aetiology of remote symptomatic infantile onset epilepsy. [17]

The aim of the present study was to assess the clinical profile of hypoglycemia in newborn and to determine the prevalence of hypoglycemia among neonates admitted in NICU.

Materials and Methods

This study was conducted as a prospective observational study, among newborns with hypoglycemia admitted in NICU, Department of Pediatrics, Nalanda Medical College and Hospital, Patna, Bihar, India for 7 months

Sample size was 200 cases with hypoglycemia. All newborns born at Nalanda Medical College and Hospital, Patna, Bihar, India and admitted in NICU with blood glucose less than 45 mg/dl were included in the study. Exclusion criteria include babies born outside RGGW and CH, Parents who are not willing to participate in the studies, newborns with persistent hypoglycemia which require enzyme and genetic evaluation. In neonates with risk factors blood sugar was screened at 2, 6, 12, 24, 48 and 72 hours of life or whenever symptoms suggestive of hypoglycemia developed in any neonates and for critically sick neonates blood sugar was screened in every 6 hour in active phase of illness.

Any neonate with blood glucose level less than 45 mg/dl were analyzed for maternal risk factors, neonatal risk factors and course in the NICU.

Results

Table 1: Demographic variables of neonates with hypoglycaemia

Variables	Number (%)
Gender	
Male	120 (60%)
Female	80 (40%)
Gestation	
Preterm	140 (70%)
Term	60 (30%)
Mode of delivery	
Normal	80 (40%)
LSCS	120 (60%)
Singleton vs multiple births	
Singleton	186 (92%)
Twin	10 (5%)
Triplets	4 (2%)
Parity	
Primipara	120 (60%)
Multipara	80 (40%)
Birth weight	
LBW (<2.5 KG)	160 (80%)
Birth weight classification	
LGA	8 (4%)
AGA	70 (35%)
SGA	122 (61%)
Maternal risk factors	170 (85%)
Gestational hypertension	76 (38%)
Gestational diabetics	24 (12%)
Gestational hypertension and diabetics	18 (9%)
Overt diabetics	8 (4%)
Seizure disorder	10 (5%)
Seizure disorder and Gestational hypertension	12 (6%)
Heart disease	8 (54%)
Heart disease and Gestational hypertension	8 (4%)
SLE and other connective tissue diseases	6 (3%)
No Maternal risk factors	30 (15%)
Neonatal co-morbidities	
IDM	54 (27%)
Sick neonates (Perinatal asphyxia, sepsis, shock)	32 (16%)

60% were male as compared to females and 70% were preterm babies. 40% were babied delivered by NVD and 92% had singleton babies. 60% belonged to pimipara and 80% had low birth weight. 85% had maternal risk factors and 15% had no maternal risk factors. 27% had IDM co-morbidity in neonatal.

Table 2: Descriptive analysis of clinical features in the study population

Clinical Features	Frequency	Percentage
Irritability	2	4
Poor feeding	40	20
Jitteriness	10	5
Seizures	8	4
Lethargy	4	2
Lethargy, poor feeding	12	6
Hypotonia, poor feeding	2	1
Cyanosis	1	0.5
No symptoms	121	60.5

Out of 200 children with hypoglycemia 121 (60.5%) were asymptomatic and 79 (39.5%) presented with symptoms. The common symptoms were poor feeding, lethargy, jitteriness, convulsions, irritability, hypotonia and cyanosis.

Table 3: Comparison of mean blood sugar levels with standard deviations between symptomatic and asymptomatic cases

Number of Cases	Mean blood sugar levels (mg/dL) with standard deviations
Symptomatic	26.17±4.004 mg/dl
Asymptomatic	30.64± 5.113 mg/dl

We found prematurity and IUGR the most associated neonatal risk factors for neonatal hypoglycaemia. Significantly low Sugar levels (p value <0.005) were noticed in symptomatic hypoglycemic babies when compared to asymptomatic hypoglycemic babies.

Discussion

Neonatal hypoglycemia has been recognized for many years, although with time there have been wide swings of opinion regarding the definition of the condition, its clinical significance and its optimal management. In the era when routine postnatal management involved the withholding of feeds from healthy infants for up to 24 hours, even longer in sick or smaller babies, many were found to have low blood glucose concentrations and this became accepted as a normal finding. [18] The reported incidence of hypoglycemia varies with its definition, but it has been estimated to occur in approximately 16% of large-for-gestational- age (LGA) infants and 15% of small-for-gestational-age (SGA) babies. [19]

60% were male as compared to females and 70% were preterm babies. 40% were babied delivered by NVD and 92% had singleton babies. 60% belonged to pimipara and 80% had low birth weight. 85% had maternal risk factors and 15% had no maternal risk factors. 27% had IDM co-morbidity in neonatal. Gestational hypertension was the most common risk factor present in many studies. [20-25] In 2004, a study done in Kerala by Sasidharan CK et al., shows that gestational hypertension was the most significant maternal risk factor associated with neonatal hypoglycaemia, accounting for 16.5%, which is lower than our study possibly because of the cohort of high-risk mothers in our tertiary level teaching hospital. Also, the ratio of preterm and term neonates with hypoglycaemia in our study was similar to this Kerala study. [25]

Out of 200 children with hypoglycemia 121 (60.5%) were asymptomatic and 79 (39.5%) presented with symptoms. The common symptoms were poor feeding, lethargy, jitteriness, convulsions, irritability, hypotonia and cyanosis. Out of the all risk factors observed by recent Indian [26] & western [27] studies it was also seen that PIH was the most significant maternal risk factor associated with hypoglycemia accounting for about 16.5% and 15.62% of cases respectively. Out of the neonatal risk factors studied in the present study we found that prematurity (57.5%) was the most significant risk factor followed by Intrauterine growth restriction (IUGR) (35%), birth asphyxia (15%), sepsis (7.5%). We found prematurity and IUGR the most associated neonatal risk factors for neonatal hypoglycaemia. Significantly low Sugar levels (p value <0.005) were noticed in symptomatic hypoglycemic babies when compared to asymptomatic hypoglycemic babies.

Neonatal hypoglycaemia is a common metabolic disorder in newborns and is a preventable cause of brain damage. The goal of management is to prevent or minimise brain injury but the optimal frequency and duration of screening for hypoglycaemia, as a well as the threshold at which treatment would prevent brain injury still remains uncertain.

Conclusion

Hypoglycemia in neonates can have variable presentations indicating the need for detailed and thorough examination for evidence of hypoglycemia. Identification of risk factors of hypoglycemia and proper monitoring blood glucose levels should be done to plan early treatment and prevent neurological damage.

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