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NEONATAL HYPOGLYCEMIA;

Presenting pattern and risk factors of neonatal hypoglycemia.

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ABSTRACT… Objective: To determine the presenting features and assessment of the neonates with hypoglycemia along with maternal and neonatal risk factors for hypoglycemia. **Subjects & methods:** All consecutive neonates with hypoglycemia admitted were included in the study. Demographic characteristics of the mothers and their babies, past medical history and illnesses during pregnancy especially that, of diabetes mellitus and duration, details of the management of labour and place of delivery, birth asphyxia as well as history of feeding prior to admission. All the risk factors and clinical features were documented. **Results:** From presenting features neonates were most common temperature instability 32% of the neonates. Maternal risk factors were as Maternal diabetic mellitus, Intrapartum administration of glucose , Maternal drug uses as: (Beta blockers, Oral hypoglycemic agents, Valproate), family history of metabolic disorder and without any factors with the percentage 13%, 17%, (15%, 08%, 07%) , 27% and 13% respectively. Neonatal risk factors of the patients were found low birth weight 49%, small gestational age 26%, macrosomia 11%, respiratory distress 32%, sepsis 20%, hypothermia 25%, congenital cardiac abnormalities 4%, endocrine disorder 4%, family history of metabolic disorder 7%, inborn errors of metabolism 4%, rhesus hemolytic disease 5%, erythroblastosis fetalis 1%, inadequate feeding 35% and neonates without factors were 6%. **Conclusions:** The risk factors associate with neonatal hypoglycemia are, low birth weight, small gestational age, macrodome, respiratory distress, sepsis, hypothermia and inadequate feeding , and maternal risk factors associate to neonatal hypoglycemia was Eclampsia, Maternal diabetic mellitus, and maternal drug uses.

Key words: Newly born babies, hypoglycemia, and risk factors.

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INTRODUCTION

Neonatal hypoglycemia is important because it is a common disorder, which is associated with brain injury and poor neuron developmental outcome[1]. Although the definition of neonatal hypoglycemia is controversial,[2] thresholds for treatment have been established[3] and are used in clinical practice[4]. Neonatal hypoglycemia affects as many as 5 to 15% of otherwise healthy babies[3,5] and is widespread in resource poor countries[6]. Furthermore, prevalence of the disorder is increasing because of the increasing incidence of preterm birth[7] and maternal factors, such as diabetes[8] and obesity,[9] which can pre-dispose babies to hypoglycemia. Little evidence exists to guide treatment and repeated calls have been made to develop evidence-based guidelines for the treatment of neonatal hypoglycaemia[3,10]. Treatment choices vary dependent on the baby's birth weight and gestational age. In late preterm and term Babies, initial management focuses on feeding and increased monitoring, requiring repeated and painful blood tests. If blood glucose concentration remains low, admission to the newborn intensive care unit for intravenous glucose is usually indicated[11]. Such admission usually means that mother and baby are separated, which can delay the establishment of breastfeeding. In addition to intravenous glucose, 40% dextrose gel is another less commonly used treatment. Potential advantages of dextrose gel are that it keeps mother and baby together while

treatment is provided, is easy to administer, and is low cost. Oral carbohydrate is first line treatment for low blood glucose concentrations in the con scious diabetic child or adult,[12] and sublingual glucose is as effective as intravenous glucose for treatment of hypoglycemic children with malaria[13]. Two small observational studies[14] in babies aged between 28 weeks' and 42 weeks' gestation have reported improvement in blood glucose concentrations after massaging of 200 mg/kg dextrose gel into the buckle mucosa. However, a randomized trial,[15] in which 75 babies with hypoglycemia were randomly assigned to a feed or feed plus 400 mg/kg dextrose gel on the first day after birth, showed no differences in blood glucose concentrations at 15 minutes and 30 minutes after treatment. Furthermore, formula-fed babies assigned to the dextrose gel group suckled a smaller volume during the subsequent feed than did those in the feed alone group[15]. Therefore the purpose of study to determine the present condition and assessment of the neonates with hypoglycemia including with maternal and neonatal risk factors, at paeds ward of Liaquat university hospital Hyderabad.

MATERIAL AND METHODS

This prospective study contains 100 neonates and was carried out at Liaquat university hospital with the duration of 1st July 2013 to 31 December 2013. All consecutive neonates with hypoglycemia admitted into the unit during the study period were included. Information obtained and entered into a Performa included demographic characteristics of the mothers and their babies, past medical history and illnesses during pregnancy especially that of diabetes mellitus and hypertension, duration and details of the management of labour and place of delivery (for referred babies), birth asphyxia as well as history of feeding prior to admission. Anthropometry, rectal temperature and clinical features were documented. One milliliter of blood was taken into dry fluoride oxalate containing specimen bottle and immediately processed in the laboratory for plasma glucose estimation using the glucose oxidase reaction method. Other investigations were done as indicated. Hypoglycemia, for this study was defined as plasma glucose level of 2.5 mmol/l. Babies with hypoglycemia were managed initially with a bolus of 10 percent intravenous Dextrose-in-water at 2 ml/kg. This was followed with 10 percent Dextrose-in-water at a rate of 6 mg/kg/min (86 monitoring blood glucose levels. Data was analyzed on SPSS program version 16.0.

RESULTS

Total of 100 neonates included in the study 81 patients were delivered in the hospital whereas 19 babies were received in the outdoor. Out of 100 patients 56 were male and 44 were female newborn. According to the gestational age less than 37 weeks were 49%, normal gestational age was found in 41% and above 41 weeks of gestational age was noted in the 9% of the neonates. As the assessment of the cases with low birth weight neonates were 26%, birth asphyxia 19%, neonatal sepsis 12%, meconeum aspiration syndrome were noted in 2% and delayed feeding was found in the 41% of the neonates. Table-I

Characteristics	Frequency	%
Receiving status		
From hospital	89	89%
Out door	11	11%
Gestational age (in wks)		
< 37 weeks	49	49%
38 – 41 weeks	41	41%
> 41 weeks	09	09%
Gender		
Male	56	56%
Female	44	44%
Assessment		
Low birth weight	26	26%
Birth Asphyxia	19	19%
Neonatal Sepsis	12	12%
Meconeum Aspiration Syndrome	02	02%
Delayed Feeding	41	41%

Table-I. Basline characteristics of babies with hypoglycemia (n=100)

Clinical presenting features of neonates were as, jitteriness 38%, cyanosis 23%, tachypnea 2%, hypotonic 7%, apnoea 4%, temperature instability 32%, seizures 3% and lethargy was noted in the 35% of the neonates. Table-II

Signs	Frequency	%
Jitteriness	38	38%
Cyanosis (blue coloring)	23	23%
Tachypnea	02	02%
Hypotonic	07	07%
Apnoea	04	04%
Temperature instability	32	32%
Seizures	03	03%
lethargy	35	35%

Table-II. Clinical signs (100)

Maternal risk factors for neonatal hypoglycemia were as eclampsia, Maternal diabetic mellitus, Intrapartum administration of glucose , Maternal drug uses as: (Beta blockers, Oral hypoglycemic agents, Valproate), family history of metabolic disorder and without any factors with the percentage 22%, 13%, 09%, (15%, 08%, 07%) , 05% and 13% respectively. Table-III

Risk factors	Frequency	%
Eclampsia	22	22%
Maternal diabetic mellitus	13	13%
Intrapartum administration of glucose	09	09%
Maternal drug uses as:		
>Beta blockers	15	15%
>Oral hypoglycaemic agents	08	08%
>Valproate	07	07%
Family history of metabolic disorder	05	05%
Without factors	13	13%

Table-III. Maternal risk factors for hypoglycemia (n=100)

Neonatal risk factors of the patients were found low birth weight 49%, small gestational age 26%, macrosomia 11%, respiratory distress 32%, sepsis 20%, hypothermia 25%, congenital cardiac abnormalities 4%, endocrine disorder 4%, family history of metabolic disorder 29%, inborn errors of metabolism 4%, rhesus hemolytic disease 5%, erythroblastosis fetalis 1%, inadequate feeding 35% and neonates without factors were 6%. Table-IV.

Neonatal risk factors	Frequency	%
Small for gestational age	49	49%
Low birth weight	26	26%
Macrosomia	11	11%
Respiratory distress	32	32%
Sepsis	20	20%
Hypothermia	25	25%
Congenital cardiac abnormalities	04	04%
Endocrine disorders	04	04%
Family history of metabolic disorders	07	07%
Inborn errors of metabolism	04	04%
Rhesus haemolytic disease	05	05%
Erythroblastosis fetalis	01	01%
Inadequate feeding	35	35%
Without factors	06	06%

Table-IV. Neonatal risk factors for hypoglycemia (n=100)

DISCUSSION

Hypoglycemia is the most common metabolic problem occurring in newborns. In majority of cases, it merely reflects a normal process of adaptation to extra uterine life. The term “hypoglycemia” refers to a reduction in the glucose concentration of the circulating blood. In the present study 81% neonates delivered in the hospital while 19% neonates admitted by outdoor. Male were more found as compare to females (56% male and 44% female) newborn. In the study of C.D.Dhananjaya et al. he found majority of the males[16]. Gestational age was noted in our study, less than 37 weeks neonates were 49%, with normal gestational age was found in 41% and above 41 weeks of gestational age was noted in the 9% of the neonates. The gestational age of babies with hypoglycemia ranged between 26 to 44 weeks and hypoglycemia was significantly most common in preterm babies than term and posterm babies[17]. On the assessment of the cases with low birth weight neonates were 26%, birth asphyxia 19%, neonatal sepsis 12%, meconeum aspiration syndrome were noted in 2% and delayed feeding was found in the 41% of the neonates. These results may compare with a study from Lahore of Munir akmal[18].

In the present study clinical presenting features of neonates were most common, jitteriness 38%, cyanosis 23%, temperature instability 32% and lethargy 25% of the neonates. In the study of C.D.Dhananjaya et al. clinical presentation of patients with hypoglycemia, in this most common features were lethargy 81.25%, and jitteriness 75%

while respiratory abnormalities 37.5%, cyanosis 18.75% and seizures 31.25%[16]. These features also correlated with the study of P.K. singhal et al[19].

Maternal risk factors for neonatal hypoglycemia in this study most common were Eclampsia 22%, Maternal diabetic mellitus 13% and maternal drug uses as: (Beta blockers 15%, Oral hypoglycemic agents 08%, Valproate 07%) total 30%. While in the study of Dorina Rodica Burdan et al, showed rupture of the membrane and urinary tract infections maternal risk factors for newborn hypoglycemia[20]. According to Cornblath M et al, maternal risk factor for neonatal hypoglycemia is arterial hypertension,[21] which is correlated with eclampstic patients of our study.

Neonatal risk factors of the patients were found in the present study, low birth weight 49%, small gestational age 26%, macrodome 11%, respiratory distress 32%, sepsis 20%, hypothermia 25%, congenital cardiac abnormalities 4%, endocrine disorder 4%, family history of metabolic disorder 7%, inborn errors of metabolism 04%, rhesus hemolytic disease 5%, erythroblastosis fetalis 1%, inadequate feeding 35%, and neonates without factors were 6%. In the study of Dorina Rodica Burdan et al, he found risk factors for neonatal hypoglycemia as, perinatal hypoxia (40.31%), neonatal hypothermia (31.45%), respiratory distress (40.31%), sepsis (12.09%), neonatal shock (9.67%) and polycytemia (8.87%)[20]. Pathogenic mechanism in hypoxia, hypothermia, shock, respiratory distress and sepsis is the increase of the consumption or the decrease of the production of the glucose[3].

CONCLUSIONS

In the conclusion of this study mostly, low birth weight, short gestational age, respiratory distress, birth asphyxia and sepsis decrease the glucose level. The risk factors associate with neonatal hypoglycemia are, low birth weight, small gestational age, macrodome, respiratory distress, sepsis, hypothermia and inadequate feeding , and maternal risk factors associate to neonatal hypoglycemia was Eclampsia, Maternal diabetic mellitus, and maternal drug uses. To prevent the above risk factors, the deliveries should be done in tertiary care Hospital setup and proper antenatal care can reduce the number of premature deliveries.

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