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Relationship Between Vitamin – D Levels and Simple Febrile Seizures in Children's

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Abstract

Objective

To evaluate the serum level of vitamin D 25(OH) vitamin D3 in children aged between 6 months to 60 months with simple febrile seizures.

METHODS:

A hospital based prospective case control study conducted at government medical college between 6 to 60 months age group presenting with simple febrile seizures in OPD or casuality.For each case ,control was taken of same age group with fever<2days duration without seizures' 2ml of blood was taken from peripheral vein in children's after consent from parents for laboratory measurement of 25 (OH)vitamin D levels by trained laboratory technician. Results were taken in form of percentages, mean and odds ratio was calculated as measure of association.

RESULTS: Total 80 cases and 80 controls were included in this study. A strong and significant P value (<0.01) association between vitamin D deficiency and simple febrile seizures was observed in this study.

CONCLUSION: There is increase prevalence of vitamin D deficiency in children with simple febrile seizures.

Keywords: Febrile seizures, Vitamin D, Children, Case control study

INTRODUCTION

Febrile seizure (FS) is one of the common childhood seizures that involves 2 to 5% percent of children (1, 2). FS is recurrent in 30% of patients (3, 4). Despite many proposed mechanisms, its exact pathogenesis is unknown. A simple febrile seizure is generalized, tonic clonic in nature, lasts for a few seconds and rarely up to 15 minutes, is followed by a brief period of postictal drowsiness and occurs once in 24 hours (5)

Genetic and environmental factors are assumed to be involved in its mechanism (6). Seizures can be the outcome of several conditions stimulating the central nervous system (CNS) such as fever, electrolyte disturbances, some infections, head trauma, etc. (7,8).

Vitamin D is involved in the regulation of 1000 human genes [9]. The human body thus pro- cures vitamin D through two independent pathways: the photochemical action of solar UVB light (295 to 320 nm) in the skin and some limited dietary sources [10]. There is increasing concern that vitamin D deficiency may play etiological role in Febrile seizures. Vitamin D Deficiency is a major health problem in children and its worldwide prevalence has been estimated at about 1 billion. It prevails to 50-90% among children in India. (11) Vitamin D deficiency is more common during the rapid growth stages, such as infancy and adolescence (12).

Few studies have reported Vitamin D deficiency rickets in children with recurrent febrile seizures and incidence of hypocalcaemic seizures due to vit. D deficiency in children's (13,14,15)

The present study was designed to evaluate the relationship between serum level of vitamin D and Febrile seizures in the children aged 6 months to five years.

Material and Methods

This is a hospital-based study conducted at Government medical college baramulla from october 2017 to October 2019

Study design: A hospital based prospective case control study

Inclusion criteria:

Children's who fulfilled the inclusion criteria were included in the study as cases after taking consent from the parents. Cases were children of age group 6 months to 5 years presenting with first episode of simple febrile seizure to the casualty or OPD of this hospital.

Diagnostic criteria for simple febrile seizures included:

Seizure associated with fever and seizure was generalized, short duration (less than 15 minutes), no recurrence of seizures within 24 hours, child is otherwise neurologically healthy and without any neurological abnormality before and after the episode of seizure, with age group between 6 months to 5 years.

Exclusion criteria

Children with history of

- 1. acute or chronic renal diseases
- 2. Meningitis, head trauma encephalitis, brain haemorrhage
- 3. Neuro developmental delay,
- 4. previous history of febrile seizures,
- 5. clinical features of rickets,
- 6. liver, renal or endocrinal disorders,

7. Atypical febrile seizures were excluded from the study.

For each case, a control was selected with similar age group and same sex who came for short duration fever (<2 days) but without seizures. Informed consent was obtained from the parents of both the study groups.

A 2 ml of blood sample was taken from the peripheral vein of each participant by trained laboratory technician and serum separated by centrifugation and then stored at -20° C and protected from direct exposure to sunlight until the analysis. The timing of blood sample collection within the disease course varied from patient to patient. However, given that vitamin D has a half-life of between 4 and 8 weeks, the small inconsistency in timing would not be expected to affect the average vitamin D level.All the determinations (25-hydroxyvitamin D3) were done at accredited laboratory. i.e transworld muslim university diagnostic centre srinagar

Based on these criteria, sufficient are defined as levels >20ng/ml, insufficient as 15-20ng/ml and deficient as levels <15ng/ml

OBSERVATIONS: This study was conducted in the Government Medical College, baramulla over a period of two years from 1st October 2017 to 1st october2019.

In total 160 children were included in the study, 80 cases and 80 controls. The mean age of cases was 10.8 \pm 6.16 months and of controls was 9.8 \pm 6.52 months with an insignificant p value. the mean serum 25-hydroxy vitamin D levels in 6 to 24 months in cases was 9.46 \pm 5.446 ng/ml as against 30.18 \pm 16.442 ng/ml in control group with a significant P- value of <0.001.

The mean serum 25-hydroxy vitamin D levels in 25–60months in case group was 11.78 ± 5.728 ng/ml and in control group was 34.78 ± 18.496 ng/ml with a significant P- value of <0.001.

Children with insufficient vitamin D levels (15-20 ng/ml) are three times more susceptible to simple febrile seizures while as childrens with deficient levels are at highest risk of simple febrile seizures.

DISCUSSION:

The study was conducted in Government Medical College, baramulla Kashmir valley. The study was conducted over a period of one year from 1st october 2017 to 1st october 2019. It was a hospital based prospective case control study.

A total of 160 children's, 80 cases and 80 controls, were included in the study.

The mean age of cases was 10.8 ± 6.16 months and of controls was 9.8 ± 6.52 months. 65% cases and 67.5% controls were 6 to 24 months whereas 35% cases and 32.5% controls were in the age group of 25 – 60months.

There is compelling rationale to suggest a potential relationship between vitamin D insufficiency and febrile seizures. To better define the role of vitamin D in febrile seizures we performed a prospective clinical study comparing serum 25(OH)D levels among children with febrile seizures to a group of healthy children. Vitamin D receptors broadly spread in the brain and vitamin D can act as a neuro transmitter thus affecting calcemic and non-calcemic actions. (16) the anticonvulsant nature of vitamin D initially was

reported in 1974(17). All cases and 52.5% controls were found to have serum 25-hydroxy vitamin D levels < 15 ng/ml with a significant P- value of <0.001. 50% cases were having severe deficiency with values < 5 ng/ml but none of the controls was found to be having severe deficiency of serum 25-hydroxy vitamin D. The mean serum levels of 25-hydroxy vitamin D levels of cases were found to be 5.14 ± 2.793 ng/ml and of controls it was 15.84 ± 8.519 ng/ml with a significant P-value of <0. 001.In other reports, the low serum levels of vitamin D in patients with seizures was reported frequently (18,19)

CONCLUSION:

In conclusion this study has demonstrated that deficient vitamin D status influences febrile seizures in childrens. The mean serum vitamin D levels was lower in patients with seizures. Thus, from this study it can be hypothesized that there is a relation between vitamin D deficiency and simple febrile seizure

Age i	in	Cases	Control			P Value
months		No	%age	No	%	0 738 (NS)
6-24		52	65	54	67.5	0.750 (115)
24-60		28	35	26	32.5	

Table 1.: Age distribution of cases and controls

Table 2. Gender distributions of cases and control

Gender	Cases		Control		P Value
	No	%age	No	%	
Male	50	62.5	54	67.5	0.507 (NS)
Female	30	37.5	26	32.5	
Total	80	100	80	100	

Table 3. Comparison of mean serum levels of Vitamin D in cases and controls

Group	No.	Mean	SD	P-Value
Cases	80	10.28	5.586	<0.001 (Sig)
Controls	80	31.68	17.038	

Age in	ases		Control		P Value
montins	Mean	SD	Mean	SD	
6-24	9.46	5.446	30.18	16.442	< 0.001 (Sig) <0.001 (Sig)
24-60	11.78	5.728	34.78	18.496	

 Table 4. Comparison of mean serum levels of Vitamin D in cases and controls as per age

Table 5. Comparision of mean serum levels of vitamin D in cases and control as per gender

Gender	Cases		Control		P Value
	Mean	SD	Mean	SD	
Male	9.62	5.796	33.48	16.372	< 0.001 (Sig)
Female	11.38	4.86	27.96	18.446	<0.001 (Sig)

Table 6. Association of Vitamin D with febrile seizures

Vitamin D	Cases	Control	Total	Crude	Adjusted
Status				odds	Odds
				Ratio	Ratio
	(N=80)	(N=80)	(N=160)		
Deficient	15	6	21	5	5
Insufficient	45	34	79	2.64	2.64
Normal	20	40	60	1	1

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