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BONE HEALTH IN CHILDREN WITH INTESTINAL FAILURE MEASURED BY DUAL ENERGY X-RAY ABSORPTIOMETRY AND HAND RADIOGRAPHY

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Aim of the study: Children with intestinal failure (IF) are at risk of developing low bone mineral density (BMD). A relatively new technique to measure BMD is to obtain a bone health index (BHI) with the BoneXpert® software in hand radiographs. We aimed to evaluate the prevalence of low BMD measured by dual energy X-ray absorptiometry (DXA) and hand radiography and compare these methods in the assessment of low BMD in children with IF.

Methods: Retrospective study including children with IF with ≥ 1 DXA scan or hand radiograph between 2000 and 2015. Standard deviation scores (SDS) of BMD total body (BMDTB), lumbar spine (BMDLS) and BHI were collected. Low BMD was defined as <-2 SDS. Relationship between BMDTB SDS and BHI SDS was analyzed using Spearman correlation coefficient and Cohen's kappa.

Main results: Forty-eight patients (22 boys) were identified, of which 21 (44%) with short bowel syndrome. Median parenteral nutrition duration at January 1, 2015 was 49 weeks. At a median age of 6 years, 5/38 patients (13%) had low BMDTB and 6/38 (16%) low BMDLS. At a median age of 5.1 years, 12/25 children (48%) had BHI SDS below -2.
Sixteen children (33%) had DXA and hand radiograph performed within a period of ≤ 6 months. Taking BMDTB SDS as the standard, hand radiography had a sensitivity of 82% and specificity of 92% to detect a low BMD. Positive and negative predictive values were 90% and 86%. Spearman correlation coefficient was 0.856 (p< 0.001) and Cohen's kappa 0.749 (substantial).

Conclusion: The prevalence of low BMD ranged between 13-48%, depending on the method used. Agreement between DXA and hand radiography to detect low BMD in children with IF was good. Hand radiography using the BoneXpert® software seems to be a feasible method for monitoring of bone health in these children.