



Vitamin D Deficiency and *Toxoplasma* Infection

Zohre FAKHRIEH KASHAN¹, *Saeede SHOJAEE¹, Hossein KESHAVARZ¹, Mohsen ARBABI², Mahdi DELAVARI², Mahbobeh SALIMI¹

1. Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran
2. Department of Medical Parasitology, School of Medicine, Kashan University of Medical Sciences, Kashan, Iran

*Corresponding Author: Email: S_shojaee@tums.ac.ir

(Received 09 Jan 2018; accepted 24 Jan 2018)

Dear Editor-in-Chief

Toxoplasmosis the zoonotic disease with world-wide distribution is life-threatening in congenital from and in immunocompromised patients (1). According to seroepidemiological studies, 18%-85% of infection is reported from different parts of Iran (2, 3). Both humoral and cellular immune systems are involved in *T. gondii* infection (4). In addition regulation role in calcium and phosphorus metabolism, vitamin D is an immunomodulator (5). On the other hand 1, 25-(OH) 2 D can act as anti-proliferative agent in mononuclear cells (5) and reduce the production of IL2 and prevention of auto-immune diseases. Vitamin D deficiency is increasing in the world (6) and it is estimated 70% in Iranian people (7). Based on this project, from the referred patients to Medical Laboratory in Kashan, Iran, 70 individuals checked for vitamin D were selected. People taking vitamin D supplements in the last 3 months and patients with chronic diseases were excluded from the study. Blood samples were

conducted after 10 h of fasting. Vitamin D levels and anti-*Toxoplasma* IgG antibody were checked by commercial kit (EUROIMMUN, Germany) and ELISA method respectively. The mean age of participants was 40 yr, 72% were female and 28% were male. Average vitamin D levels were 9.9 ng/ml in deficient group and 67.23 ng/ml in normal group. Anti-*T. gondii* IgG antibody was positive in 17.14% of normal vitamin D group and 28.57% in vitamin D deficient group ($P \leq 0/05$) (Tables 1,2,3). Statistical analysis was done by SPSS software (ver. 16, Chicago, IL, USA) and results expressed as mean \pm SD. The significant differences of values were analyzed using Student's t-test and one-way ANOVA test ($P \leq 0.05$).

There was widespread high prevalence of vitamin D deficiency in populations (6, 7). On the other hand, *T. gondii* infection is one of the most prevalent infectious diseases worldwide.

Table 1: Average concentration of vitamin D (ng/ml) and percent of *Toxoplasma* seropositivity in groups A, B

No.	Type	Vitamin D average concentration(ng/ml)	<i>Toxoplasma</i> seropositivity (%)
Group A (35)	Vitamin D deficient	9.9	28.57
Group B (35)	Normal vitamin D	67.23	17.14

Table 2: Average concentration of vitamin D (ng/ml) and percent of *Toxoplasma* seropositivity in age groups of group A

Age (yr)	No.	Vitamin D average concentration (ng/ml)	Toxoplasma seropositivity No. (%)
0-10	1	16.26	-
11-20	3	4.6	-
21-30	7	7.77	1(2.85)
31-40	14	7.38	5 (14.28)
41-50	5	13.6	3 (8.58)
>50	6	10.35	1 (2.85)
Total	35	9.9	10 (28.56)

One-Way ANOVA test ($P < 0.05$)

Table 3: Average concentration of vitamin D (ng/ml) and percent of *Toxoplasma* seropositivity in age groups of group B

Age (yr)	No.	Vitamin D average concentration (ng/ml)	Toxoplasma seropositivity No.(%)
0-10	4	56.62	1 (2.85)
11-20	-	-	-
21-30	5	49.23	1(2.85)
31-40	3	60.4	-
41-50	12	55.58	3 (8.5)
>50	11	47.11	1 (2.85)
Total	35	67.23	6 (17.14)

One-Way ANOVA test ($P < 0.05$)

Regarding the results of this study, the difference in prevalence of *T. gondii* infection in two groups of vitamin D sufficient and deficient individuals was noticeable and *Toxoplasma* infection was associated with vitamin D deficiency. More studies are suggested for in vivo and in vitro interpretation of vitamin D and parasitic infections.

Acknowledgements

This study was supported by Department of Medical Parasitology, and approved by ethical committee of Tehran University of Medical Sciences.

Conflict on interests

The authors declare that there is no conflict of interests.

References

- Ramos JM, Milla A, Rodríguez JC et al (2011). Seroprevalence of *Toxoplasma gondii* infection among immigrant and native pregnant women in Eastern Spain. *Parasitol Res*, 109(5): 1447-52.
- Bayani M, Mostafazadeh A, Oliace F, Kalantari N(2013). The Prevalence of *Toxoplasma gondii* in hemodialysis patients. *Iran Red Crescent Med J*, 15(10):e5225.
- Sharbatkhori M, Dadi Moghaddam Y, Paghehp A et al (2014). Seroprevalence of *Toxoplasma gondii* infections in pregnant women in Gorgan city, Golestan province, northern Iran-2012. *Iran J Parasitol*, 9(2): 181-87.
- Denkers EY (1999). T lymphocyte-dependent effector mechanisms of immunity to *Toxoplasma gondii*. *Microbes Infect*, 1(9): 699-708.
- Huhtakangas JA, Veijola J, Turunen S et al (2017). 1,25(OH) 2D3 and calcipotriol, its hypocalcemic analog, exert a long-lasting anti-

- inflammatory and anti-proliferative effect in synoviocytes cultured from patients with rheumatoid arthritis and osteoarthritis. *J Steroid Biochem Mol Biol*, 173:13-22.
6. Pirdehghan A, Vakili M, Dehghan R, Zare F (2016). High prevalence of vitamin D deficiency and adverse pregnancy outcomes in Yazd, a central province of Iran. *J Reprod Infertil*, 17(1): 34-38.
 7. Bonakdaran Sh, Ghayour-Mobarhan M, Fakhraee F (2015). Assessment of 25 hydroxyvitamin D level and its correlation with metabolic syndrome in Mashhad. *Medical Journal of Mashhad University of Medical Sciences*, 58:88-95. [Persian]