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Maternal and Neonatal Risk Factors and Outcome of Neonatal Hypoglycemia in a Tertiary Care Teaching Hospital

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ABSTRACT

BACKGROUND:- Neonatal hypoglycemia is most common form of metabolic disturbance in newborn. Severe neonatal hypoglycemia leads to neurological damage, mental retardation, epilepsy, personality disorder, impaired cardiac performance and muscle weakness.

OBJECTIVE:- To study the correlation of neonatal hypoglycemia with different maternal risk factors and outcome of hypoglycemia in newborn.

METHOD:-Neonates admitted in postnatal ward & neonatal ICU of Hi-tech Medical College, Bhubaneswar during study period. They were clinically assessed . Perinatal and maternal history was recorded and analyzed . After discharge, they were asked to come for follow up for neurodevelopmental assessment.

STUDY DESIGN:- Hospital based prospective study at Hi-tech Medical College and Hospital from 1st january 2021 to 31st december 2021.

RESULT:- 125 neonates having hypoglycemia who were in postnatal ward & also admitted neonates in NICU of hi-tech medical college, Bhubaneswar. Among them male:56, female:69 . In total ,105(84%) were preterm. The mean birth weight 1780 gms. Mean birth length 41 cm. 48(38.4%)were very low birth weight(<1500gms). 57 (45.60%) were LBW(1500-2500gm). 12 babies (9.6%) were above 2500 gms.Mean gestational age was 32wks 5days, HIE found in 5(4%), infection 33(27%), RDS 13(10.4%), ICH in 3 (2.4%), Death in 3(2.40%).

CONCLUSION:- Neonatal hypoglycemia is a significant factor of neonatal mortality. Infection, low birth weight and low gestational age were most commonly associated with neonatal hypoglycemia. Paediatrician must be aware of risk factors of hypoglycemia in newborns that can be both maternal and neonatal. Though neonatal hypoglycemia is treatable but can be fatal if gone untreated.

I. INTRODUCTION:-

Neonatal hypoglycemia is defined as blood glucose level <40mg/dl or plasma glucose level <45mg/dl. Neonatal hypoglycemia is most common form of metabolic disturbance. Brain cells highly depend upon ATP produced by continuous supply of glucose. Neurons and glial cells are more sensitive to hypoglycaemia . Severe neonatal hypoglycaemia leads to neurological damage, mental retardation, epilepsy, personality disorder, impaired cardiac performance and muscle weakness.Newborn blood glucose levels falls as low as 30mg/dl in first 1 to 2 hrs of life and then stabilizing at mean level of 65mg/dl to 70 mg/dl by 3 to 4 hrs of life[1].Various predisposing factors for hypoglycemia has been described in literature ,eg:- prematurity, maternal diabetes, small for gestational age and perinatal asphyxia which may have a different incidence pattern in our locality.

II. METHODOLOGY:-

This study covered neonates admitted in postnatal ward & neonatal ICU of Hi-tech Medical College, Bhubaneswar during study period. During admission ,the parents or guardian were asked about the study & informed consent was taken from them. Detailed maternal history like maternal age , number of pregnancy , gestational diabetes , overt diabetes , hypertension , antepartum hemorrhage , perinatal history like (gestational age , number of pregnancy , birth weight of baby's in grams , small for gestational age or large for gestational age , birth asphyxia , APGAR score) and neonatal data (gender , any h/o sepsis i.e EONS/LONS , prematurity , seizure , lethargy , jitteriness , IEM , storage disorders) was taken. These enrolled babies were followed up during hospital stay for 7 days & there after every 15 days for 3 months to Identify different neonatal problems and attempt has been done to

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correlate hypoglycemia with predisposing factors in mother. In each visit, assessment of growth ,breast feeding adequacy and detailed neurological evaluation were done. In follow up visit of first 15 days, OAE examination was also done. Blood sugar of all babies with risk factors & of high risk mothers were done starting from 2 hrs of life .Data so obtained were analyzed & relevant statistical analysis was done by using statistical software SPSS 2.0.

PROFILE OF NEONATAL POPULATION UNDER STUDY

CHARECTSTICS OF STUDY POPULATION	number	Percentage
Gestation age (in weeks) <37 weeks 38-41 weeks >41 weeks	220 120 40	57.89% 31.57% 10.52%
Gender Male Female	220 160	57.9% 42.1%

CHARECTSTICS OF

PROFILE OF MOTHER UNDER THE STUDY

MATERNAL PROFILE	PERCENTAGE	
MATERNAL AGE >31 YRS < 31 YRS	42% 58%	
MATERNAL WEIGHT > 69 YRS <69 YRS	50% 50%	
MATERNAL PARITY >1 0-1	84% 16%	
DELIVERY VAGINAL CEASERIAN	4% 96%	
INDICATION MEDICAL SPONTANEOUS	58% 42%	
ONE MIN APGAR ? 3 4-6 ?7	2% 18% 80%	
FIVE MIN APGAR ?3 4-6 ?7	0% 2% 98%	

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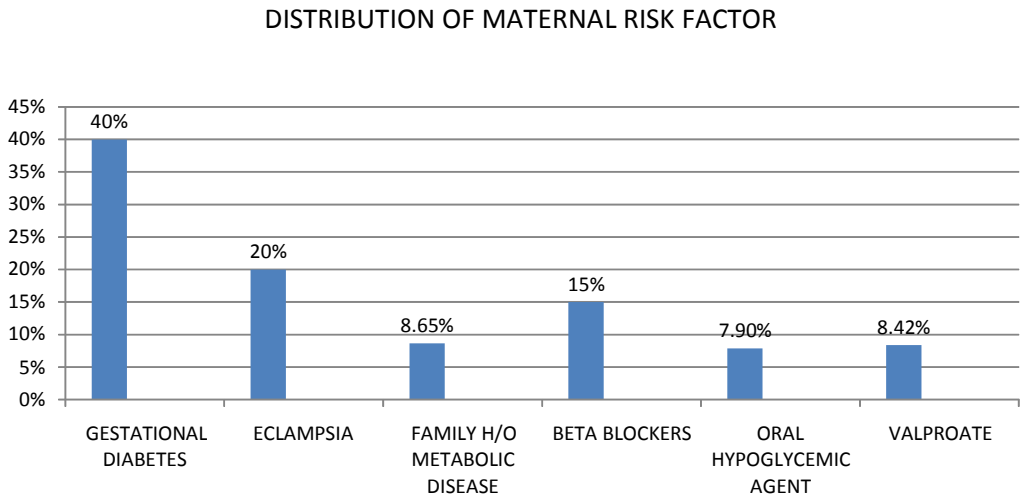
STUDY POPULATION
CHARECTSTICS OF STUDY POPULATION



NEONATAL RISK FACTOR NEONATAL HYPOGLYCEMIA:-

NEONATAL RISK FACTORS	NUMBER OF HYPOGLYCEMIC BABY	% OF HYPOGLYCEMIA IN BABIES
LBW	41	32.8%
SGA	28	22.4%
SEPSIS	20	16%
RDS	15	12%
IN ADEQUATE FEEDING	10	8%
HYPOTHERMIA	5	4%
IEM	3	2.4%
OTHERS	3	2.4%

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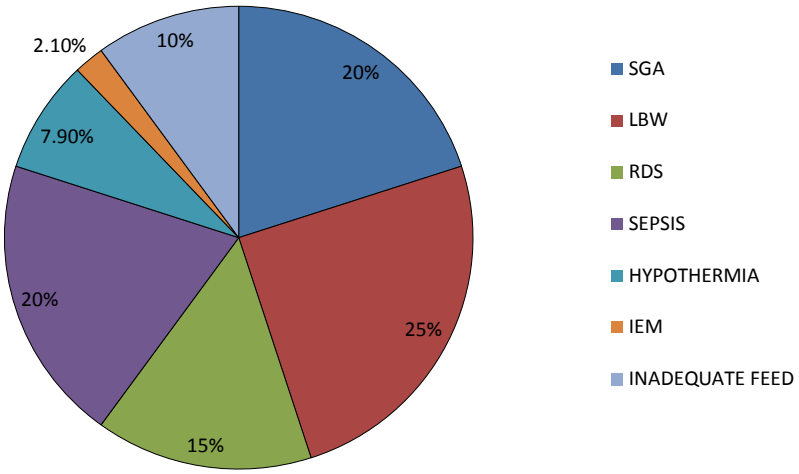
MATERNAL RISK FACTOR IN NEONATAL HYPOGLYCEMIA

MATERNAL RISK FACTORS	NUMBER OF BABIES WITH HYPOGLYCEMIA	PERCENTAGEOF HYPOGLYCEMIA FOUND IN BABIES
GDM	53	42.4%
FAMILY H/O METABOLIC DISEASE	18	14.4%
BETA BLOCKERS	13	10.4%
OHA	11	8.8%
VALPROATE	8	6.4%
ECLAMPSIA	17	13.6%
OTHERS	5	4%

DISTRIBUTION OF NEONATAL HYPOGLYCEMIA AS PER NEONATAL PROBLEM



III. RESULT:-

We investigated 125 neonates having hypoglycemia who were in postnatal ward & also admitted neonates in NICU of hi-tech medical college, Bhubaneswar.Among them male:56, female:69 .In total 105(84%) were preterm. The mean birth weight 1780 gms. Mean birth length 41 cm. 48(38.4%)were very low birth weight(<1500gms). 57 (45.60%) were LBW(1500-2500gm). 12 babies (9.6%) were above 2500 gms. Mean gestational age was 32wks 5days, HIE found in 5(4%), infection 33(27%), RDS 13(10.4%), ICH in 3 (2.4%), Death in 3(2.40%).One hundred seven babies had come for follow up after 15 days, who were clinically stable .Five of them ,with developmental delay at 6 month age and had not attained neck control. Five babies with normal development having infantile spasm and other seizure disorders after 3 month of age.

IV. DISCUSSION:-

In neonates, long term sequelae can occur with in wide range of low serum glucose values. Even transient moderate hypoglycemia can results in neurological demage[3].The duration and severity of neonatal hypoglycemia greatly influences the creation of a permanent neurological demage[4,5] .serum glucose level in neonates normally declines until age 1-3 hours and spontaneously increase afterwards. In fact, there is no rigorously determined specific blood glucose concentration for definition of neonatal hypoglycemia for infants[6-12].Neonatal hypoglycemia is a significant factor of neonatal mortality. Infection, low birth weight and low gestational age were most commonly associated with neonatal hypoglycemia . Pediatrician must be aware of risk factors of hypoglycemia in newborns that can be both maternal and neonatal. Though neonatal hypoglycemia is treatable but can be fatal if left untreated.

V. CONCLUSION:-

Hypoglycemia is common in neonates which is physiological rather than pathological. The prevalence of hypoglycemia is significantly higher in LBW, Preterm babies because of small glucose reserve & immature metabolic pathway. They have high metabolic demand due to relatively higher brain size, poorly developed counter regulatory mechanism to prevent hypoglycemia .The study shows that there are no significant association between maternal age, weight of mother, gravity, parity, 1 min & 5 min APGAR score.Neonates from GDM have high risk of neonatal hypoglycemia. Newborn who developed neurodeficit and seizure disorder due to hypoglycemia which are preventable. Identification of high risk categories in pregnant mother will help in early identification of neonatal hypoglycemia, through constant monitoring . This will help in early treatment of hypoglycemia &future neurodisability may be prevented.

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