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Vitamin D Supplementation and Systemic Lupus Erythematosus

Pamela Rangen, PA-S, M.Ed., RRT-NPS, AE-C

Abstract

• Patients with systemic lupus erythematosus (SLE) are prone to hypovitaminos D because of their photosensitivity.
• Vitamin D has beneficial effects not only on bone metabolism but also on the function of the immune system.
• Vitamin D levels depend on many variables, including sun exposure, age, ethnicity, body mass index, use of medications and supplements.
• Patients with SLE should avoid the sun because of photosensitive rash and potential for disease flare, so adequate oral supplementation is critical.

In addition, to the traditional known metabolic activities, vitamin D has been shown to modulate the immune system, and its deficiency has been linked to the development of several autoimmune disorders including SLE.

• The purpose of this review was to determine if vitamin D has an immunosuppressive effect and if it can suppress autoimmunity.
• The findings indicated that repletion of vitamin D has benefits beyond bone health for patients with certain autoimmune disorders, such as SLE.

Introduction

• Systemic lupus erythematosus is an autoimmune inflammatory disease with diverse clinical manifestations which affects several different organ systems.
• Vitamin D deficiency is widespread and has been associated with many chronic diseases, including autoimmune disorders.
• Vitamin D and its analogs may be related to the prevention of autoimmune diseases, but they could also be used to treat these diseases.
• Vitamin D can also be considered as a potential anti-inflammatory agent and immunosuppressant.

Statement of the Problem

• The prevalence and incidence of autoimmune diseases, such as systemic lupus erythematosus is on the rise.
• Researchers have identified 80-100 different autoimmune diseases and suspect at least 40 additional diseases of having an autoimmune basis.
• Further research is needed into the immune system and vitamin D deficiency, one process involved in development of autoimmune disease.
• This research can further explore the potential outcome of vitamin D supplementation and suppression of autoimmunity.

Research Question

• In patients with systemic lupus erythematosus, is vitamin D supplementation an effective adjunctive therapy to standard medical treatment at increasing the probability of remission of systemic lupus erythematosus?
• It is reported that vitamin D deficiency is more prevalent among SLE patients than in the general population. One possible explanation for this is the universal recommendation of photoprotection for these patients. In addition, many drugs, such as glucocorticoids and hydroxychloroquine, interfere with vitamin D metabolism and determine changes in the serum levels of 25 (OH) D.
• Attar et al., also found that vitamin D deficiency was frequent in patients with SLE. More specifically they found that patients with SLE have a higher risk of developing 25 (OH) D deficiency in the presence of low serum C3 and C4 levels, and high anti-dsDNA levels.
• A randomized placebo-controlled study by Abou-Raya et al., with 267 patients evaluated inflammatory and hemostatic biomarkers, as well as, disease activity rate, before and after oral supplementation with 200 IU of cholecalciferol daily for a period of 12 months. At baseline, the mean 25 (OH) D was 19.8 mg/ml in patients and 28.7 mg/ml in controls. The prevalence of vitamin D insufficiency (10-30 mg/ml) or deficiency (< 10 mg/ml in the beginning of the study was 69% and 39% respectively. After 12 months of supplementation, there was significant improvement in the levels of inflammatory and hemostatic markers, and disease activity was reduced in the treatment group when compared with the placebo group.

A systematic review by Sakthiswary et al., found a total of 22 studies met the selection criteria. The majority of the studies were observational (95.5%) and cross-sectional (90.9%) out of the 15 studies which looked into the association between vitamin D and SLE disease activity, 10 studies (including the three largest in the literature) revealed statistically significant inverse relationship (p > 0.02). There is convincing evidence to support the association between vitamin D levels and disease activity.

Discussion

• Vitamin D has also been shown to facilitate progression of existing autoimmune disease. In a study by Zold et al., 161 patients with an early undifferentiated connective tissue disease were followed for a mean of over two years. Most patients did not progress and remained in an undifferentiated state. Thirty-five (21%) patients went on to develop a defined rheumatologic diagnosis including rheumatoid arthritis, SLE, mixed connective tissue disease, and Sjögren’s disease while 126 did not progress. Baseline characteristics of the two groups were similar. Importantly, the mean vitamin D level was significantly lower in the group that progressed to a definitive disease.

• Induction and dosing to achieve and maintain adequate levels of 25 (OH) D depends on the initial serum level and individual risk factors of each patient, such as obesity, Malabsorption disease, concomitant medications, and limited sun exposure.

• On average, 100 IU/day of vitamin D intake is needed to increase 1 mg/ml of serum 25 (OH) D, which takes about 3 months to become stable once supplementation is started.

References


Applicability to Clinical Practice

• The reported prevalence of systemic lupus erythematosus in the population is 20 to 150 cases per 100,000. In women, prevalence rates vary from 164 (white) to 406 (African American) per 100,000.
• Due to improved mildness of disease, the incidence nearly tripled in the last 40 years. Estimated incidence rates are 1 to 25 per 100,000 in North America, South America, Europe and Asia.

• Vitamin D supplementation is considered to be safe, inexpensive, and widely available agent that may be effective as a disease-suppressing intervention for patients with SLE alone with their current medical regimen.
• One could propose the reduction or discontinuance of current standard medical intervention by supplementation of vitamin D. The application of cost-effectiveness to patients also plays a clinical role.

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