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Low Serum Vitamin D Levels in Iranians with Immune Thrombocytopenia: A Single Center Study

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Abstract

Immune thrombocytopenia purpura (ITP) is a disorder characterized by decreased platelet production and degradation. Recently, 1,25[OH]2D3 has been known as an immune modulator. The purpose of our study was to assess the relationship between 1,25(OH)2D3 levels and ITP based on sex, age and duration of disease. The present study was retrospectively conducted by reviewing medical records of the ITP patients. Demographic data including age, sex, and disease history and serum vitamin D levels was extracted and collected in a pre-designed form. Data was reported as Mean ±SD and as frequency (percentage). Independent T-test or ANOVA test was used to compare the mean serum levels of vitamin D based on sex, age or disease history. Subjects enrolled into the study were 140, they were 71 females and 69 males with mean age± SD of 39.90 ± 16.11 years which 87(62.14%) of them in acute and 53(37.86%) of them were in chronic phase of the disease. The mean serum vitamin D level in patients was 18.85 ± 10.87. There was no significant relation between sex and serum vitamin D level (P = 0.943). Patients in the range of 30-40 years have the most frequency and the lowest level of vitamin D in serum (17.11± 9.68). There was no relation between age and vitamin D based on Pearson's test (p=0.181). Vitamin D level in acute ITP patients was lower than chronic ITP patients, but this difference was not meaningful (p=0.403). According to the findings of this study, it is an interesting area of research that vitamin D can be administered as a new immunomodulatory therapy in patients with ITP.

Keywords: Immune Thrombocytopenia (Itp); Vitamin D; Iran

Abbreviations: ITP: Immune Thrombocytopenia Purpura; IVIG: Intravenous Immunoglobulin; VDR: Vitamin D Receptor; RA: Rheumatoid Arthritis; CD: Crohn's Disease; SSc: Systemic Sclerosis; SLE: Systemic Lupus Erythematosus.

Introduction

Immune thrombocytopenia purpura (ITP) is a disorder characterized by immune-mediated accelerated platelet destruction and suppressed platelet production [1]. The incidence is approximately 2.5 per 100,000 persons per year [2]. The goal of treatment is to keep the platelet count above $3\times10^4/mm^3$ to prevent major internal organ bleeding [3]. Current treatment involves intravenous corticosteroids, immunosuppressants such as mycophenolate mofetil, azathioprine, cyclophosphamide and intravenous immunoglobulin (IVIG) [4]. In recent years $1,25(OH)_2D_3$ has been rediscovered as an immune modulator, including anti-proliferation, pro-differentiation, and pro-apoptosis of a variety of cells. These functions of $1,25(OH)_2D_3$ are mediated by binding to vitamin D receptor (VDR). It has been indicated that VDR is not only present in intestine, bone and

kidney but also in peripheral blood monocytes and activated lymphocytes. Therefore, VDR is known to be involved in various immunomodulatory activities [5,6]. Recent studies, have reported a significant link between $1,25(OH)_2D_3$ deficiency and autoimmune diseases, including rheumatoid arthritis (RA), systemic sclerosis (SSc), Crohn's disease (CD) and systemic lupus erythematosus (SLE) [7,8]. By our knowledge, any study has not done about the role of vitamin D deficiency in ITP occurrence but, an article reported that in two patients ITP was treated effectively with vitamin D plus prednisolone [9]. Limited studies have investigated the levels of vitamin D in ITP patients [10,11]. The present study was conducted to assess the relationship between $1,25(OH)_2D_3$ levels and ITP based on sex, age and duration of disease.

Methods and Materials

After approval by the Ethics Committee, the present study was retrospectively conducted by reviewing medical records of the ITP patients who were admitted in hematology-oncology ward of Imam Khomeini Hospital in Urmia-Iran between March 21, 2017 and March 20, 2019. Demographic data including age, sex, disease history, length of hospitalization and serum vitamin D levels was extracted and collected in a pre-designed form (Elisa was used to measure serum vitamin D level). Quantitative variables were reported as Mean ±SD and qualitative variables were reported as frequency (percentage). Independent T-test or ANOVA tests were used to compare the mean serum levels of vitamin D in terms of sex, age or disease history. Data was analyzed using SPSS-17 software and the significance level was less than 0.05.

Results

Subjects enrolled into the study were 140; they were 71 females and 69 males with a female: male ratio of 1.03:1 with mean age± SD of 39.90 ± 16.11 years ranging from 12-71 years. The level of vitamin D (above or below optimal values) in relation to gender is shown in Table 1.

Age group	No.	Mean	SD	Min	Max
<20	16	18.65	11.5	3	46
20-29	36	18.37	10.1	4.39	44.3
30-39	38	17.11	9.68	4.39	44.3
40-49	22	18.49	11.9	3	46
50-59	10	17.97	11.7	4.48	42
60-69	11	28	12.6	5.6	46
70-79	7	19.33	9.5	8.43	36

Table 1: The level of vitamin D in relation to gender.

Table 2 presents vitamin D values distribution according to the age grouping. Patients in the range of 30-40 years have the most frequency and the lowest level of vitamin D in serum (17.11± 9.68 ng/ml). There was no relation between age and vitamin D level in serum (p=0.181).

Serum Vit D* Gender			
p-value= 0.943	69(49.28)	No.(%)	
	18.62	Mean	Male
	10.34	SD	
	4.39	Min	
	46	Max	
	71(50.72)	No.(%)	Female
	19.08	Mean	
	11.43	SD	
	3	Min	
	44.3	Max	

Table 2: Vitamin D values distribution according to the age grouping.

Table 3 shows that vitamin D level in acute ITP patients was lower than chronic ITP patients, but this difference was not meaningful (p=0.403).

p-value	Serum Vit D* Disease history		
0.403	87(62.14)	No.(%)	
	18.37	Mean	Acute
	10.79	SD	
	3	Min	
	46	Max	
	53(37.68)	No.(%)	Chronic
	19.64	Mean	
	11.05	SD	
	4.88	Min	
	46	Max	

Table 3: Vitamin D level in acute and chronic ITP patients.

Discussion

The aim of this study was to assess vitamin D status in patients with ITP and to correlate it with sex, age and illness duration (acute or chronic). The present study included 140 ITP patients (71 females and 69 males), 87 patients with acute and 53 with chronic thrombocytopenia. The proportion of females to males was nearly similar, but in Schoonen, et al. [9] and Soliman, et al. [10] studies ITP in female patients

was higher than male patients, but, in a study in Iran this ration was equal [11]. It seems that probably geographical differences are important factor in this proportion. Although several studies have reported that the incidence of the ITP in females is more than males [9,10,12] but, in studies conducted in Iran, males are almost equal to females [13,14].

The mean age of ITP patients in our study was 39.90 ± 16.11 years; this was higher than what described by Cines, et al. [15] who stated that, the incidence of ITP is more common in women aged between 18 and 40 years. On the other hand Neylon, et al. [16] estimated a higher incidence of ITP among those aged 60 years and older whereas in our study, patients in the age 30-40 have the most incidence but not statically significant in compare with other age groups.

In the present study, we did not find a significant correlation between vitamin D levels and age, sex or disease duration in ITP patients. This finding is in line with the results of a study by Soliman, et al. [10]. Also other studies did not find significant correlation between vitamin D level and age or disease duration in SLE [7] and rheumatoid arthritis [15] patients. In the present study, we have found significantly lower mean $1,25(OH)_2D_3$ levels among ITP cases compared to reference ranges for total serum 25-hydroxyvitamin D, (18.85±10.87 ng/ml) vs (25-80 ng/ml) respectively [19]. These findings were accordance with Soliman, et al. [10] and Mu, et al. [20] results our study has shown that the blood level of vitamin D in chronic ITP was higher than acute ITP however not meaningful statistically, but in Čulić, et al. [21] study results were on the contrary. On the other hand, in the study conducted by Lassandro, et al. [22], the results were in line with our study. But considering that in these studies the sample size was very small and conducted in pediatric groups, so it seems that the comparison of these results with the results of present study is not rational and more and more extensive studies are recommended.

However, there is an obvious limitation of our study, as we did not have the control group of patients and we compared the results by normal range of vitamin D [19]. According to the findings of this and other studies, and reports of Bockow, et al. [3] it is an interesting area of research that vitamin D can be administered as a new immunomodulatory therapy in patients with ITP.

Conclusion

In this study we conducted to assess the relationship between 1,25(OH)2D3 levels and ITP based on sex, age and duration of disease. Our results showed that vitamin D could be useful as a supplement in patients with ITP. To investigate the role of Vitamin D as an immune-modulating drug for patients with ITP, a prospective randomized placebo-controlled trials need to be performed.

Conflict of Interest Statement

The authors stated that there are no conflicts of interest.

Ethic Approval

The study was approved by the ethics committee of Tabriz University of Medical Sciences (Code: 3014-63-09-1396).

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References

1. Liu X, Hou Y, Peng J (2013) Advances in immunopathogenesis of adult immune thrombocytopenia. Front Med 7(4): 418-424.

2. Fogarty PF (2009) Chronic immune thrombocytopenia in adults: epidemiology and clinical presentation. Hematol Oncol Clin North Am 23(6): 1213-1221.

3. Bokow B, Kaplan TB (2013) Refractory immune thrombocytopenia successfully treated with high-dose vitamin D supplementation and hydroxychloroquine: two case reports. J Med Case Rep 7: 91.

4. Thota S, Kistangari G, Daw H, Spiro T (2012) Immune thrombocytopenia in adults: an update. Cleve Clin J Med 79(9): 641-650.

5. Sharkawy AE, Malki A (2020) Vitamin D Signaling in Inflammation and Cancer: Molecular Mechanisms and Therapeutic Implications. Molecules 25(14): 3219.

6. Liu W, Li H, Hao Y, Lia Y, Lva M, et al. (2016) Decreased immunosuppressive actions of 1, 25-dihydroxyvitamin D3 in patients with immune thrombocytopenia. J Mol Immunol 78: 89-97.

7. Arab F, Rastin M, Faraji F, Rabe SZT , Tabasi N, et al. (2015) Assessment of 1,25-dihydroxyvitamin D3 effects on Treg cells in a mouse model of systemic lupus erythematosus. Immunopharmacol. Immunotoxicol 37(1): 12-18.

8. Zerr P, Vollath S, Zerr KP, Tomcik M, Huang J, et al. (2015) Vitamin D receptorregulates TGF-beta signalling in systemic sclerosis. Ann Rheum Dis 74(3): e20.

9. Schoonen WM, Kucera G, Coalson J, Li L, Rutstein M, et al. (2009) Epidemiology of immune thrombocytopenic purpura in the general practice research database. Br J

Haematol 145(2): 235-244.

10. Soliman A, Elsalakawy W, Saeed A, Mohammed SA (2017) Low serum vitamin D levels in egyptian adults with chronic primary Immune thrombocytopeniasingle center study. IJAR 5(3): 1789-1797.

11. Saeidi S, Jaseb K, Asnafi AA, Fakher R, Pourmotahari F, et al. (2014) Immune Thrombocytopenic Purpura in Children and Adults: A Comparative Retrospective Study in IRAN. IJHOSCR 8(3): 30-36.

12. Kistanguri G, McCrae KR (2013) Immune Thrombocytopenia. Hematol Oncol Clin North Am 27(3): 495-520.

13. Nazari SH, Gorji FA, Koupai MTS (2012) Epidemiology of Idiopathic Thrombocytopenic Purpura in Children. Iranian Journal of Pediatric Hematology Oncology 2(1): 35-39.

14. Alavi S, Malek F, Eghbali A, Arzanian MT, Shamsian Sh, et al. (2009) Immune Thrombocytopenic Purpura and relevant factors in patients in Mofid Children Hospital from 2003 to 2008. Sci J Iran Blood Transfus Org 6(3): 165-173.

15. Cines DB, Bussel JB (2005) How I treat thrombocytopenic purpura (ITP). Blood 106(7): 2244-2251.

16. Neylon AJ, Saunders PW, Howard MR, Proctor SJ, Taylor PR, et al. (2003) Northern Region Haematology Group. Clinically significant newly presenting autoimmune thrombocytopenic purpura in adults: a prospective study of a population-based cohort of 245 patients. Br J Haematol 122(6): 966-974.

17. Emam FE, Wahab TMAbdE, Mohammed MS, Elsalhy SA, Rahem SIA, et al. (2014) Assessment of serum vitamin D level in patients with systemic lupus erythematosus. Egyptian Rheumatology and Rehabilitation 41(2): 71-78.

18. Rossini M, Bongi MS, Montagna GL, Minisola G, Malavolta N, et al. (2010) Vitamin D deficiency in rheumatoid arthritis: prevalence, determinants and associations with disease activity and disability. Arthritis Res. Ther 12(6): R216.

19. Kennel KA, Drake MT, Hurley DL (2010) Vitamin D Deficiency in Adults: When to Test and How to Treat. Mayo Clin Proc 85(8): 752-758.

20. Mu W, Wang W, Cui ZG, Sui AH (2013) Expression and significance of vitamin D and its receptor mRNA in the peripheral blood of initial immune thrombocytopenic patients. Journal of experimental Hematology 21(3): 684-687.

21. Culic S, Markic J, Petrovic D, Konjevoda P, Pavelic J, et al. (2016) Serum vitaminD levels in children with newly diagnosed and chronic immune thrombocytopenia. Seminars in Hematology 53(s1): S67-S69.

22. Lassandro G, Carriero F, Palmieri V, Palladino V, Amoruso A, et al. (2020) Serum Vitamin D Levels in Children with Immune Thrombocytopenia. Endocr Metab Immune Disord Drug Targets 20(2): 221-226.