Research article

Vitamin D deficiency in rheumatic diseases

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Abstract

Background: Vitamin D is classified as secosteroid. The main source of vitamin D is *de novo* synthesis in the skin. Although vitamin D is consumed in food, dietary intake alone is often insufficient, supplying only 20% of the body's requirement. The role of vitamin D in situations other than calcium homeostasis and bone health has become very topical. It is apparent that vitamin D has significant effects on the immune system and as such may contribute to the pathogenesis of autoimmune diseases.

Objective: To assess the frequency of vitamin D deficiency in our patients with autoimmune rheumatic diseases.

Methods: One hundred Libyan patients with rheumatic diseases who were registered in rheumatology outpatients' clinic, Tripoli Medical Center in the period between January 2017 and June 2017 were included in the study. Blood samples were extracted from these patients and sent for vitamin D (25-hydroxycholicaciferol) level.

Results: One hundred Libyan patients with different rheumatic diseases who were registered in rheumatology out patients' clinic, Tripoli Medical Center, in the period from January 2017 to June 2017 were included in our study. The median age was 47 years (range from 18-58 years). Seventy (70%) patients were female and 30 (30%) patients were male. Ninety eight (98%) patients had vitamin D deficiency. Only 2 (2%) patients had normal vitamin D level. Sixty out of ninety eight (61%) of patients had vitamin D less than 10 ng/ml (ie severe deficiency).

Conclusion: Ninety eight per cent of our patients with different rheumatic diseases had vitamin D deficiency diseases.

Key words: Vitamin D, Autoimmune rheumatic diseases

Introduction

Vitamin D is classified as secosteroid. The main source of vitamin D is *de novo* synthesis in the skin. Although vitamin D is consumed in food, dietary intake alone is often insufficient, supplying only 20% of the body's requirement[1].

The role of vitamin D in situations other than calcium homeostasis and bone health has become very topical. It is apparent that vitamin D has significant effects on the immune system and as such may contribute to the pathogenesis of autoimmune diseases[2]. The net effect of the vitamin D endocrine system on the immune response is an enhancement of innate immunity coupled with multifaceted regulation of adaptive immunity[3].

1,25-dihydroxyvitamin D3 (1,25(OH)2D3) the biologically active metabolite of vitamin D exerts immunomodulation via the nuclear Vitamin D Receptor (VDR) expressed in antigen presenting cells and activated T/B cells[4]. Epidemiological evidence indicates a significant association between vitamin D deficiency and an increased incidence of autoimmune diseases[5].

Materials and Methods

One hundred Libyan patients with rheumatic diseases who were registered in rheumatology outpatients' clinic, Tripoli Medical Center in the period between January 2017 and June 2017 were included in the study. Blood samples were extracted from these patients and sent for vitamin D (25-hydroxycholicaciferol) level. Vitamin D level less than 30 ng/ml was considered as deficiency and levels between 0-10 ng/ml was considered as severe deficiency according to vitamin D council standard. The results were analysed statistically using the Statistical Package for Social Sciences version 11 computer package (SPSS Inc., Chicago, IL., USA).

Results

One hundred Libyan patients with different rheumatic diseases who were registered in rheumatology out patients' clinic, Tripoli Medical Center, in the

period from January 2017 to June 2017 were included in our study. Fifty (50%) patients had Rheumatoid Arthritis (RA), 30 (30%) patients had Systemic Lupus Erythematosus (SLE), 9 (9%) patients had systemic sclerosis, 7 (7%) patients had ankylosing spondylitis and 4 (4%) patients had polymyositis.

The median age was 47 years (range from 18-58 years). Seventy (70%) patients were female and 30 (30%) patients were male. Ninety eight (98%) patients had vitamin D deficiency. Fifty out of ninety eight (51%) patients had RA, 30/98 (30.6%) patients had SLE, 9/98 (9.2%) had systemic sclerosis, 7/98 (7.2%) had ankylosing spondylitis and 2/98 (2%) had polymyositis. Only 2 (2%) patients had normal vitamin D level. Sixty out of ninety eight (61%) of patients had vitamin D less than 10 ng/ml (ie severe deficiency).

Discussion

The vitamin D has direct and indirect effects which might be related to the risk of developing a rheumatic disease or the degree of disease activity[6]. We have three evidences which support the role of vitamin D in autoimmune diseases. The first is the presence of vitamin D receptor on extra-osseous cells, such as cartilage cells, sinoviocytes and muscle cells. The second evidence is the proven role of vitamin D in the control of transcription of genes involved in rheumatic diseases. The third evidence is that the activation of vitamin D not only presents in the kidneys, but also in monocyte-macrophage and lymphocytic cell lines[6].

Most of our patients 98% with different rheumatic diseases had vitamin D deficiency with vitamin D less than 10 ng/ml (severe deficiency) in 60/98 (61%) patients. In Martin- martinez *et al*[7] study which included a total of 2234 patients: 755 RA, 738 AS and 721PsA, in addition to 677 non-inflammatory individuals with OA, osteoporosis and low back pain. They found that the patients with inflammatory diseases had a more marked deficiency of vitamin D< 20 ng/ml, than the non-inflammatory diseases (40.5% in RA; 40% in AS; 41% in PsA; and 26.7% in the control group; (P<0.001).

With respect to RA, Cutolo *et al*[8] point out the changes in the serum vitamin D concentration and the increase in the severity of joint symptoms in patients with this disease. Specifically they found that the lowest vitamin D concentration and the highest RA activity occur in winter. On the other hand, in susceptible populations high vitamin D intake lowers the risk of developing RA and, in individuals who already have the disease; it reduces RA activity.

Mok *et al*[9] included 290 SLE patients. Two hundred and seventy seven (96%) had vitamin D< 30 ng/ml and 77 (27%) patients had vitamin deficiency<15 ng/ml. They found that, vitamin D levels correlated inversely with SLE activity scores as physicians' global assessment (PGA) (β -0.20; P=0.003), total SLEDAI scores (β -0.19; P=0.003) and sub scores due to active renal, musculoskeletal and haematological diseases. Vitamin D supplementation is indicated in patients with SLE for the management of the changes related to bone mineral loss and, in the case of deficiency, can help to reduce the severity of the disease expression[10].

Conclusion

Ninety eight per cent of our patients with different rheumatic diseases had vitamin D deficiency. As there are strong evidences which link vitamin D deficiency to autoimmune rheumatic diseases, this encourages us for more studies testing a therapeutic role of vitamin D in rheumatic diseases.

References

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