



ORIGINAL ARTICLE

## Vitamin D deficiency at pediatric intensive care admission<sup>☆</sup>

Corsino Rey<sup>a,\*</sup>, David Sánchez-Arango<sup>b</sup>, Jesús López-Herce<sup>c</sup>,  
Pablo Martínez-Cambor<sup>d</sup>, Irene García-Hernández<sup>e</sup>, Belén Prieto<sup>f</sup>, Zamir Pallavicini<sup>g</sup>

<sup>a</sup> Pediatric Intensive Care Unit, Hospital Universitario Central de Asturias, Universidad de Oviedo, Oviedo, Spain

<sup>b</sup> Pediatric Day Care Center of Culleredo and Complejo Hospitalario Universitario A Coruña, A Coruña, Spain

<sup>c</sup> Pediatric Intensive Care Department, Hospital General Universitario Gregorio Marañón, Instituto de Investigación Sanitaria Gregorio Marañón, Universidad Complutense de Madrid, Madrid, Spain

<sup>d</sup> Oficina de Investigación Biosanitaria FICYT, Universidad de Oviedo, Oviedo, Spain

<sup>e</sup> Pediatric Service, Complejo Hospitalario Universitario A Coruña, A Coruña, Spain

<sup>f</sup> Biochemical Department, Hospital Universitario Central de Asturias, Universidad de Oviedo, Oviedo, Spain

<sup>g</sup> Pediatric Service, Hospital Universitario Central de Asturias, Oviedo, Spain

Received 22 April 2013; accepted 7 August 2013

Available online 30 October 2013

### KEYWORDS

25 hydroxivitamin D;  
Critically-ill children;  
Critical care;  
Prognostic markers;  
Mortality risk

### Abstract

**Objective:** to assess whether 25hydroxivitaminD or 25(OH)vitD deficiency has a high prevalence at pediatric intensive care unit (PICU) admission, and whether it is associated with increased prediction of mortality risk scores.

**Method:** prospective observational study comparing 25(OH)vitD levels measured in 156 patients during the 12 hours after critical care admission with the 25(OH)vitD levels of 289 healthy children. 25(OH)vitD levels were also compared between PICU patients with pediatric risk of mortality III (PRISM III) or pediatric index of mortality 2 (PIM 2) > p75 [(group A; n=33) vs. the others (group B; n=123)]. Vitamin D deficiency was defined as < 20 ng/mL levels.

**Results:** median (p25-p75) 25(OH)vitD level was 26.0 ng/mL (19.2-35.8) in PICU patients vs. 30.5 ng/mL (23.2-38.6) in healthy children (p=0.007). The prevalence of 25(OH)vitD < 20 ng/mL was 29.5% (95% CI: 22.0-37.0) vs. 15.6% (95% CI: 12.2-20.0) (p=0.01). Pediatric intensive care patients presented an odds ratio (OR) for hypovitaminosis D of 2.26 (CI 95%: 1.41-3.61). 25(OH)vitD levels were 25.4 ng/mL (CI 95%: 15.5-36.0) in group A vs. 26.6 ng/mL (CI 95%: 19.3-35.5) in group B (p=0.800).

**Conclusions:** hypovitaminosis D incidence was high in PICU patients. Hypovitaminosis D was not associated with higher prediction of risk mortality scores.

© 2013 Sociedade Brasileira de Pediatria. Published by Elsevier Editora Ltda.

Este é um artigo Open Access sob a licença de [CC BY-NC-ND](#)

<sup>☆</sup> Please cite this article as: Rey C, Sánchez-Arango D, López-Herce J, Martínez-Cambor P, García-Hernández I, Prieto B, et al. Vitamin D deficiency at pediatric intensive care admission. J Pediatr (Rio J). 2014;90:135–42.

\* Corresponding author.

E-mail: [crey@uniovi.es](mailto:crey@uniovi.es) (C. Rey).

**PALAVRAS-CHAVE**

25-hidroxivitamina D;  
Crianças gravemente  
doentes;  
Terapia intensiva;  
Indicadores  
prognósticos;  
Risco de mortalidade

**Deficiência de vitamina D em internações na unidade de terapia intensiva pediátrica****Resumo**

**Objetivo:** avaliar se a deficiência da 25-hidroxivitamina D, ou 25 (OH) vitD, tem prevalência elevada em internações na unidade de terapia intensiva pediátrica, e se estaria relacionada à previsão de escores de risco de mortalidade.

**Método:** estudo observacional prospectivo comparando níveis de 25 (OH) vitD de 156 pacientes, mensurados nas primeiras 12 horas da internação em terapia intensiva, com níveis de 25 (OH) vitD de 289 crianças saudáveis. Os níveis de 25 (OH) vitD também foram comparados entre pacientes na UTIP com escore PRISM III ou PIM 2 > p75 (Grupo A; n = 33), e o restante, (Grupo B; n = 123). A deficiência de vitamina D foi definida como níveis < 20 ng/mL.

**Resultados:** o nível médio (p25-p75) de 25 (OH) vitD foi 26,0 ng/mL (19,2-35,8) em pacientes internados na UTIP, em comparação a 30,5 ng/mL (23,2-38,6) em crianças saudáveis (p = 0,007). A prevalência de 25 (OH) vitD < 20 ng/mL foi de 29,5% (IC 95%, 22,0-37,0), em comparação a 15,6% (IC 95%, 12,2-20,0) (p = 0,01). Os pacientes em terapia intensiva pediátrica apresentaram uma razão de chance (RC) para hipovitaminose D de 2,26 (IC 95%, 1,41-3,61). Os níveis de 25 (OH) vitD foram 25,4 ng/mL (IC 95%, 15,5-36,0) no grupo A, em comparação a 26,6 ng/mL (IC 95%, 19,3-35,5) no grupo B (p = 0,800).

**Conclusões:** a incidência de hipovitaminose D foi elevada em pacientes em terapia intensiva pediátrica, mas não foi associada à maior previsão de escores de risco de mortalidade.

© 2013 Sociedade Brasileira de Pediatria. Publicado por Elsevier Editora Ltda.

Este é um artigo Open Access sob a licença de [CC BY-NC-ND](#)

**Introduction**

Low levels of vitamin D are common in adult and pediatric populations.<sup>1</sup> Vitamin D deficiency has been classically related with osseous illness, such as rickets. Currently, vitamin D deficiency is considered to be related with overall mortality,<sup>2</sup> prevention of infections, innate immunity,<sup>3</sup> hypertension,<sup>4</sup> hypertriglyceridemia, type 1 and 2 diabetes mellitus,<sup>5</sup> neoplasms,<sup>6</sup> and autoimmune disorders.<sup>7</sup> In children, it has been related to severe asthma, bronchiolitis episodes, and lower response to corticoids.<sup>8</sup>

The most important source of vitamin D is the skin, through the action of ultraviolet B radiation on 7dehydrocholesterol. Vitamin D must be metabolized to 25 hydroxvitamin D (25(OH)vitD) in the liver, which is an inactive precursor with a half-life of approximately two to three weeks. The half-life of the active form (1,25(OH)vitD) is only four to 24 hours.<sup>9</sup> For that reason, 25 (OH)vitD has been the most common form of vitamin D measured in previous studies<sup>10</sup> In healthy children, age, skin pigmentation, season of the year, sun exposure, and dietary calcium intake influence 25(OH)vitD concentrations. Most studies have adopted the definition of vitamin D insufficiency as 25(OH)vitD concentrations lower than 30 ng/mL, and vitamin D deficiency as concentrations below 20 ng/mL.<sup>10</sup>

Recently, vitamin D deficiency has been associated with higher illness severity upon admission, mortality, and worse short and long term outcomes in adult intensive care units (ICU) patients.<sup>11-13</sup> Several studies<sup>14-16</sup> provided new information regarding the relationship between vitamin D status and critical illnesses in children admitted to pediatric ICUs (PICUs). It was observed that hypovitaminosis D is a common finding in critically-ill children. McNally et al.<sup>16</sup> also reported that vitamin D deficiency was associated with greater severity of critical illness. However, Rippel et al.<sup>14</sup> did not find an

association between hypovitaminosis D and length of stay or hospital survival. Vitamin D status may play an important role in acute stress and critical illness, but its pleiotropic effects in acute illness are not completely understood. Many confounding factors (hemodilution, interstitial extravasation, decreased synthesis of binding proteins, renal wasting of 25(OH)vitD, pH, underlying disease, season of the year, age, and dietary supplementation, among others) influence vitamin D status during critical illness.<sup>17</sup> To date, there is no consensus regarding the optimal definitions of vitamin D deficiency, nor the threshold levels to define health benefits.<sup>17,18</sup>

Therefore, this study aimed to investigate whether vitamin D deficiency is highly prevalent in patients admitted to a PICU. The secondary objective was to verify whether vitamin D deficiency would be associated with increased mortality risk scores and illness severity at PICU admission.

**Patients and methods**

This study was a secondary analysis of data and biological samples collected as part of the new prognosis biomarkers investigation, a prospective observational study set in the eight-bed PICU of the Hospital Universitario Central de Asturias, in Oviedo, Spain. The study protocol was approved by the Hospital Ethics Committee. The study was conducted in 156 patients admitted to the PICU and aged less than 16 years. The exclusion criteria were no blood extraction during the first 12 hours after admission; lack of consent to participate by parents or by children older than 12 years; known or suspected adrenal, pituitary, or hypothalamic disease; and use of systemic steroids for > ten days in the previous month, or more than one dose of systemic steroids within 24 hours of admission (except for dexamethasone).

Download English Version:

<https://daneshyari.com/en/article/4154057>

Download Persian Version:

<https://daneshyari.com/article/4154057>

[Daneshyari.com](https://daneshyari.com)