

Low Trabecular Bone Score in Children with Inflammatory Bowel diseases



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Objective: Trabecular bone score (TBS) is an emerging technology to assess bone microarchitecture of the lumbar spine. We aimed to assess TBS in children with inflammatory bowel diseases (IBD) and to evaluate correlations with clinical, laboratory and densitometric variables.

Methods: A retrospective study of TBS and areal bone mineral density (aBMD) measurements by dual-energy X-ray absorptiometry (DXA) of children with IBD. Clinical, anthropometric and laboratory data were retrieved from the medical charts. Bone mineral apparent density was calculated for size adjustment. TBS standard deviation scores (SDS) for each child were calculated based on data from a healthy population of similar age and gender distribution.

Results:

- Thirty-five patients (age at diagnosis 12.6±3.4 years, 22 males) were included.
- The mean TBS was 1.359±0.090.
- The mean TBS-SDS was -0.369, significantly lower than expected for healthy children (p=0.016).
- TBS was positively correlated with weight-SDS (r=0.480, p=0.003), body mass index (BMI)-SDS (r=0.491, p=0.003) and DXA measurements: lumbar spine bone mineral content (BMC) (r=0.416, p=0.013) and total body less head aBMD (r=0.475, p=0.004).
- In a subgroup of patients (n=13) who performed the DXA scan close to the diagnosis of IBD, a negative correlation was found between TBS and fecal calprotectin at diagnosis (r=-0.674, p=0.016).
- A stepwise linear regression analysis identified BMI z-score as an independent predictor of TBS (r²=0.469, p<0.001).

Table 1. Demographic and clinical characteristics of participants

Patient characteristics	N=35
Age at diagnosis, years*	12.6±3.4
Male gender (%)	22 (63%)
Disease duration, months**	10.9 (2.8-23.4)
Disease type	
Crohn disease	26 (74%)
Ulcerative colitis	9 (26%)
Disease activity at diagnosis (PGA)	
Moderate	18 (56%)
Severe	14 (44%)
Medical treatment	
Corticosteroids	14 (40%)
Imuran	16 (46%)
Anti TNF-α	15 (43%)
6MP/MTX	11 (31%)
Antibiotics	23 (66%)
Disease activity at DXA (PGA)	
Remission	17 (53%)
Mild	5 (16%)
Moderate	7 (22%)
Severe	3 (9%)

Table 2. Anthropometric and laboratory data

	At diagnosis	At DXA	p-value
Age, years	12.6±3.4	14.0±2.5	<0.01
Height-SDS	-0.38±1.12	-0.44±1.17	0.99
Weight-SDS	-0.78±1.42	-0.31±1.63	<0.01
BMI-SDS	-0.78±1.42	-0.18±1.58	<0.01
Blood tests			
Hemoglobin, g/dl	11.3 (9.9-12.3)	12.9 (11.8-13.6)	<0.01
CRP, mg/l	26.1 (12.1-74.3)	1.3 (0.5-6.4)	<0.01
Albumin, g/dl	3.6 (3.3-4.0)	4.3 (3.9-4.5)	0.03
calprotectin, mcg/g	668 (336-1500)	464 (147-1054)	0.91
Calcium, mg/dl	9.2 (8.8-9.6)	9.5 (9.0-9.8)	0.07
Phosphorus, mg/dl	4.0 (3.5-4.6)	4.6 (3.9-4.9)	0.16
ALK. PHOS, IU/l	122 (98-165)	199 (121-244)	0.02
25-OH Vit. D, ng/ml	25 (13.7-47.5)	27 (13-45.7)	0.14
DXA			
aBMD L1-4 z-score		-1.16±0.97	
aBMD TBLH z-score		-0.49±1.03	
BMAD z-score		-1.17±1.15	
TBS		1.359±0.090	

Conclusions: Children and adolescents with IBD had lower TBS compared to healthy children. TBS correlated with BMI, BMC and aBMD. This finding may likely reflect the deteriorative effect of IBD on bone microarchitecture.