

## Original Article

### Prevalence of IgG and IgM Anti-*Toxoplasma gondii* Antibodies in HIV Positive Patients in Northeast of Iran

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#### ABSTRACT

**Background and Objectives:** Toxoplasmosis has become one of the more frequent opportunistic infections and the most common cause of focal brain lesions complicating the course of AIDS. However, there is a little information about the frequency of the toxoplasmosis in various regions of Iran. At the present study, we evaluated the prevalence of toxoplasmosis in patients with AIDS in Mashhad (Northeast Iran).

**Material and Methods:** Overall, 258 suspected patients with CD<sub>4</sub><sup>+</sup> T-cell count and clinical manifestation for HIV infection were referred from Infectious Disease Center to Imam Reza Hospital in 2009. These patients were examined by ELISA, western blot method and tested by P24 antigen. HIV positive patients (n=121) were entered in this cross-sectional study and investigated for IgG and IgM anti-*Toxoplasma* antibodies with ELISA.

**Results:** The mean age of the patients was  $35.83 \pm 6.75$  yr. 83.5% of the patients were intravenous drug misuse. The IgG anti-*Toxoplasma* antibodies were positive in 46 (38.01%) patients, while IgM antibody was detected in 3 cases (2.5%).

**Conclusion:** The rate of toxoplasmosis infection in HIV positive patients is high. Therefore, immediate treatment of these patients is essential in rising specific antibody cases that may cause toxoplasmic encephalitis resulting from its reactivation.

**Key word:** *Toxoplasma gondii*, AIDS, Prevalence, Iran

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## Introduction

*Toxoplasma gondii* may cause a wide range of diseases from abortion to fatal encephalitis. The frequency of reactivated toxoplasmosis depends on the rate of seroprevalence and the concentration of IgG antibodies (1). Therefore, a long-term follow-up is necessary for antibody responses and its relation to clinical and epidemiological parameters (2).

Toxoplasmosis in patients with AIDS is usually the result of reactivation of latent infection. In HIV positive patients, without previous exposure to *T.gondii*, the acute infection could not be well controlled and in these susceptible hosts a wide range of infection is expected (3), although, toxoplasmosis occurs mostly in brain that is the frequent clinical finding (4,5) even in those patients with latent toxoplasmosis. CD4+ T-cell count can show reactivated latent infection. Reduction, under 100/ml and *Toxoplasma* titer greater than 150 IU/ml will be meaningful (2).

Approximately one-third of the human populations have anti-*T. gondii* antibodies (6). However, serologic prevalence varies a greatly in geographical regions within a country, and within different ethnic groups (7-9). It is mentioned the cut-off values used for serologic surveys, are also affected by the seroprevalence (6).

Frequent studies have been done on toxoplasmosis prevalence in Iran, while only few reports have been published on toxoplasmosis in HIV and AIDs patients (10). Therefore, indicating seroprevalence of anti-*Toxoplasma* antibodies in HIV/AIDS patients is quite important, because of high morbidity in this group of patients.

In this study we evaluated the prevalence of toxoplasmosis among those who registered as a HIV positive patients in Mashhad, Khorasan Razavi Province, northeast Iran.

## Material and Methods

### Patients and the applied diagnostic methods:

This cross-sectional study was carried out for six months from February to July 2009 in the city of Mashhad. All suspected patients to HIV infection were referred to Imam Reza Hospital from Infectious Diseases Center for laboratory tests after early diagnosis. These suspected HIV positive patients (based on clinical presentation and CD4+ T-cell count) were examined in this period by ELISA, western blot and IFA using P24 antigen. HIV ELISA and western blot were performed by Biomerieux and MP Diagnostic Kit made in Spain respectively.

Those patients with positive result of ELISA and western blot entered to the study. Besides those patients who had ELISA positive results but with negative western blot were tested by immunoassay using P24 antigen to ensure of the disease, this group of patients were entered to the study group if they had positive result for immunoassay too.

All these confirmed HIV positive patients, were included in the analysis. Totally 121 HIV positive patients were studied for anti-*T. gondii* IgG and IgM antibodies during the whole period.

Anti-*T. gondii* IgG and IgM antibodies were measured on sera of these 121 HIV positive patients by ELISA method using EIAgen Kit. (Adaltis Italia), IgG and IgM anti-*T. gondii* antibodies were detected according to the manufacturer's instructions in the Central Reference Laboratory for Toxoplasmosis in Emam Reza Hospital.

**Epidemiological parameters:** We followed epidemiological parameters such as age, sex, risk factors for HIV transmission, stage of diseases and clinical diagnosis for toxoplasmosis.

## Results

The patients' age were ranged between 15 to 54 years old. The highest frequency of patients was observed in 31-40 years old (43.8%), while patients less than 20 years old had the lowest frequency (Mean 35.83,  $\pm$  6.75). 104 patients (86%) were male, and 17 patients (14%) were female (Table 1). Thirty-four patients were at AIDs stage (28.1%) and the rest were HIV positive (71.9%).

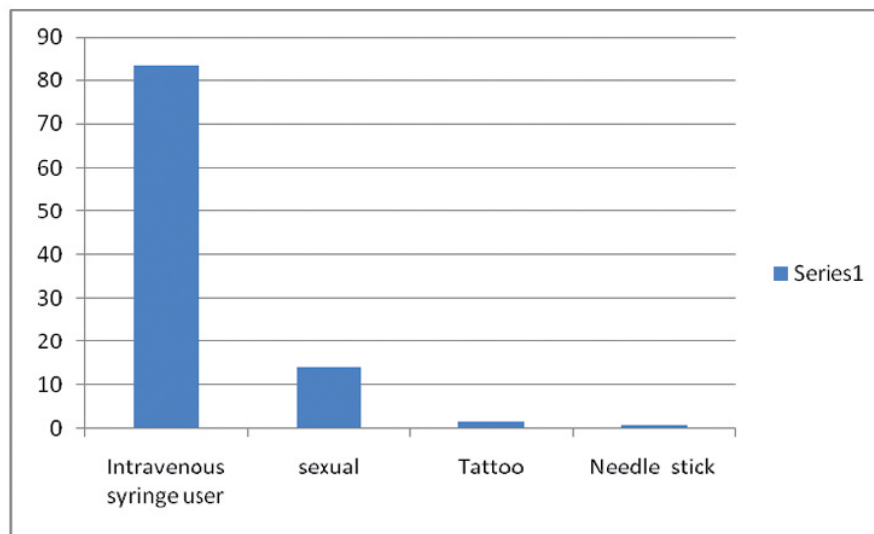
**Table 1:** Frequency of HIV positive patients in different age groups based on gender

Age	Female	Male	Total
Less than 20	1	0	1
2130-	7	25	32
3140-	4	49	53
4150-	4	25	29
Over than 50	1	5	6
<b>Total</b>	17	104	121

**Transmission route in HIV positive patients:**

Our investigation showed 101 out of 121 studied patients were intravenous drug abusers (83.5%). The number of patient who infection by HIV via sexual

activity, tattoo and needle stick was 17(14.04%), 2 (11.65%), and 1(0.82) in this investigated group respectively (Fig.1).

**Fig. 1:** Transmission of HIV in the studied patients

**CD4+ T-cell count:** Aanalysis of CD4+ T-cell number/ microliter showed that only 4 of those 34 patients who were at AIDs stage (14%) had CD4+ T-cell less than 100 / microliter, and the count for the rest were less than 200 / microliter.

**Toxoplasmosis:** The seropositivity of IgG anti-toxoplasma antibodies was in 46 (38.01%) patients and IgM antibodies were positive in three cases (2.5%) (Table2).

**Table 2:** Seroprevalence of anti-Toxoplasma gondii antibodies according to age group

Age	No. of Patients	No. of Patients with IgG+ (%)	No. of Patients with IgM+ (%)
Less than 20	1	0 (0)	0 (0)
2130-	32	11 (23.91)	1 (33.3)
3140-	53	21 (45.65)	1 (33.3)
4150-	29	12 (26.08)	1 (33.3)
Over than 50	6	2 (4.34)	0
<b>Total</b>	121	46	3

**Toxoplasma encephalitis** : Only 2 patients had symptoms of encephalitis, based on symptoms and CT scan taken from HIV+ patients at stage of AIDS. The count of CD4+ T-cell was less than 100 / microliter for both.

## Discussion

Our results showed the seropositivity of IgG anti-*Toxoplasma* antibodies 38.01% in HIV positive patients. There is little report on the seroprevalence of anti-*Toxoplasma* antibody in HIV positive patient in Iran. Davarpanah's report (*et al.*) from Shiraz shows lower prevalence (18.2%) (10). However, our result is comparable with Nissapatorn's report Malaysia (44.8%) (11), while is lower than published report from Ethiopia (93.3%) (12). There are also various reports regarding the frequency of toxoplasmosis in Iran's cities in non-infected HIV patients (13). Those reports indicate the frequency of toxoplasmosis infection can be different in various geographical regions (7, 9). The diagnosis of a recent acquired *T.gondii* infection is usually based on the detection of specific IgM antibody rather than seroconversion or a four-fold or greater rise in the titer of *T.gondii*-specific IgG antibodies. Seroconversion and a rise in IgG titers are rarely demonstrable. Therefore, detection of *T.gondii*-specific IgM antibodies has been the most frequently used serological marker for diagnosing acute infection. Anti-*Toxoplasma* IgM antibody were detected in 3 cases (2.5%) that look similar to other population groups (14).

Investigations on toxoplasmosis in HIV positive patients confirm that they have a greater percentage of anti-*T. gondii* IgG antibodies (1517-). The presence of anti-toxoplasma IgG antibody in HIV+ and AIDS patients can be due to reactivations of the latent *Toxoplasma* infection, as other authors have considered (1518-). Toxoplasmosis is a silent disease, which its diagnostic and treatment is, faced some challenges especially in HIV infected patients, since anti-toxoplasmosis antibody titer are often low (1920-).

In the present study, the greatest number of seropositive cases was found in the 31 to 40 years

age group, since the vast majority of AIDS and HIV infected patients fall into this age range that has been reported in another study (18). In the results obtained, the seroprevalence of anti-*Toxoplasma* antibodies was 38.01% with IgG in AIDS patients and only two patient in AIDS patients developed cerebral toxoplasmosis, similar to what the other researchers have pointed out (14).

## Conclusion

The rate toxoplasmosis infection in HIV positive patients is higher. Therefore, immediate treatment of these patients is essential in rising specific antibody cases that may cause toxoplasmic encephalitis resulting from its reactivation, although further studies may be needed, or further guidelines of HIV/AIDS patients care could be recommended.

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