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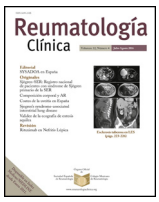

Original Article

Vitamin D Insufficiency and Deficiency in Mexican Patients With Systemic Lupus Erythematosus: Prevalence and Relationship With Disease Activity☆

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ABSTRACT

Objectives: To determine and compare the prevalence of vitamin D insufficiency and deficiency in patients with systemic lupus erythematosus (SLE) with and without disease activity.
Patients and methods: We made a comparative, observational, cross-sectional, prospective study of 137 women with SLE according to American College of Rheumatology criteria. Patients with chronic kidney disease, cancer, hyperparathyroidism, pregnancy, and lactation were excluded. Disease activity was assessed using the MEX-SLEDAI score: a score of ≥3 was considered as disease activity. Data were collected on diabetes mellitus, the use of corticosteroids, chloroquine, and immunosuppressants, photoprotection and vitamin D supplementation. Vitamin D levels were measured by chemiluminescent immunoassay: insufficiency was defined as serum 25-hydroxyvitamin D <30 ng/mL and deficiency as <10 ng/mL.
Results: 137 women with SLE (mean age 45.9 ± 11.6 years, disease duration 7.7 ± 3.4 years) were evaluated. Mean disease activity was 2 (0–8): 106 patients had no disease activity and 31 had active disease (77.4% versus 22.6%). Vitamin D insufficiency and deficiency was found in 122 (89.0%) and 4 (2.9%) patients, respectively. There was no significant difference in vitamin D levels between patients with and without active disease (19.3 ± 4.5 versus 19.7 ± 6.8; $P = .75$). No correlation between the MEX-SLEDAI score ($P = .21$), photosensitivity, photoprotection, prednisone or chloroquine use and vitamin D supplementation was found.
Conclusions: Women with SLE had a high prevalence of vitamin D insufficient. No association between vitamin D levels and disease activity was found.

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Insuficiencia y deficiencia de vitamina D en pacientes mexicanas con lupus eritematoso sistémico: prevalencia y relación con actividad de la enfermedad

Palabras clave:
Lupus eritematoso sistémico
Vitamina D
Insuficiencia
Deficiencia

R E S U M E N

Objetivos: Determinar la prevalencia de insuficiencia y deficiencia de vitamina D en pacientes con lupus eritematoso sistémico (LES) y compararlas con actividad de la enfermedad.
Pacientes y métodos: Estudio comparativo, observacional, transversal y prolectivo. Se incluyeron 137 mujeres con LES según los criterios del Colegio Americano de Reumatología. Se excluyeron pacientes con enfermedad renal crónica, cáncer, hiperparatiroidismo, embarazo y lactancia. La actividad fue medida mediante el índice MEX-SLEDAI, considerando actividad ≥ 3. Se obtuvieron los siguientes datos: diabetes mellitus, uso de glucocorticoides, cloroquina e inmunosupresores, fotoprotección y suplementación con vitamina D. Los niveles de vitamina D se midieron con inmunoanálisis quimioluminiscente considerando insuficiencia a niveles séricos de 25-hidroxivitamina D < 30 ng/ml y deficiencia < 10 ng/ml.
Resultados: Se evaluaron 137 mujeres con LES (edad promedio 45,9 ± 11,6 años, duración de la enfermedad 7,7 ± 3,4 años). La mediana de actividad mediante MEX-SLEDAI fue 2 (0-8),106 pacientes en inactividad y 31 con actividad (77,4% versus 22,6%). La insuficiencia y deficiencia de vitamina D se encontró en 122 (89,0%) y 4 (2,9%) pacientes respectivamente. Al comparar los niveles de vitamina D entre pacientes con y sin actividad no existieron diferencias estadísticamente significativas (19,3 ± 4,5 versus 19,7 ± 6,8; p = 0,75); tampoco se encontró una correlación con el puntaje MEX-SLEDAI (p = 0,21) ni fotosensibilidad, fotoprotección, uso de prednisona, cloroquina ni suplementación con vitamina D.
Conclusiones: Las mujeres con LES presentaron elevada prevalencia de insuficiencia de vitamina D. No se encontró asociación de niveles de vitamina D con actividad de la enfermedad.

Introduction

Vitamin D (vit D) is a fat-soluble prohormone that acts by binding to vitamin D receptor (VDR).[1] The discovery of VDR in most of the cells of the immune system (lymphocytes and macrophages) suggests that it participates in the regulation of the immune response, beyond its traditional role in bone health and calcium homeostasis. Vitamin D has been related to several chronic diseases such as cardiovascular disease, cancer and autoimmune diseases like type 1 diabetes mellitus, multiple sclerosis, rheumatoid arthritis and systemic lupus erythematosus (SLE).[2,3] The latter is a multisystem autoimmune disease characterized by a diversity of immunological changes. A number of the immunomodulatory activities of vit D deficiency counteract the immunological alterations observed in SLE. This vitamin has been related to inhibition of the production of IgG anti-double-stranded DNA (anti-dsDNA), dendritic cell maturation and interferon alpha (IFN-α) gene expression in patients with SLE.[4,5] A recent study also showed that patients with SLE and vit D deficiency had greater IFN-α activity and B-cell activation compared with those who had higher vit D levels. This fact shows that vit D insufficiency can intensify the immunological changes in SLE patients[6]; this deficiency seems to be multifactorial (lack of sun exposure, use of sunscreens, glucocorticoid therapy and chronic kidney disease).[7,8] The epidemiology of vit D insufficiency in SLE patients in tropical countries like Mexico should be analyzed, as we have access to preventive and therapeutic methods. However, the relationship between vit D levels and disease activity is a controversial subject. The objectives of this study are to determine the prevalence of vit D insufficiency and deficiency in Mexican SLE patients and compare the vit D levels in patients with and without disease activity.

Patients and Methods

In this observational, cross-sectional, prospective study we enrolled Mexican Mestizo women who met the classification criteria for SLE of the American College of Rheumatology (ACR).[9,10] The patients were from the research unit for systemic autoimmune diseases of Hospital General Regional N.° 36 of the Mexican Social Security Institute, Puebla, Mexico. All of the participants signed the informed consent form. The local institutional committee approved the study. The sample size was determined in accordance with the difference in vit D in SLE patients with and without disease activity. The calculated minimum sample size was 126 patients. The participating women were legally of age (≥18 years), and were excluded if they had chronic kidney disease (creatinine clearance <60 mL/min), cancer or hyperparathyroidism, and if they were pregnant or breastfeeding. A structured interview was held to obtain demographic data and the medical history, including age, a history of photosensitivity, the use of sunscreens, disease duration, a diagnosis of diabetes mellitus, glucocorticoid (prednisone) therapy and dose at the time of the study, as well as administration of immunosuppressive agents, chloroquine and vit D supplementation. Physical examination provided weight, height and body mass index.

Disease Activity

We used the Systemic Lupus Erythematosus Disease Activity Index, validated for the Mexican population (MEX-SLEDAI),[11] to evaluate disease activity. This resulted in a group of patients with no activity—MEX-SLEDAI score of 0–2—and those with activity, indicated by a score of ≥3.[12]

Vitamin D Measurements

Several serum samples were collected to measure serum 25-hydroxyvitamin D (25[OH]D) using an ARCHITECT chemiluminescent microparticle immunoassay (Abbott, Abbott Park, IL, United States). Vitamin D insufficiency was defined as 25(OH)D levels <30 ng/mL and deficiency as <10 ng/mL.[7,13] For the statistical analysis, we considered any level of vit D <30 ng/mL to be low.

Statistical Analysis

All of the statistical estimates were performed using the statistical software package SPSS version 18.0 for Windows (SPSS Inc., Chicago, IL, United States). Normality of the data was established