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Letter to the Editor

Toxoplasma gondii Infection and Alcohol Consumption: An Age-and Gender-Matched Case-Control Seroprevalence Study

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Dear Editor-in-Chief

Very little is known about the link between *Toxoplasma gondii* infection and alcohol consumption. In two cross-sectional studies, *T. gondii* exposure was associated with alcohol consumption (1, 2). However, there is not a previous report about the association between *T. gondii* infection and alcohol consumption assessed by an age- and gender-matched case-control study design.

We sought to determine this association in a sample of people in Durango City, Mexico from January 2017 to August 2019. Two hundred and fourteen subjects with a history of alcohol consumption (cases) and 214 subjects without alcohol consumption (controls) were examined for anti-*T. gondii* antibodies. Each group included 78 males and 136 females. Cases were recruited in Alcoholic Anonymous centers (n=127) and health care centers (n=87).

The age in cases (mean: 34.41±11.27; range: 17-68 years) was similar (*P*=0.97) to that in controls (mean: 34.37±11.31; range 17-68). There was no difference (*P*=0.44) in residence place between groups. Sera of participants were analyzed for detection of anti-*T. gondii* IgG antibodies using the enzyme immunoassay "*Toxoplasma gondii* IgG" kit (Diagnostic Automation/Cortez Diagnostics, Inc., Woodland Hills, California. USA). Anti-*T. gondii* IgG seropositive samples were tested for anti-*T. gondii* IgM antibodies by the enzyme immunoassay "*Toxoplasma gondii* IgM" kit (Diagnostic Automation/Cortez Diagnostics, Inc.).

The Institutional Review Board of the Institute of Security and Social Services of State Workers in Durango City, Mexico approved this study.

Ten (4.7%) of the 214 cases and 21 (9.8%) of the 214 controls had anti-*T. gondii* IgG antibodies (OR: 0.45; 95% CI: 0.20-0.98; *P*=0.04). As shown in Table 1, stratification by gender and age showed a lower seroprevalence of *T. gondii* infection in male cases than in male controls (*P*=0.03), and in cases aged 31-50 years than in controls of the same age group (*P*=0.03). Cases of Alcoholics Anonymous had the lowest seroprevalence of *T. gondii* infection (Table 2). The frequency of high (>150 IU/ml) levels of anti-*T. gondii* IgG antibodies was similar in cases and in controls (6/10:

60% and 13/21; 61.9%, respectively; *P*=0.91). One (10%) of the 10 cases and 5 (23.8%) of the 21 controls with anti-*T. gondii* IgG antibodies were also positive for anti-*T. gondii* IgM antibodies (*P*=0.63).

Table 1: Stratification by sex and age in cases and controls and seroprevalence of *T. gondii* infection

Variable	***Cases***			***Controls***				
	No.	Seropositivity to *T. gondii*		No.	Seropositivity to *T. gondii*		OR (95% CI)	*P*
Characteristics	tested	No.	%	tested	No.	%		
Gender								
Male	78	1	1.3	78	8	10.3	0.11 (0.01-0.93)	0.03
Female	136	9	6.6	136	13	9.6	0.67 (0.27-1.62)	0.37
Age (yr)								
≤30	86	4	4.7	87	6	6.9	0.65 (0.17-2.42)	0.74
31-50	110	6	5.5	108	15	13.9	0.35 (0.13-0.95)	0.03
>50	18	0	0.0	19	0	0.0	-	-

Table 2: Comparison of *T. gondii* seropositivity rates in cases and controls according to recruitment place

Variable	***Cases***			***Controls***				
	No.	Seropositivity to *T. gondii*		No.	Seropositivity to *T. gondii*		OR (95% CI)	*P*
Place	tested	No.	%	tested	No.	%		
AA*	127	3	2.4	127	14	11.0	0.19 (0.05-0.69)	0.01
No AA	87	7	8.0	87	7	8.0	1.00 (0.33-2.98)	1.00

*Alcoholics Anonymous.

The results suggest that seropositivity to *T. gondii* is negatively associated with a history of alcohol consumption. In a study in Poland, no correlation between the presence of *T. gondii* DNA in the brain and excessive alcohol consumption was found (3). In a study about *T. gondii* infection and common mental disorders in the Finnish general population, investigators found that *T. gondii* seroprevalence was not associated with alcohol use disorders (4). In contrast, in a study of postmortem examinations in Poland, researchers found that the frequency of anti-*T. gondii* antibodies was significantly higher in people with positive blood alcohol test results than in their equivalents with negative test results (5). In addition, in a study of patients suffering from heart disease, the frequency of *T. gondii* seropositivity was significantly higher in patients with alcohol consumption than in those without this consumption (1).

Further research to determine the association between *T. gondii* exposure and alcohol consumption is needed.

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Conflict of interest

The authors declare that no conflict of interest exist.

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