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ORIGINAL RESEARCH

Incidence of hypocalcemia in infants with seizures

[1]Dr. Shruti, [2]Dr. Priyank Verma, [3]Dr. Pankaj Mishra

[1,2]Assistant Professor, Department of Pediatrics, Mayo Institute of Medical Sciences, Barabanki, UP, India
[3]Professor, Department of Community Medicine, Mayo Institute of Medical Sciences, Barabanki, UP, India

Correspondence:
Dr. Priyank Verma
Assistant Professor, Department of Pediatrics, Mayo Institute of Medical Sciences, Barabanki, UP, India
Email: priyankverma07@gmail.com

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Abstract
Background: Amongst the various etiologies, hypocalcemia is an important cause of seizures in infancy. The present study assessed incidence of hypocalcemia in infants with seizures.
Materials & Methods: 60 infants with seizures of both genders were studied and a decrease in total plasma calcium concentration of <8.8 mg/dl was considered as hypocalcemia.
Results: Out of 60 patients, boys were 28 and girls were 32. Hypocalcemia was seen among 34. Maximum hypocalcemia was seen in 12 upto age 3 months and upto 1 years each, 10 in 3-6 months The difference was significant (P< 0.05). Seizures were due to hypocalcemic seizures in 22, febrile seizures in 20, pyogenic meningitis in 4, bronchiolitis in 2, aseptic meningitis in 1, septicemia in 1, cerebral infarct in 1 and dyselectrolytemia in 2 patients. The difference was significant (P< 0.05).
Conclusion: Hypocalcemiais a common cause of seizures in infants. Maximum cases of hypocalcemia were seen in age group upto 1 years of age.
Key words: infants, hypocalcemia, seizures

Introduction

Amongst the various etiologies, hypocalcemia is an important cause of seizures in infancy. Early diagnosis can avoid expensive tests like neuro-imaging, invasive procedures like lumbar puncture and initiation of antiepileptic drugs. There is paucity of Indian data on the prevalence of hypocalcemia inseizures.[1]Hypocalcemia is seen in post-neonatal infants, which is related to poor oral intact of calcium, low level of Vitamin-D, familial causes, sepsis, multiorgan failure. Calcium requirement in the first 6 months is 210 mg/day and 7–12 months is 70 mg/day. Calcium deficiency is observed in infants and children receiving inadequate diet having <200 mg elementary calcium per day.[2]

When serum calcium is decreased, parathyroid hormone is secreted from parathyroid gland which leads to calcium absorption and release of calcium and phosphorus from bones and excretion of phosphorus and bicarbonate in urine to maintain serum calcium level. Hence, in Vitamin-D deficiency and/or decreased calcium intake, we find low serum calcium, increased alkaline phosphatase level, and decreased phosphorus level.[3] Breast milk provides adequate calcium (28 mg/100 ml) while Vitamin-D plays crucial role in calcium absorption. Vitamin D

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is synthesized in the skin by ultraviolet light from sun by its precursor 7-dehydrocholesterol.[4]The present study assessed incidence of hypocalcemia in infants with seizures.

Materials & Methods

The present study comprised of 60 infants with seizures of both genders. Parental written consent was obtained.

Data such as name, age, gender etc. was recorded. Blood samples were taken and serum calcium, phosphorus, and alkaline phosphatase level estimation was performed. Cerebrospinal fluid analysis was done. A total serum calcium level of 8.8–10.8 mg/dl (2.2–2.7 mmol/l) was considered as normal and decrease in total plasma calcium concentration of <8.8 mg/dl was considered as hypocalcemia. Any serum phosphorus level <3.8 mg/dl was considered below normal value. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 60		
Gender	**Boys**	**Girls**
Number	28	32

Table I shows that out of 60 patients, boys were 28 and girls were 32.

Table II Age wise distribution

Age group	Hypocalcemia	Others	P value
Upto 3 months	12	8	0.05
3-6 months	10	10	1
Upto 1 year	12	8	0.04
Total	34	26	

Table II shows that hypocalcemia was seen among 34. Maximum hypocalcemia was seen in 12 upto age 3 months and upto 1 years each, 10 in 3-6 months The difference was significant (P< 0.05).

Table III Distribution of seizures

Seizures	Number	P value
Hypocalcemic seizures	22	0.01
Febrile seizures	20	
Pyogenic meningitis	4	
Bronchiolitis	2	
Aseptic meningitis	2	
Septicemia	1	
Cerebral infarct	1	
Dyselectrolytemia	2	

Table III, graph I shows that seizures were due to hypocalcemic seizures in 22, febrile seizures in 20, pyogenic meningitis in 4, bronchiolitis in 2, aseptic meningitis in 1, septicemia in 1, cerebral infarct in 1 and dyselectrolytemia in 2 patients. The difference was significant (P< 0.05).

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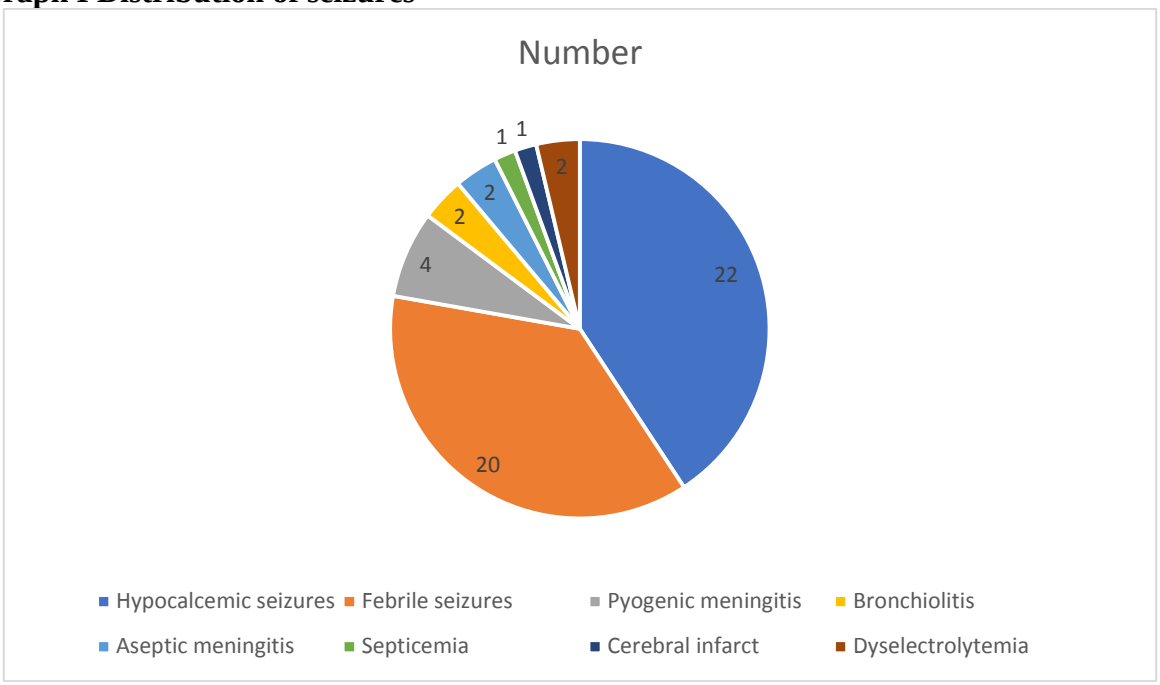
Graph I Distribution of seizures



Discussion

Seizures are common in pediatric age group and approximately 4–10% of children experience at least one episode of seizure in the first 16 years of age. Calcium plays an important role in intracellular signaling and proper functioning of intracellular and extracellular processes including muscle contraction, nerve conduction, and hormone release.[5]During growth, bone mass increases faster than body weight, which results in increased demand of calcium. Along with calcium, phosphorus is also an essential component of bone and is necessary for skeletal mineralization. In the absence of Vitamin-D, only 10–15% of dietary calcium and 55–60% of phosphorus is absorbed.[6]The present study assessed incidence of hypocalcemia in infants with seizures.

We found that out of 60 patients, boys were 28 and girls were 32.Kamate et al[7]enrolled normal children between 1month to 2 years with seizures to study the prevalence of hypocalcemia. The contribution of hypovitaminosis D to hypocalcemia was also studied. Of 78 infants (51 boys) enrolled, 18(23.1%) had hypocalcemia. Fifteen (19.2%) had hypocalcemia secondary to hypovitaminosis D and 3 (3.8%) had hypomagnesemia. In infants aged less than 6 month who were exclusively breastfed, 15 (41.67%) had hypocalcemia in comparison to other two age groups[2 (10.53%) in 6–12 months age-group and 1 (4.35%) in 1–2 y age-group]. This association was statistically significant.

We found that hypocalcemia was seen among 34. Maximum hypocalcemia was seen in 12 upto age 3 months and upto 1 years each, 10 in 3-6 months. Manzoor Ali Khanet al[8] found that 51.2% of children with hypocalcemia were less than 6months of age. Mehrotra et al[9] in the study of 60 infants of hypocalcemic seizures found low level of Vitamin D (<10 ng/ml) in 54 infants, concluding Vitamin D deficiency as a major cause of hypocalcemic seizures in infancy.

We found that seizures were due to hypocalcemic seizures in 22, febrile seizures in 20, pyogenic meningitis in 4, bronchiolitis in 2, aseptic meningitis in 1, septicemia in 1, cerebral infarct in 1 and dyselectrolytemia in 2 patients. Nikunj et al[10] in their study of 75infants with first seizure found hypocalcemia in 34% infants. Bande et al[11]studied the incidence of hypocalcemia in infants admitted with seizures. A total of 54 infants were enrolled according to the study design among which, 19 patients (35.15%) had hypocalcemic seizures while 16

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of them were below 6 months of age having increased alkaline phosphatase level and low serum phosphorus level which corresponds to Vitamin-D deficiency. The second common cause was febrile seizures 25.92% (n=14) and rest were of infective etiology.
Current guidelines and recommendations for evaluation and management of seizures and status epilepticus in children especially less than 2 years should mandate the testing for hypocalcemia as hypocalcemia occurs in one third to one-quarter of children, especially in those less than 6 months. Hence it is important to test for hypocalcemia in this age group.[12]

Conclusion

Authors found that hypocalcemia is a very common cause of seizures in infants. Maximum cases of hypocalcemia were seen in age group upto 1 years of age.

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