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Significance of Hypocalcemia in Neonatal Seizures in Neonates Admitted In Nicu

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ABSTRACT: BACKGROUND:Seizure is a common neurological disorder in neonatal age group.Primary metabolic derangement is one of the common reason.Among metabolic abnormalities,hypocalcemia being the most common.Hypocalcaemia is defined as total serum calcium <8mg/dl or ionized calcium <4.4mg/dl in term babies and total serum calcium <7mg/dl or ionized calcium <4 mg/dl in pre-terms

OBJECTIVES:The study was carried out to assess calcium status in the serum of neonates with convulsion,where no obvious cause of convulsion was found

METHODOLOGY:A prospective case control study was conducted in NICU of Hi-Tech Medical College and Hospital over two year from July 2018 to June 2020.A total of 100 neonates were studied.Among them 50 neonates who had convulsions without any apparent reasons of convulsions were taken as cases and 50 age,sex and body weight matched neonates were enrolled as control who were admitted for other illness not known to cause convulsion.Neonatalhypocalcemia is considered if Serum calcium is less than 1.75 mmol/L(7mg/dl)

RESULTS:Among a total of 50 cases,60% had hypocalcemia and about 20% of controls also had low calcium level without any manifestation.The mean serum calcium level of cases and control were 1.62+/- 0.29 and 2.07 +/- 0.03 mmol/L respectively

CONCLUSION:It is seen that hypocalcemia is an important cause of neonatal seizures due to primary metabolic abnormalities.So early recognition and treatment could save these babies from long term neurological sequeale.

KEYWORDS: neonate,seizure,hypocalcemia

I. INTRODUCTION:

Seizure is a common neurological disorder in neonates.They are at particular risk because seizure among them can be a manifestation of metabolic,toxic,infectious and structural disorder during this time than at another period of life.The manifestations of neonatal seizures are extremely subtle.Repetitive lip smacking movements,cycling or swimming movements, blinking, nystagmus, deviation of eye and alteration of respiratory rate including apnea can be manifestations of neonatal seizure which is sometimes difficult to distinguish from neonatal movement.

As many as 20% newborn in intensive care unit may have seizure activity at sometime.Prevalence is as low as 0.5% in term and as high as 21% in preterm babies.Seizure is not a diagnosis,it is a symptom underlying CNS disorder due to systemic and biochemical disturbances.It is difficult to control seizure in their presence and there is a risk of further brain damage.Early recognition and prompt treatment of biochemical disturbance is essential for optimal management and good long term outcome.Different types of biochemical abnormalities can cause seizure like hypocalcaemia, hypoglycemia, hypomagnesemia, hypernatremia, hyponatremia, hyperbillirubinemia etc. Hypocalcemia is the most common followed by hypoglycemia and hypomagnesemia. Hypocalcemia is defined as total serum calcium levels of less than 1.75mmol/L(7mg/dl).Though several studies on assosciation with neonatal seizure had been carried out in our country but very few exist with that of calcium.So it is important to measure calcium status in neontaes with seizure who have no other apparent causes of convulsion.Early recognition and treatment can significantly influence the better outcome of neonates with seizure

II. MATERIALS AND METHODS:

This case control study was carried in neonatal care unit of Hi-Tech Medical college and hospital from july2018-june 2020.A total of 100

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babies were studied,among them 50 neonates who had convulsions but had no history of fever,septicemia,meningitis,perinatalasphyxia,birth injuries,CNS anomalies or other obvious causes of convulsion were enrolled as cases and 50age,sex and body weight matched neonates were enrolled as controls who were admitted to NICU for other illness not known to cause convulsion.Consent was taken from the parents and proper history taking was done for each and every case.A thorough physical examination was done in every neonate.Convulsion was treated by per rectal diazepam,then 3ml of venous blood was collected and sent for serum calcium measurement along with other routine investigations. Neonatalhypo calcemia is considered if serum level isles than 1.75mmol/L(7mg/dl).Data were analyzed by SSPS using appropriate stastical tools.

III. RESULTS:

Among 50 cases,60% were male and 40% were female.80% were within first 5 days and remaining 20% were between 6-28 days. Distribution of controls were also similar.Mean age of both cases and controls were 4.37 and 4.22 days respectively.Of different types of convulsions it was found focal in 15% and subtle in 35%.Hypocalcemia was present in 50% of cases.it was noted 20% of controls also had low calcium,though they had no manifestation.The mean serum calcium levels of cases and controls were 1.62 +/- 0.29 and 2.07+/- 0.03 mmol/L respectively.

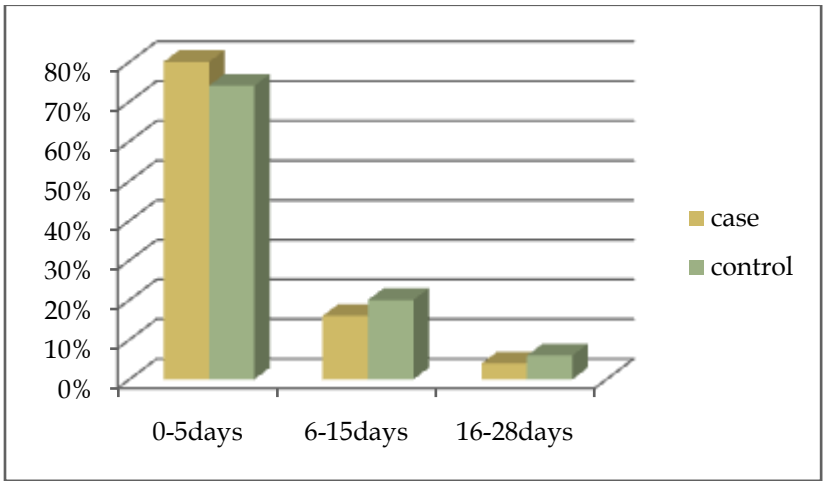

Fig 1-Age distribution of cases and control

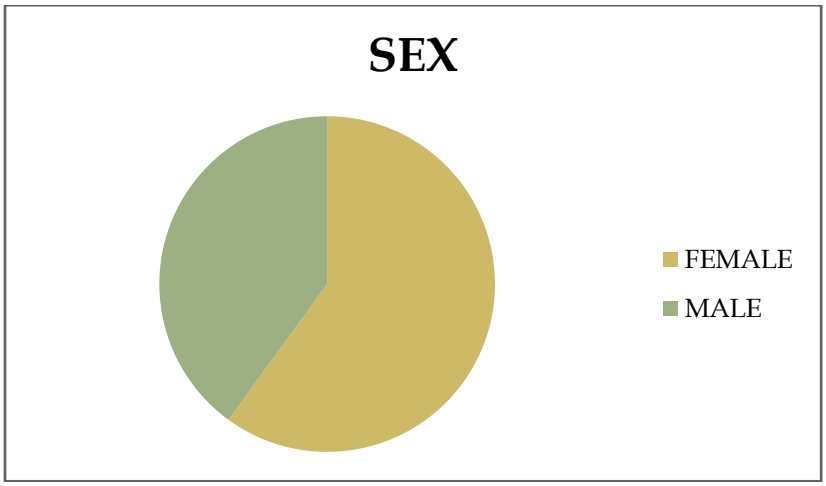

Fig 2-Sex incidence of cases and control

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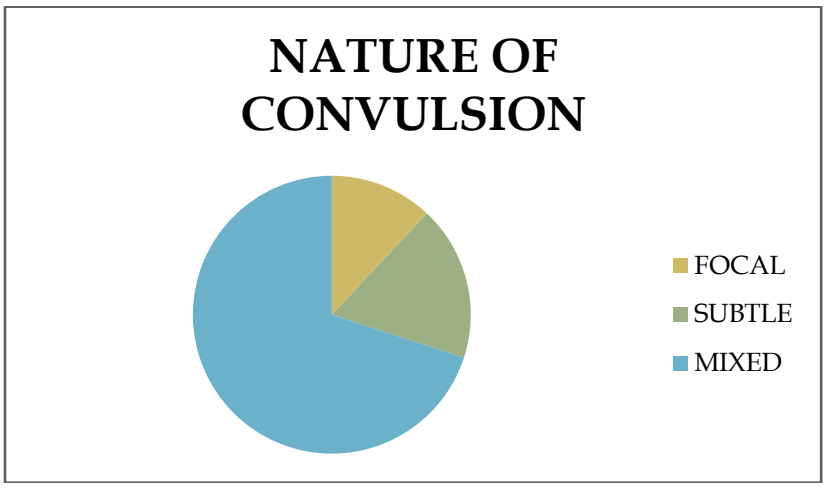

Fig 3-Nature of convulsion

Duration (in min)	Case(n=50)	Control(n-50)
<5	32(64%)	-
5-30	18(36%)	-

Table 1: Number and percentage of neonates by duration of convulsion

Total no	No of hypocalcemia	Percentage of hypocalcemia	Serum calcium Mmol/L (mean+/-SD)
CASE(n=50)	30	60%	1.62+/-0.29
CONTROL(n=50)	10	20%	2.07+/-0.30 (p value<0.001)

Table 2: Presentation of biochemical abnormalities in cases and controls

IV. DISCUSSION:

In this study,the neonates who had no apparent cause of convulsion were studied and were compared with age and sex matched controls.Kumar et al in a study showed that primary metabolic disorder accounted for 25% cause of neonatal convulsion.In a study which was carried out over 2 years period on neonatal convulsion by Cockburn et al,it was found that 55% of neonatal convulsions were due to primary disturbances of mineral metabolism.Metabolic cause of convulsion is common in India due to delayed & infrequent breast feeding and faulty feeding practices.This is in contrast to western countries where feeding practices is so efficient that this is an uncommon cause of seizure.

Among primary metabolic abnormalities in neonates,hypocalcemia is most common.In this study 60% of seizures were due to hypocalcemia.Almost similar findings were found by Kumar et al.In this study 20% of control had hypocalcemia.Hypocalcemia is common between 2-7 hour of life,specially in premature infants,infants with asphyxia at birth and infants of diabetic mother.Duration of convulsion has prognostic value.Seizures lasting more than 30 minutes bears a poor prognosis.In this study majority had seizures lasting less than 5minutes(64%).

Solitar et al studied 115 neonates with seizures, which showed significantly higher incidence of hypocalcemia in full term and pre term infants.Jajoo et al showed that 13 out of 35 infants with convulsion had serum calcium level 7.5 mg/dl.Tsang et al showed that ,mean serumcalcium was 7.51+/-0.25 mg/dl in neonates with convulssion compared with 8.12+/-0.23 mg/dl in control infants ($p<0.0025$).In the present study,mean serum calcium was 1.62+/-0.29 which is significantly lower than the level in controls 2.07+/-0.30mml/L($p<0.0001$)

Finding of present study were consistent with other studies in some aspect and different in some aspect.

V. CONCLUSION:

From the study it is revealed that hypocalcemia is common among neonatal seizure due to primary metabolic abnormalities,where no cause is identified.So early recognition and treatment could save the babies from long term

neurological sequelies.Further studies with large sample size covering both urban and rural population will give more insight to this and can help us in building a bright future of our country's building blocks(our children).

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