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SERUM CALCIUM LEVEL IN CHILDREN WITH FEBRILE CONVULSIONS

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Conflicts of Interest: Nil

Abstract:

Introduction- In children the most common forms of convulsion are febrile seizures. Water electrolyte imbalance occurs during acute febrile illness and hypocalcaemia is one of them. Hypocalcaemia is also present in cases of seizures. To find out significance of calcium levels in cases of seizures this study was conducted.

Methods: Case control prospective analytical study conducted in department of Pediatrics, RVRS Medical College, Bhilwara. The serum calcium level was estimated by atomic absorption spectrophotometer (AAS) according to the method of Zettner and Seligs.

Results: Mean ionized calcium level was 4.52±0.24 mg/dl and 4.01±0.16 mg/dl in control and cases groups respectively and this difference was found statistically highly significant ($p<0.001$).

Conclusion- The findings suggest that a considerable percentage of children having febrile seizures are suffering from low level of calcium.

Keywords: Hypocalcemia, serum calcium, febrile seizures

Introduction

Febrile seizures are the commonest convulsions occurring between 6 months to 5 years of age without any central nervous system infection. [1] Incidence of febrile seizures is 4.8/1000 children/year. [2] Febrile seizures are not only agonizing to the parents but also to the child and can cause psychological trauma to both. They have been studied thoroughly since last two decades but the pathophysiology is still unknown till date. Several hypotheses have been postulated and many independent risk factors considered as a predisposing factor.

A common biochemical abnormality causing seizures is hypocalcemia, which may manifest as muscle cramps, tetany, seizures and paraesthesia[3]. During any acute febrile disease, disturbances in water and electrolytes occur frequently. It has been suggested that change in serum calcium might enhance the susceptibility to seizures.

Thus, keeping in view the association of febrile seizures with hypocalcaemia, a case control study was conducted to assess association between febrile convulsion and hypocalcemia.

MATERIALS AND METHODS

Study design:

Case control prospective analytical study

Study location:

Department of Pediatrics, RVRS Medical College, Bhilwara

Sample size and method:

In the present study total 100 participants were included based on inclusion and exclusion criteria.

Sample selection:

100 subjects out of which 50 were cases of febrile convulsion between the ages of 6 months to 5 years. 50 age and weight matched children suffering from a febrile illness without seizures, such as urinary tract infection, gastroenteritis and respiratory tract infection served as controls.

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Inclusion Criteria:

Children with simple/complex febrile seizures (seizure occurring in developmentally normal child in association with a febrile illness in the absence of CNS infection or any other defined cause of seizures).

Exclusion Criteria:

Children with previous history of established non febrile seizures, neurological infections (meningitis, encephalitis), hereditary metabolic disorders, developmental delay, children with history of birth asphyxia and persistent neurological deficits

Data Collection:

Demographic data, seizure details, nature of febrile illness, complete developmental history, family history of epilepsy/febrile seizures, temperature at admission, general examination, Systemic examination and nutritional status were recorded (IAP weight for age classification was used to grade protein energy malnutrition) including the final diagnosis was recorded.

Methodology:

Demographic data, seizure details, nature of febrile illness, complete developmental history and family history of epilepsy /febrile seizures was recorded. The serum calcium level was estimated by atomic absorption spectrophotometer (AAS) according to the method of Zettner and Seligs.

Statistical analysis: Data was collected from eligible patients on a pre-structured pre-tested Performa. For data analysis statistical software SPSS-22 version was used and data were analyzed with the help of frequencies, figures, proportions, measures of central tendency and appropriate statistical test.

RESULTS

Mean age was 2.12±1.03 years and 2.09±0.78 years in study and control group respectively and this difference was found statistically insignificant (p>0.05).

In present study, male predominance over females in both study and control groups, where total 60% and 58% patients were males in study and control groups respectively. On applying chi square test, the gender difference was found statistically insignificant (p>0.05).

Table 1: Distribution of cases according to Ionized Calcium (mg/dl) level in both groups

Ionized Calcium (mg/dl)	Grouping	
	Control (Means ± SD)	Cases (Means ± SD)
Ionized Calcium	4.52±0.24	4.01±0.16
t-value	4.871	
p- value	<0.001	

Mean ionized calcium level was 4.52±0.24 mg/dl and 4.01±0.16 mg/dl in control and cases groups respectively and this difference was found statistically highly significant (p<0.001).

DISCUSSION

Convulsions or seizures are one of the important pediatric health problems in developing and developed countries and febrile seizures are the most common seizure disorder in childhood, affecting 2% to 5% of children between the ages of 6 and 60 months[1]. It is generally believed that FS is an age-dependent response of the immature brain to fever. This postulation is supported by the fact that most (80-85%) febrile seizures occur between 6 months and 3 years of age, with the peak incidence at 18 months. Studies based on animal models suggest that there is enhanced neuronal excitability during the normal brain maturation but the exact mechanism is still unclear[2].

In our study mean ionized calcium level was 4.52±0.24 mg/dl and 4.01±0.16 mg/dl in control and cases groups respectively and this difference was found statistically highly significant (p<0.001).

In a study by Akbayramset al[4] where 48 children with febrile seizures were compared with age matched controls and found low serum calcium (P=0.001). In literature there are inadequate

studies relating serum calcium in children with febrile seizures.

Our observation is also similar to studies by Chiarelli F et al. where Serum levels of sodium and calcium were significantly lower in children with FS.[5] There was no association between low Serum calcium and FS in studies by N. Rutter et al and Sayedzadeh S A et al.[6,7]

CONCLUSION

The findings suggest that a considerable percentage of children having febrile seizures are suffer from calcium deficiency

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