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Original Research Paper

Study of vitamin d deficiency in patients on anti-epileptic

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ABSTRACT:

Introduction: Epilepsy is most prevalent neurological condition in children[1]. A prevalence of 1.1 cases per 1000 people was found in an Indian study. Long-term use of antiepileptic medications (AEDs) causes hepatic P450 enzymes, which speed up vitamin D metabolism and increase its degradation into inactive metabolites, resulting in aberrant bone metabolism. Present study was conducted to assess the levels of serum vitamin D in children with epilepsy on Antiepileptic drugs**.**

Materials and Methods: Present observational comparative study was carried out between 2022 and 2023. 60 cases on antiepileptic drugs between 4-16 years of age of both gender (30 cases on valproate & 30 on phenytoin) were enrolled. Serum vitamin D levels were measured in all cases & data evaluated for significance.

Observations and Results: Mean ± SD of age was 8.03 ± 2.48 in group 1 & 7.03 ± 2.64 in group 2. Male cases were 32 (53 %) & female cases were 28 (47 %). Mean ± SD of VIT D level (ng/mL) was 23.67 ± 9.42 in group 1 & 28.63 ± 9.55in group 2. Difference was statistically significant (P=0.04). When VIT D status was correlated with type of antiepileptic drugs, result showed statistically significant correlation (P=0.03).

Conclusion: Present study's findings indicate that antiepileptic medicine and duration of antiepileptic therapy are strongly correlated with vitamin D deficiency

Keywords: Vitamin D, antiepileptic, Epilepsy

INTRODUCTION:

Epilepsy is most prevalent neurological condition in children[1]. A prevalence of 1.1 cases per 1000 people was found in an Indian study[2]. According to long-term population-based outcome studies, even though the prognosis for epilepsy in children is favourable, over 30% of these youngsters will still require treatment after five years[3]. Long-term use of antiepileptic medications (AEDs) causes hepatic P450 enzymes, which speed up vitamin D metabolism and increase its degradation into inactive metabolites, resulting in aberrant bone metabolism. There is mounting evidence that vitamin D has a variety of roles in the developing and mature brain, such as regulating neurotropic factors, maintaining calcium homeostasis and signalling, offering neuroprotection, promoting synaptic plasticity, and modifying neurotransmission. Human CSF fluid has been found to include all three of the main metabolites of vitamin D turnover: 25-hydroxyvitamin D3 (25(OH)D3), 1,25-dihydroxyvitamin D3 (1,25(OH)2D3), and 24,25-dihydroxyvitamin D3 (24,25(OH)2D3)[4]. A study by **Christiansen et al. (1974)**[5] found that vitamin D administration can reduce seizure frequencies by 40%, indicating that vitamin D is produced locally in the human brain. High dosages of vitamin D can significantly lower the frequency of seizures in people with poorly managed epilepsy, according to the findings of another study[6]. Numerous conditions, including multiple sclerosis, schizophrenia, Parkinson's disease, and autism, have been linked to low serum vitamin D levels. However, more research is needed to fully understand how vitamin D affects seizure

control, especially in youngsters. Present study was conducted with the same objectives to assess the levels of serum vitamin D in children with epilepsy on Antiepileptic drugs.

AIM AND OBJECTIVE:

To assess deficiency of serum vitamin D levels in children's on two different antiepileptic drug treatment.

MATERIALS AND METHOD:

Present observational comparative study was carried out between 2022 and 2023. Permission from the institutional ethics committee was obtained before the study started. Sixty cases on antiepileptic drugs who met the inclusion and exclusion criteria were enrolled. Every participant received an explanation of the study, and their written informed consent was acquired.

Inclusion Criteria:

60 cases on antiepileptic drugs between 4-16 years of age of both gender (30 cases on valproate & 30 on phenytoin)

Exclusion Criteria:

1. Cases with conditions known to affect bone metabolism (e.g., renal disease, hyperparathyroidism and other severe disease
2. Cases with severe physical disabilities/mental retardation
3. Cases on medications which affect bone metabolism (corticosteroids)

Procedure:

A detailed clinical history including age, gender, geographical location, duration of antiepileptic drug therapy, dose of antiepileptic drug was recorded at the time of enrolment. The classification of epilepsy was done according to the ILAE classification of epilepsy[4]. Total 60 patients were divided randomly into two groups as

1. **Group 1:** 30 cases on valproate antiepileptic drugs
2. **Group 2:** 30 cases on phenytoin antiepileptic drugs

Serum vitamin D levels were measured using blood samples. The VITROS 5600 Immunodiagnostic method was used to quantify serum vitamin (total 25-hydroxy vitamin D3). According to recent research, vitamin D insufficiency is defined as having less than 20 ng/ml of the vitamin[7]. The serum vitamin D levels in our investigation have been interpreted as follows: < 29 ng/ml: Insufficiency 30-70 ng/ml: Sufficiency

Statistical Aanalysis:

SPSS software, version 20, was used to conduct the statistical analysis. The data were presented as frequency in percentages N (%) and mean ± SD. Data were statistically evaluated using the unpaired-t test & chi square test. If the P value was less than 0.05, statistical significance was presumed.

OBSERVATION AND RESULT:

Table 1: Clinical history

Sr No	Parameter	Group 1 30 (50 %)	Group 2 30 (50 %)	Total 60 (100 %)
1	**Age (**years**)** (Mean ± SD)	8.03 ± 2.48	7.03 ± 2.64	-
2	**Gender** n (%)			
	Male	17 (28 %)	15 (25 %)	**32 (53 %)**
	Female	13 (22 %)	15 (25 %)	**28 (47 %)**
3	**Geographical location** n (%)			
	Urban	13 (22 %)	10 (16 %)	**23 (38 %)**
	Rural	17 (28 %)	20 (34 %)	**37 (62 %)**

Mean ± SD of age was 8.03 ± 2.48 in group 1 & 7.03 ± 2.64 in group 2. Male cases were 32 (53 %) & female cases were 28 (47 %). Urban cases were 23 (38 %) & rural cases were 37 (62 %). (**Table 1**)

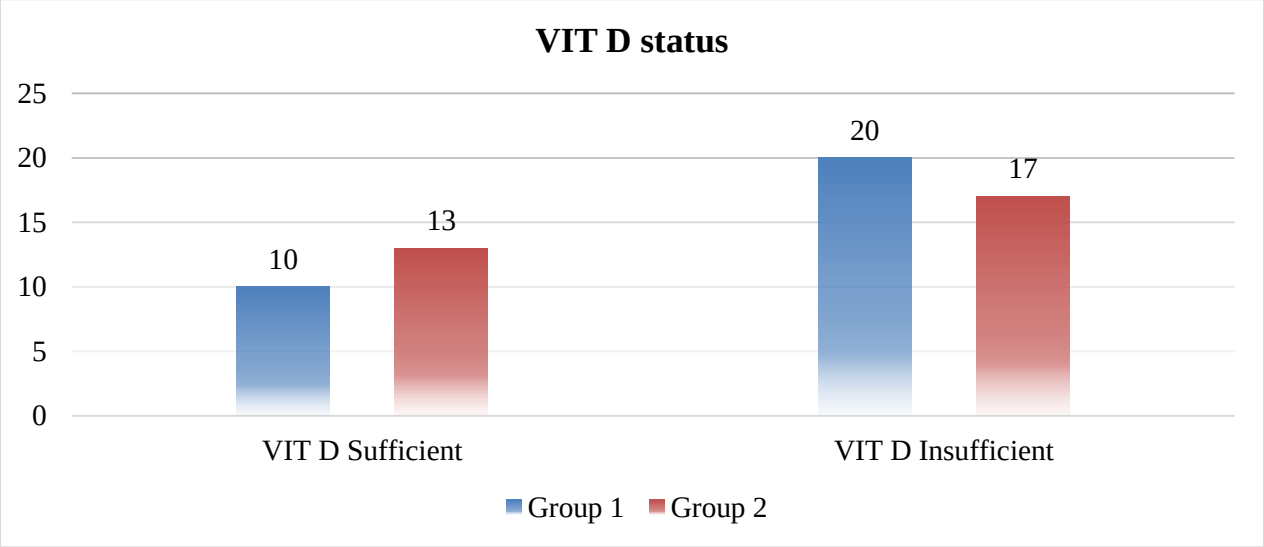
Table 2: Treatment history

Sr No	Parameter	Group 1 30 (50 %)	Group 2 30 (50 %)	P value
1	**Drug dose of respective drug (mg/kg/day)** (Mean ± SD)	28.83 ± 7.84	5.2 ± 0.76	-
2	**Duration of treatment (**years**)** (Mean ± SD)	3.89 ± 2.16	2.68 ± 1.67	**0.01 (S)**
3	**VIT D LEVEL (ng/mL)**	23.67 ± 9.42	28.63 ± 9.55	**0.04 (S)**

	(Mean ± SD)			
4	**VIT D status** n (%) Sufficient Insufficient	 9 (16 %) 21 (34 %)	 18 (22 %) 12 (28 %)	 **0.03 (S)**

Mean ± SD of dose of valproate was 28.83 ± 7.84 mg/kg/day & phenytoin was 5.2 ± 0.76 mg/kg/day. Mean ± SD of duration of treatment (years) in group 1 was 3.89 ± 2.16 & in group 2 was 2.68 ± 1.67. Difference was statistically significant (P=0.01). Mean ± SD of VIT D level (ng/mL) was 23.67 ± 9.42 in group 1 & 28.63 ± 9.55in group 2. Difference was statistically significant (P=0.04). When VIT D status was correlated with type of antiepileptic drugs, result showed statistically significant correlation (P=0.03). **(Table 2)**

Graph 1: VIT D status



DISCUSSION:

Epilepsy is a common non-communicable disease that affects both young and the elderly, with a cumulative lifetime incidence of 3%. Bone health may be impacted by prolonged AED use, and present study aims to investigate the relationships between long-term antiepileptic usage with vitamin D levels. In present study mean ± SD of age was 8.03 ± 2.48 in group 1 & 7.03 ± 2.64 in group 2. Male cases were 32 (53 %) & female cases were 28 (47 %). Urban cases were 23 (38 %) & rural cases were 37 (62 %). In similar study by Bezboruah G et al (2023)[8] they found 5 (5.3%) were less than 1 year of age, 48 (51.1%) were between 1-3 years of age, 8 (8.5%) were between 4-6 years, 15 (16%) were between 7-9 years of age and 18 (19.1%) were of age 10 or more years. 71 were males and 23 were females. In present study Mean ± SD of dose of valproate was 28.83 ± 7.84 mg/kg/day & phenytoin was 5.2 ± 0.76 mg/kg/day. Mean ± SD of duration of treatment (years) in group 1 was 3.89 ± 2.16 & in group 2 was 2.68 ± 1.67. Difference was statistically significant (P=0.01). Mean ± SD of VIT D level (ng/mL) was 23.67 ± 9.42 in group 1 & 28.63 ± 9.55in group 2. Difference was statistically significant (P=0.04). When VIT D status was correlated with type of antiepileptic drugs, result showed statistically significant correlation (P=0.03). In similar study by Bezboruah G et al (2023)[8] they found statistically significant relationship between serum vitamin D deficiency and antiepileptic drugs with a p value of <0.001. Iragamreddy VR et al (2023)[9] in their study found Out of 30 instances, 27 (90%) had low vitamin D levels, 7 (10%) had inadequate levels, and none had adequate levels. Among the 30 controls, none had vitamin D deficiency, 9 had insufficient vitamin D, and 21 had enough vitamin D. The analysis of vitamin D insufficiency in patients and controls revealed that it was statistically significant (p=0.001)

Limitations:

A limited number of patients is considered the main limitations of our study

CONCLUSION:

Our study's findings indicate that antiepileptic medicine and duration of antiepileptic therapy are strongly correlated with vitamin D deficiency. Hypovitaminosis D was very common in our group. Children with epilepsy should receive extra attention from pediatric neurologists and pediatricians regarding their vitamin D levels.

Conflict of Interest: None declared

REFERENCES:

1. Fine A. Wirrell EC. Seizures in Children. Pediatr Rev. Am Acad Pediatr. 2020;41(7);321-47.
2. Panagariya A, Sharma B, Dubey P, Satija V, Rathore M. Prevalence, Demographic profile and Psychological Aspects of Epilepsy in North-Western India: A Community Based Observational Study. Ann Neurosci. 2018;25(4):177-86.
3. Cebeci AN, Ekici B. Epilepsy Treatment by Sacrificing Vitamin D. Expert Rev Neurother. 2014;14(5):481-91.
4. Scheffer IE, Berkovic S, Capovilla G, Connolly MB, French J, Guilhoto L, et al. ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology. Epilepsia. 2017; 58(4):512-21.
5. Christiansen C, Rodbro P, Sjö O. Anticonvulsant action of vitamin D in epileptic patients? A controlled pilot study. Br Med J. 1974;2(5913):258-9.
6. Holló A, Clemens Z, Kamondi A, Lakatos P, Szucs A. Correction of vitamin D deficiency improves seizure control in epilepsy: a pilot study. Epilepsy Behav. 2012;24(1):131-3.
7. Fong CY, Riney CJ. Vitamin D Deficiency Among Children with Epilepsy in South Queensland. J Child Neurol. 2014;29(3):368-73.
8. Bezboruah G, Kalita S. Serum vitamin D status in children with epilepsy on antiepileptic drugs and its relation to the frequency of breakthrough seizures. Int J Contemp Pediatr 2023;10:1262-7.
9. Iragamreddy VR, Channegowda RC. Study of association of vitamin D levels in children and adolescents on antiepileptics drug therapy. Int J Contemp Pediatr 2023;10:774-9.