Nutritional status in neurologically impaired children and its relation with bone mineralization

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Background and objectives

Malnutrition and low bone mineral density (BMD) are common in neurologically impaired (NI) children.

AIM: assess nutritional status, bone health and the relation between the two conditions in our population of NI children.

Methods

✓ Recruitment November 2014- December 2015 children with epilepsy attending Neurology Unit.

1) **Nutritional assessment:** feeding history, weight, height, body mass index (BMI) and triceps skinfold thickness (TST).
2) **Biochemical analyses:** parathormone (PTH), 25-hydroxy-vitamin D (25OH-D), bone alkaline phosphatase (BAP) and carboxy-terminal collagen (CTX).
3) **BMD measurement at lumbar spine** (L1-L4) with Dual Energy X-ray Absorptiometry (DEXA).

Population

✓26 NI subjects (mean age 9,9 + 3,7 years, M:F ratio 11:15, all Caucasian except for one Hispanic).

✓Diagnoses were: cerebral palsy (CP) 42.3% (n=11), epilepsy of various etiology associated with mild or no motor impairment (epilepsy without CP) 57.7% (n=15).

Results

Characteristic	Prevalence %	
	Total	CP
Weight < -2 SDS	30.7% (8/26)	63.6% (7/11)
Height < -2 SDS	26.9% (7/26)	63.65 (7/11)
BMI < -2 SDS	34.6% (9/26)	72.7% (8/11)
TST< 10° c.le	38.5% (10/26)	72.7% (8/11)
25OH-D ≤ 20 ng/ml	65% (17/26)	81.8% (9/11)
L1-L4 BMD z-score ≤ -2	38.5% (10/26)	72.7% (8/11)

Tabe1. Nutritional status, vitamin D levels and bone mineral density in our population of NI children.

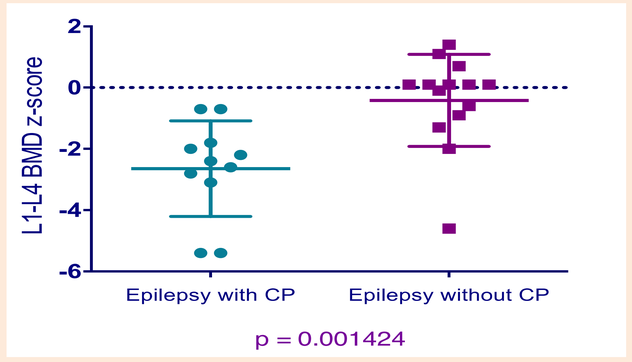


Figure1. L1-L4 BMD z-scores of epileptic children with CP (mean L1-L4 BMD z-score -2.64 ± 0.47) and without CP (mean L1-L4 BMD z-score -0.3 ± 0.38); p=0.0014.

Marker	CP (n=11)	not-CP (n=15)	p
25OH-D (ng/ml)	13,14 ± 2,6	18,38 ± 3,18	0,12
PTH (pg/ml)	61,98 ± 5,37	56,83 ± 5,29	0,89
BAP (UI/L)	99,6 ± 14,81	136,47 ± 16,74	0,048*
CTX (ng/l)	1210, 91 ± 118,4	1624 ± 209,15	0,039*

Table 2. Markers of bone metabolism . *= statististically significant values

Results

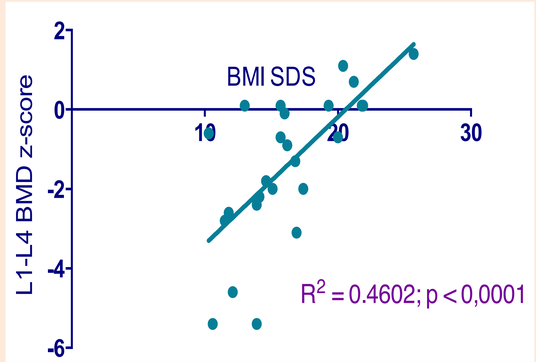
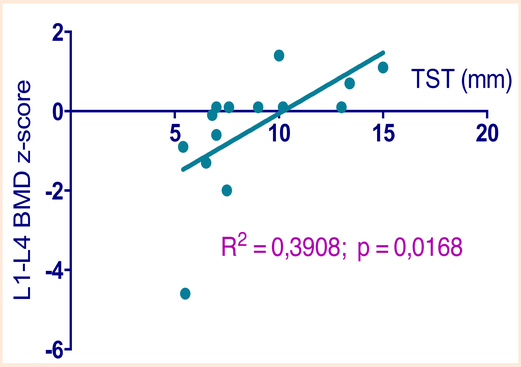


Figure 2. Direct correlation between BMI SDS and L1-L4 BMD z-score.

Figure 3. Direct correlation between TST (mm) and L1-L4 BMD z-score.



Conclusions

High prevalence of malnutrition, vitamin D insufficiency and poor bone mineralization in NI children, particularly in those with CP. Direct correlations between nutritional status (BMI and TST) and bone mineralization (L1-L4 BMD). Nutritional status negatively impacts on bone mineralization.

Conflicts of interest: none declared