



Relationship between Vitamin D and Brainstem Auditory Evoked Potentials (BAEPs)

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Objective

It is known that vitamin D has differential roles in cell proliferation, differentiation, neurotransmission and neuroplasticity in nervous system and exerts neurotrophic and neuroprotective effects, even different functions of vitamin D has been studied by advocating that vitamin D should be classified as a neurosteroid. It has been long known that vitamin D deficiency, VDR dysfunction, hyperparathyroidism and hypervitaminosis are potential causes for sensorineural hearing loss [1]. Here, we aimed to evaluate BAEPs (Brainstem Auditory Evoked Potentials) before treatment in patients with rickets

Material and methods

This study included BAEPs (brainstem auditory evoked potentials) evaluations of 30 patients aged 0-15 years who were diagnosed as rickets in Child Endocrinology department of Yüzüncü Yıl University, Prof.Dr.Dursun Odabaş Medical Center between January, 2014 and July, 2014.

Results

Mean age was 2.15 ± 4.12 years (min-max: 0.07-15.13) in 30 patients with rickets. There were 8 girls (25.8%) and 23 boys (74.2%). When biochemical and hormone values were studied in patients with rickets, the following results were observed: mean calcium value, 8.09 ± 1.52 mg/dL; mean phosphor value, 4.24 ± 1.53 mg/dL; mean magnesium value 1.95 ± 0.23 mg/dl; mean alkaline phosphatase value 838.23 ± 627.86 U/L; mean parathormone value, 314.82 ± 310.76 pg/mL; mean creatinine kinase value, 173.58 ± 239.73 U/L; mean albumin value 4.05 ± 1.41 g/dL; and mean 25 OH vitamin D level 5.52 ± 3.20 ng/mL.

Mean and standard deviations and maximum-minimum values were calculated for latencies of waves I, II, III, IV and V and I-III, III-V and I-V intervals in BAEP studies (Table 1). When BAEPs of bilateral ear were assessed together, it was found that there was prolongation in latency of wave I in 19 patients, (63.3%), in latency of wave II in 9 patients (30%), in latency of wave II in 19 patients (63.3%), in latency of wave IV in 4 patients (13.4%), in latency of wave V in 14 patients (46.6%) and in latency of interval I-III in 19 patients (63.3%), in latency of interval III-V in 13 patients (43.3%) and in latency of interval I-V in 20 patients (66.6%). A marked prolongation was detected in the latencies of waves I, II, V, I-III and III-V.

Table 1. The mean and standart deviation values of patients' wave latencies at 90 db HL.

	Left		Right		Total (Result [prolonged; n(%) / normal; n(%)])
	mean± SDS (Min-max)	Result [prolonged;n(%) / normal; n(%)]	mean± SDS (Min-max)	Result prolonged;n(%) / normal; n(%)	
I	1,90±0,35 (1,17-2,81)	16 (53,3)/14 (46,7)	1,92±0,45 (1,09-2,92)	14 (46,7)/16 (53,3)	19 (63,3) /11 (36,7)
I SDS	2,53±3,64 (-4,3-6,00)		2,62±4,13 (-5,50-17,00)		
II	2,89±0,33 (2,3-4,05)	6 (20)/24 (80)	2,94±0,48 (2,27-4,60)	6 (20)/24 (80)	9 (30) /21 (60)
II SDS	0,60±1,30 (-2,6-2,8)		0,74±1,56 (-1,70-4,50)		
III	4,30±0,53 (3,35-5,73)	11 (36,7)/19 (63,3)	4,25±0,58 (3,39-5,49)	17 (56,7)/13 (43,3)	19 (63,3) /11 (36,7)
III SDS	1,84±3,33 (-2-11)		0,69±4,02 (-9,10-9,70)		
IV	5,45±0,58 (4,62-6,77)	5 (16,7)/25 (83,3)	5,45±0,58 (4,30-6,55)	4 (13,4)/26 (86,6)	4 (13,4) /26 (86,6)
IV SDS	0,90±2,35 (-5,5-9,1)		0,91±2,09 (-2,40-7,70)		
V	6,28±0,59 (5,13-7,59)	7 (23,3)/23 (76,7)	6,30±0,65 (5,38-7,70)	13 (43,3)/17 (56,7)	14 (46,6) /16 (53,4)
V SDS	1,42±4,71 (-7-15,00)		0,97±5,46 (-5,50-22,00)		
I-III	2,41±0,41 (1,55-3,08)	9 (30)/21 (70)	2,32±0,36 (1,67-3,32)	17 (56,7)/13 (43,3)	19 (63,3) /11 (36,7)
I-III SDS	-0,68±8,50 (-35-23,00)		-2,33±6,78 (-31,00-7,50)		
III-V	1,97±0,33 (1,33-2,64)	7 (23,3)/23 (76,7)	2,11±0,43 (1,39-3,47)	12 (40)/18 (60)	13 (43,3) /17 (56,7)
III-V SDS	-0,41±1,93 (-6,10-4,30)		0,46±2,44 (-4,70-6,00)		
I-V	4,41±0,47 (3,64-5,41)	15 (50)/15 (50)	4,39±0,40 (3,75-5,16)	17 (56,7)/13 (43,3)	20 (66,6) /10 (33,4)
I-V SDS	-1,15±2,97 (-10,-60)		-0,93±3,14 (-9,10-5,60)		
Total		22 (73,3)/8 (26,7)		27 (90)/ 3 (10)	28 (93,3) /2 (6,7)

Conclusion

We intended to emphasize that there could be prolongation in BAEP studies in patients with rickets and that there should be need for detailed examination to monitor this prolongation in subsequent years

References

1. Allgrove J. A practical approach to rickets. In: Allgrove J, Shaw NJ (eds). Calcium and Bone Disorders in Children and Adolescents, Endocr Dev. Basel, Karger, 2009; 16:115-132.

