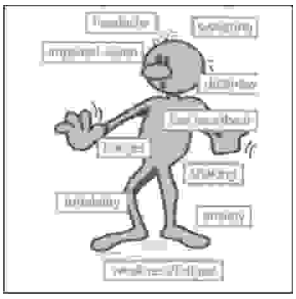
ORIGINAL PROF-1159

RISK FACTORS ASSOCIATED WITH NEONATAL HYPOGLYCEMIA



DR. MUNIR AKMAL LODHI, MBBS, FCPS
Child Specialist
Combined Military Hospital, Lahore

DR. GHULAM SHABBIR, MBBS, FCPS
Child Specialist
Combined Military Hospital,
Quetta

DR. NASIR ALI SHAH, MBBS, FCPS
Child Specialist
Combined Military Hospital, Chunian

ABSTRACT ... Objectives: Recurrent episodes of neonatal hypoglycemia are strongly associated with long term physical and neuro-developmental deficits. (1) Moreover in neonates hypoglycemia can be overlooked as it may have nonspecific symptoms only. (2) This study was therefore carried out to analyse the risk factors associated with neonatal hypoglycemia and to evaluate the risk factors which have predictive value in its diagnosis. .**Design:** Based case control study. **Period:** Six months from January 2005 to June 2005. **Setting** CMH Pano Aqil. **Material and Methods**: 385 newborns were studied. Newborns of both civilians as well as military personnel were included in the study. 11 newborns were excluded. Out of remaining 347 patients 101 were found to be hypoglycemia. Five risk factors (low birth weight, Birth Asphyxia, Neonatal sepsis, Meconeum aspiration syndrome delayed feeding) strongly and independently predicated the risk of hypoglycemia. **Results:** The most common associated risk factor was low birth weight (47.47%) followed by delayed feeding (46.29%). Blood sampling for glucose estimation was done at birth / admission at 6 hours, 12 hours, 24 hours and 48 hours. Test was initially performed by glucometer, the reading which were confirmed by laboratory testing in border line case. **Conclusions:** In neonates with associated risk factors it is cost affective to carry out blood glucose levels at the time of birth and follow up readings taken as indicated by clinical progress later on.

Keywords: Neonatal Hypoglycemia, Risk Factors.

INTRODUCTION

In neonates there is not always an obvious correlation between blood glucose concentration and the classic clinical manifestation of hypoglycemia. The absence of symptoms dose not indicate that glucose concentration is normal. There is evidence that hypoxemia and ischemia may potentiate the role of hypoglycemia in causing permanent brain damage. Therefore the lower limit of accepted normality of blood glucose level in newborn infants with associated illness that already impairs cerebral metabolism has not been determined. The definition of clinically significant hypoglycemia is one of the most confused and contentious issue in contemporary[3]. Many authorities now urge that any value

of blood glucose less than 50 mg/dl in neonates be viewed with suspicion and vigorously treated[4].

Blood glucose concentration in the fetus is approximately 15 mg / dl less than the maternal glucose concentration. Glucose concentration normally decreases in the immediate postnatal period. With concentrations below 40-50 mg/dl being considered indicative of hypoglycemial.. By three hours, the glucose concentration in normal tem babies stabilized between 50/80mg/dl should be considered abnormal. The two most commonly encountered groups of term newborn infants at high risk of neonatal hypoglycemia are IDMs and IUGR infants.

Glucose has a central role in fuel economy and is a source of energy storage in the form of glycogen, fat and protein. Glucose, an important source of energy provides 38 mol of adenosine triphosphate (A TP) / mol of glucose oxidized. It is important for cerebral energy metabolism because it is usually the preferred substrate and its utilization accounts for nearly all the oxygen consumption in brain[5].

Cerebral transport of glucose is a carrier - mediated, facilitated diffusion process that is dependent on blood glucose concentration. Deficiency of brain glucose transporters can result is seizures because of low cerebral glucose concentration while blood glucose is normal. To maintain the blood glucose concentration and prevent it form precipitously falling to levels that impair brain function, an elaborate regulatory system has evolved[4].

The defense, against hypoglycemia is integrated by the automatic nervous system and by hormones that act in concert to enhance glucose production through enzymatic modulation of glycogenolysis and gluconeogenesis while simultaneously limiting peripheral glucose utilization[2].

Almost half a century after it was first described, neonatal hypoglycemia is a frequently observed phenomena particularly among high risk population such as preterm infants and low birth weight neonates. Irreversible neuronal damage is one of the most devastating affects of neonatal hypoglycemia.. Hypoglycemia is one of the most common clinical care issues facing the neonatal practitioner[5]. Neonatal hypoglycemia may cause many acute and chronic complications and may be observed in infants with no clear factors. It may cause posterior cerebral lesions, abnormal findings, at neurologic examination, and symptomatic epilepsy, most frequently occipital lobe epilepsy[6].

PURPOSE OF STUDY

To study the predictive value of associated risk factors like low birth weight, delayed onset of feeding, neonatal sepsis, fetal distress, gestational age, birth asphyxia and meconium aspiration syndrome in hypoglycemia neonatal.

MATERIALS AND METHODS

This is an observational study of 347 neonatal to evaluate the frequency of hypoglycemia and associated risk factors with the predictive value towards hypoglycemia carried out at Combined Military Hospital Pano Aqil over a period of six month from January 2005 to June 2005.

INCLUSION CRITERIA

All babies delivered in obstetric unit of Combined Military Hospital Pano Aqil or received in the outdoor with in 6 hours of birth were included in the study.

EXCLUSION CRITERIA

All newborns of diabetic mothers and newborns with gross dysmorpism or obvious chromosomal were excluded from the study.

METHODS

the data was collected for pertinent variables through a prescribed proforma. Following information was collected.

I. Gestational age.
II. Mode of delivery and any associated problems like distress, birth asphyxia and mecoeum aspiration syndrome.

III. Time of onset of feeding. Delayed feeding was defined if started later than 2 hours after birth.
IV. Weight. Low birth was defined as weight below 2.5 kg at birth.
V. Blood glucose estimation was carried out at the time of birth / admission at 6 hours, at 12 hours, at 24 hours and at 48 hours.
VI. Blood glucose estimation was carried out on glucometer and later on confirmed from laboratory in borderline cases.
VII. Blood glucose values of 40 mg/dl (2.2 mmol/L) or less were considered as indicative of hypoglycemia .
VIII. Any associated illness like neonatal sepsis.

RESULTS

A total of 358 neonates were screened. 319 patients were delivered in the hospital whereas 39 babies were received in the outdoor. 11 patients were excluded from the study as 6 of them were born to diabetic mothers. I was of trisomy 21 and 4 had gross dysmorphic features. Out of 347 patients, 148 were male and 199 were female newborn.

Table-I. Frequency of Neonatal hypoglycemia in different Risk Factors

Risk Factors	No of Patients having hypoglycemia	Total patients with hypoglycemia	%age
Low birth weight Birth	47	101	46.53%
Birth Asphyxia	7	101	6.93%
Neonatal Sepsis	5	101	4.95%
Meconeum Aspiration Syndrome	8	101	7.92%
Delayed feeding	25	101	24.75%
No risk factor	9	101	8.91%

Table-II. Percentage of different conditions leading to hypoglycemia

Associated conditions	No of Patients	No of patients having hypoglycemia	% age
Low birth weight	99	47	47.47%
Birth Asphyxia	17	7	41.17%
Neonatal Sepsis	12	5	41.66%
Meconeum Aspiration Syndrome	35	8	22.85%
Delayed Feeding	54	25	46.29%
Full term babies without factors	130	9	6.92%

Out of 347 patients who completed the study 101(29.1%) were found to have hypoglycemia recorded at least one time out of 4 readings 6 had hypoglycemia in all the 4 readings.

Out of 101 patients who had hypoglycemia 47(46.53%) were low birth weights babies, 7(06.93%) had birth asphyxia, 5(4.95%) had neonatal sepsis, 8(7.92%) had meconecum aspiration syndrome and 54(53 .46%) had delayed feeding, 09(8.91%) of the hypoglycemia had no

associated risk factors.(Table I and II).

DISCUSSION

Incidence of hypoglycemia varies with definition, population, methods and timing of feeding and type of glucose assay (serum levels are higher than whole blood values). In our study whole blood values were taken at birth and at intervals later on. Early feeding decreased the incidence whereas prematurity, hypoxemia, maternal diabetes and intrauterine growth retardation increase the incidence of hypoglycemia[4].

In our study 101(29.1%) out of 347 neonates had hypoglycemia. This incidence is higher as compared to that in united states. The difference is because of three times low birth weight rate, 5 to 20 times higher sepsis rate and higher premature birth rate in Pakistan than USA. This is in conformation with studies by Pildes RS etal[7].

Five variables (low birth weight, birth asphyxia, meconeum aspiration, neonatal sepsis, and delayed feeding) strongly and independently predicted the risk of neonatal hypoglycemia. They collectively accounted for 92(91.08%) of the 101 hypoglycemia neonatal. However 09(8.91%) hypoglycemia neonatal had no risk factors and were normal symptomatically. This result is similar to the study carried out by Sasidharan ck et al[8]. Thus this condition may occur in neonatal with nuclear risk factors. This observation is similar to study carried out by Oalgic N et al[1]. In 31 hypoglycemia neonatal more than one variable were co-existent.

CONCLUSION

Hypoglycemia is a common problem in apparently normal asymptomatic babies. It is more consistently present when above mentioned risk factors exist. Mandatory blood glucose screening in babies with any of these risk factors serves as an easy and cost effective measure for identification of this condition.

REFERENCES

1. Oaglic N, Ergenekon E, Soysal S et al. **Transient neonatal hypoglycemia longterm effects on neurodevelopmental outcome.** J Paediatric Endocrinal Metab 2002 Mar. 15 (3); 319-24.

2. William W.H Anothony RH, Myron JL, Judith Ms. **Current pediatric Diagnosis and Treatment**, 15th Ed MC Grow Hill, 2001.

3. Com blath M; Rawdon William S AF; Aynsley- Green A; **Controversies regarding definition of neonatal hypoglycemia peadiatric,** 2002 Nov... 105 (5) 11415.

4. Behrman, Kliegmas, Jenaion. **Nelson textbook of paediatrics,** 16th ed Saunders 2000.

5. Cowett PM; Long ead J L, **Neonatal glucose metabolism; differential diagnosis, evaluation, and treatment of hypoglycemia.** Neonatal Netw 2002 Jun; 24-9.

6. Caraballo RH; Sakr D; Mozzi M etal, **symptomatic occipital lobe epilepsy following neonatal hypoglycemia.** Paediatric Neural 2004 Jul 31 (I); 24-9.

7. Pildes RS, Pyati SP, **Hypoglycemia and hyperglcemia in tiny infants,** Clin perinatol 1986; 13: 2351-75.

8. Sasidharan ck; Gokul E; Sabitha S. **Incidence and risk factors for neonatal hypoglycemia** in Kerala India Ceylon Med J 2004 Dec; (4) 110-3.