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Assessment of serum vitamin D level and its relationship with disease activity in adult patients with Systemic Lupus Erythematosus (SLE)

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Aim

Vitamin D is a steroid hormone that has a critical role in calcium metabolism, skeletal health, immune system regulation, and bone homeostasis.Vitamin D2 (ergocalciferol) and vitamin D3 (cholecalciferol) are two physiological forms of vitamin D.The principal origin of vitamin D3 is assembly by the conversion of 7-dehydrocholesterol to pre-vitamin D3 in the skin by UVB rays-exposed surface, and a smaller amount of it is provided by the diet . Also, renal impairment, which can happen in subjects with lupus nephritis, could break the hydroxylation of vitamin D .Above all, chronic use of immunosuppressive drugs (especially corticosteroid) as well as medications used regularly for SLE therapy change the metabolism of vitamin D . As physiological and clinical consequences of vitamin D deficiency in SLE are not entirely known, this study was designed to assess vitamin D level in the serum of these patients and its association with disease activ Vitamin D level varies according to the geographic location.

Methods

To evaluate vitamin D levels, 5 ml of peripheral blood samples were obtained from all study subjects. After that,serum samples were isolated from the whole bloods and stored in the -80 °C refrigerator until further evaluations.Vitamin D levels were analyzed by Enzyme-linked immunosorbent assay (ELISA) technique using a commercial kit (CALBIOTECH, CA, USA).

In this study, we applied the widely used cut-off points for describing Vitamin D deficiency, insufficiency and sufficiency as suggested previously by Munns et al.. Therefore, a Vitamin D level less than 12 ng/ml (< 30 nmol/L) was recognized as Vitamin D deficiency, a level between 12-20 ng/ml (30-50 nmol/L) was considered Vitamin D insufficiently, and an optimal level (sufficiency)was determined to be more than 20 ng/ml (50 nmol/L). SPSS version 22.0 for Windows program (SPSS Inc.,Chicago, IL, USA) was utilized for statistical analyses.

Conclusion

Taking all the evidence together, this study revealed that Vitamin D level was negatively and positively correlated with SLEDAI and duration of sun exposure, respectively,in the SLE patients. Moreover, Vitamin D level was lower in patients with photosensitivity and those using sun protector cream. Besides, SLE patients receiving glucocorticoid drugs, had lower levels of Vitamin D in comparison to those who did not. Therefore, it is recommended for the physicians to include Vitamin D supplementation in their medication prescriptions for SLE patients, particularly when glucocorticoids are already being consumed. Furthermore, it would be advantageous for the patients to be exposed to sunlight provided that there is no photosensitivity.

Univariate and multivariate regression analyses of the association between serum vitamin D level and the disease activity (SLEDAI).

	Univariate regression			Multivariate regression		
	Z-score	*P* value	OR (95% CI)	Z-score	*P value*	OR (95% CI)
Smoking	-1.234	0.126	0.65 (0.48-1.253)	-0.742	0.367	0.75 (0.61-1.49)
Sun protector cream use	-0.385	0.700	0.864 (0.41-1.81)	-0.769	0.442	0.69 (0.28-1.75)
Disease duration (Year)	-	-	-	0.240	0.084	1.06 (0.78-1.65)
Sun exposure (hrs/day)	-	-	-	0.121	0.822	1.08 (0.56-2.32)

Results

In this study, we tried to evaluate the association of vitamin D level with different indexes in the SLE patients, among which age in particular, gender distribution, SLEDAI, sun exposure, smoking, photosensitivity, sun protector cream use, and drug regimen. Most importantly, we found that Vitamin D level had significantly negative and positive correlation with SLEDAI and duration of sun exposure, respectively. Moreover, Vitamin D level was lower in patients with photosensitivity and those using sun protector cream. In addition, patients taking glucocorticoid drugs, had lower levels of Vitamin D when compared to those not consuming glucocorticoids.

We found inverse correlation of Vitamin D level and SLEDAI. Furthermore, patients receiving glucocorticoid drugs had lower levels of Vitamin D in comparison to those who did not. As a consequence, it is critical to monitor Vitamin D level in SLE patients regularly and include Vitamin D supplementation in their medication regimen, particularly when glucocorticoids are included in their drug administrations.

Vitamin D level has been shown to impress several immune system pathways, which in turn imposes remarkable consequences for patients with SLE. Our study revealed that Vitamin D level was significantly lower in SLE patients with photosensitivity compared to the patients lacking photosensitivity. In addition, 44% of patients were using sun protector cream, who had significantly lower level of Vitamin D in comparison to those not using sun protector creams. Furthermore, Vitamin D level had a positive correlation with daily duration of sun exposure. Interestingly, we detected a negative correlation between Vitamin D level and SLE disease activity. Therefore, it seems that lower sunlight absorption (even though 35% patients were taking Vitamin D supplementation) caused Vitamin D deficiency in the SLE patients , which may exacerbate clinical manifestations.