analesdepediatría

www.analesdepediatria.org

ORIGINAL ARTICLE

Low bone mineral density in juvenile idiopathic arthritis: Prevalence and related factors☆

Rocío Galindo Zavala[a,b,*], Esmeralda Núñez Cuadros[a], Laura Martín Pedraz[c], Gisela Díaz-Cordovés Rego[d], Carlos Sierra Salinas[e], Antonio Urda Cardona[c]

[a] *Sección de Reumatología Pediátrica, UGC Pediatría, Hospital Regional Universitario de Málaga, Málaga, Spain*
[b] *Departamento de Pediatría y Farmacología, Facultad de Medicina, Universidad de Málaga, Málaga, Spain*
[c] *UGC Pediatría, Hospital Regional Universitario de Málaga, Málaga, Spain*
[d] *Sección de Reumatología Pediátrica, UGC Reumatología, Hospital Regional Universitario de Málaga, Málaga, Spain*
[e] *Sección de Gastroenterología y Nutrición Infantil, UGC Pediatría, Hospital Regional Universitario de Málaga, Málaga, Spain*

Received 6 October 2016; accepted 28 December 2016
Available online 12 September 2017

KEYWORDS
Bone mineral density;
Juvenile idiopathic arthritis;
Low bone mineral density for chronological age;
Body composition;
Bone turnover markers;
Nutritional status

Abstract
Introduction: Height adjustment is currently recommended for *Z*-score bone mineral density (BMD) assessed by dual energy X-ray absorptiometry.

At present there are no studies that evaluate the prevalence of low BMD in paediatric patients with juvenile idiopathic arthritis (JIA) in Spain following current recommendations.
Objectives: To evaluate low BMD in JIA in paediatric patients with JIA in Spain following the latest recommendations, as well as to assess associated factors.
Methods: Observational cross-sectional study of Spanish JIA patients from 5 to 16 years-old, followed-up in a Paediatric Rheumatology Unit between July 2014 and July 2015.

Anthropometric, clinical and treatment data were recorded. Dual energy X-ray absorptiometry, and bone metabolism parameters were collected, and a completed diet and exercise questionnaire was obtained.
Results: A total of 92 children participated. The population prevalence estimation of low BMD was less than 5% (95% CI).

A significant positive correlation was found in the multiple linear regression analysis between the body mass index percentile (*B*: 0.021; $P < .001$) and lean mass index (*B*: 0.0002; $P = .012$), and BMD *Z*-score adjusted for height (*Z*-SAH). A significant negative correlation was found between fat mass index (*B*: −0.0001; $P = .018$) and serum type I collagen N-propeptide (*B*: −0.0006; $P = .036$) and *Z*-SAH.

☆ Please cite this article as: Galindo Zavala R, Núñez Cuadros E, Martín Pedraz L, Díaz-Cordovés Rego G, Sierra Salinas C, Urda Cardona A. Baja densidad mineral ósea en artritis idiopática juvenil: prevalencia y factores relacionados. An Pediatr (Barc). 2017;87:218–225.

* Corresponding author.
E-mail address: rociogalin@hotmail.com (R. Galindo Zavala).

Conclusions: Low BMD prevalence in JIA patients in our population is low.

An adequate nutritional status and the prevalence of lean over fat mass seem to promote the acquisition of bone mass. Those JIA patients with lower BMD could be subjected to an increase of bone turnover.

PALABRAS CLAVE
Densidad mineral ósea;
Artritis idiopática juvenil;
Baja densidad mineral ósea para la edad cronológica;
Composición corporal;
Marcadores del metabolismo óseo;
Estado nutricional

Baja densidad mineral ósea en artritis idiopática juvenil: prevalencia y factores relacionados

Resumen

Introducción: Actualmente se recomienda ajustar por talla el Z-score densidad mineral ósea obtenido mediante absorciometría de rayos X de doble energía en pediatría. No hay estudios en nuestro medio que evalúen la prevalencia de baja densidad mineral ósea para la edad cronológica (BDMOec) en niños con artritis idiopática juvenil (AIJ) siguiendo estas recomendaciones.

Objetivos: Estimar la prevalencia de BDMOec en niños con AIJ en nuestro medio y evaluar los factores implicados en su desarrollo.

Métodos: Estudio observacional, transversal, en españoles niños de 5-16 años con AIJ, en seguimiento por una unidad de reumatología pediátrica entre julio de 2014 y julio de 2015.

Se recogieron datos antropométricos, clínicos y de tratamiento. Se realizaron absorciometría de rayos X de doble energía, estudio metabólico óseo y encuestas sobre dieta y ejercicio.

Resultados: Participaron 92 niños. La estimación de la prevalencia poblacional de BDMOec fue inferior al 5% (IC 95%).

En el análisis multivariante el percentil de índice de masa corporal (B: 0,021; $p < 0,001$) y el índice de masa magra (B: 0,0002; $p = 0,012$) presentaron relación positiva con el Z-score de DMO ajustado por talla, mientras que el índice de masa grasa (B: −0,0001; $p = 0,018$) y el propéptido aminoterminal del colágeno tipo I (B: −0,0006; $p = 0,036$) presentaron correlaciones negativas.

Conclusiones: La prevalencia de BDMOec en los niños con AIJ en nuestro medio es baja. Un adecuado estado nutritivo y el predominio de la masa magra sobre la grasa podrían favorecer la adquisición de masa ósea. Aquellos pacientes con AIJ con DMO más baja podrían estar sometidos a un aumento del remodelado óseo.

Introduction

Osteoporosis, which traditionally has been considered an adult disease, is an increasingly prevalent disease in children due to the increased life expectancy of paediatric patients with chronic diseases and the use of osteotoxic drugs, among other factors.[1]

Dual-energy X ray absorptiometry (DXA) of the lumbar spine or the whole body is the gold standard for the measurement of bone mineral density (BMD) in the paediatric age group, as recommended by the International Society for Clinical Densitometry (ISCD) in 2007.[2] The assessment of BMD through this technique uses the *Z*-score, which expresses the number of standard deviations (SDs) that the patient's BMD deviates from the mean BMD of healthy controls of the same age and sex.[2] Many authors have also expressed the need to adjust the *Z*-score for height for a more accurate assessment,[3] and the updated 2013 recommendations of the ISCD called for doing so in children with short stature.[4]

Zemel et al. proposed a formula for the adjustment of the BMD *Z*-score (*Z*-BMD) for height that has been validated in healthy children, which eliminates the height bias from the *Z*-BMD. The authors claim that this adjustment should be performed in every child.[3]

In patients with juvenile idiopathic arthritis (JIA), as happens in other children with chronic diseases, bone accrual may be inhibited by direct and indirect mechanisms.[5]

Establishing the prevalence of osteoporosis and low BMD for chronological age (LBMDca) in this group of patients is not easy, as most of the studies published in the literature did not use current definitions,[6,7] and none were performed in the Spanish population.

In respect of the factors involved in the development of osteoporosis and LBMDca in this group of patients, the prevailing hypothesis is that of a multifactorial aetiology that would include the inflammatory activity of the disease, the drugs used for its treatment and a low level of physical activity.[5,8] However, the data on the role of some of these factors are inconsistent.