Iranian J Parasitol: Vol. 3, No. 2, 2008, pp. 34-37

Original Article

Seroprevalence of Toxoplasmosis in Pregnant Women in Ilam Province, Iran

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(Received 10 Jan 2008; Accepted 18 Jun 2008)

Abstract

Background: *Toxoplasma gondii* is an obligate intracellular protozoan parasite which can infect human and animals. Acquired toxoplasmosis during pregnancy can lead to fetal infection, which may ultimately result in loss of fetus or lesion in brain and eyes. This study was performed to evaluate the seroepidemiological status of toxoplasmosis in pregnant women in Ilam City, western Iran.

Methods: In this cross-sectional study, 553 blood samples were collected from pregnant women. Sera were separated by blood centrifugation at 3000 rpm for 5 min and frozen at -20 °C until use. The samples were tested for IgG antibody by Indirect Immunoflourecence antibody test (IFA).

Results: Out of the 553 pregnant women, 247 were positive for *T. gondii* IgG antibodies and 306 were negative. The mean age of women was 21 and the seropositive rate of latent *T. gondii* infection was 44.8%.

Conclusion: About half of the married women in the present study were at risk of infection with *T.gondii*, so preventive method should be considered.

Keywords: *Seroepidemiology, Toxoplasmosis, IFA, Iran*

Introduction

Toxoplasmosis is one of the most common parasitic infections in humans. *Toxoplasma gondii*, an apicomplexan parasite, is a globally distributed obligate protozoon, which can infect the central nervous system of warm-blooded animals as well as humans (1, 2). The general routes of *T. gondii* transmission are well-known with infection usually occurring following ingestion of viable cysts in raw or undercooked meat, or of oocysts shed in cat feces; thus, eating habits and poor hygiene are risk-factors for Toxoplasma infection (2, 3). Specific antibodies against the parasite appear soon after primary infection. The prevalence of *T. gondii* differs among countries worldwide, but also within a country. During the last few decades, a remarkable decrease in the prevalence has been observed. Since raw meat is probably one of the major sources of *T. gondii*, the decrease in prevalence is probably related to improvements in health education and meat processing (4).

Toxoplasmosis is asymptomatic in immunocompetent individuals. *T.gondii* infection may result in the loss of the fetus or lesions normally involve the brain and eyes. The risk of maternal fetal transmission of infection increases with gestational age at the time of exposure, while the incidence of severe disease decreases (2).

Prevention of congenital toxoplasmosis in pregnant women has been based on serological test for *Toxoplasma* antibodies. Many serological tests including the latex agglutination test, ELISA, indirect fluorescence antibody test (IFA) and haemagglutination test have been

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utilized in the detection of antibodies against *T.gondii* (3).

There have been several reports regarding the screening of *T.gondii* antibodies among Iranians. The rate of toxoplasmosis in Karaj (Iran) in 1998 was 45.5% (5). In another study in Chaharmahal and Bakhtyari the seroprevalence of *Toxoplasma* antibodies among pregnant women using IFA was 27.6 % (6). The researches on *Toxoplasma* antibodies demonstrated that about 20-70 % of populations of different countries are infected chronically (4).

In order to plan a strategic approach for the prevention of congenital toxoplasmosis, it is necessary to know the frequency of infection among pregnant women. However the infection should be diagnosed at the early acute stage, when treatment is more effective. There is scarce information about the epidemiology of *T. gondii* infection in pregnant women in Ilam. This study performed in order to determine the *Toxoplasma* antibodies in pregnant women in Ilam,western Iran using IFA method.

Materials and Methods

In this cross sectional study the sample size was calculated as 553 cases on a prevalence of 36%: d=0.04 at a confidence level 96%. The samples were women referred to the central laboratory of Ilam for routine pregnancy test. A total of 553 serum samples were tested at the Department of Parasitology, School of Public Health, Tehran University of Medical Sciences, Iran. Blood samples were collected and sera separated by blood centrifugation at 3000 rpm for 5 min and frozen at -20 °C until use. Antigen prepared from tachyzoites of *T.gondii*, RH strain. Briefly, tachyzoites of *T.gondii*, RH strain, inoculated in peritoneal of Balb/c mice. After 4 days, tachyzoites were collected by peritoneal washing and centrifuged in 2000 rpm, washed 3 times with PBS, coated on microscopic slides and frozen at -20 °C until use. Sera were diluted serially and *Toxoplasma* IgG antibodies were detected with indirect immunoflourscent antibody method in titers of 1:10. Higher titers were evaluated as positive in this study. Ethical Committee of the University approved this study.

Results

44.8% of cases were positive for anti-*T. gondii* IgG antibodies. The mean age of studied women was 21 yr. Therefore the prevalence of latent *T. gondii* infection was 44.8%. Among positive cases 43.7% had titer of 1:10, 34% titer of 1:100, 13.8% titer of 1:200 and 6.1% titer of 1:400 of *T.gondii* IgG antibody. Just 2.4% of positive cases suffered from acute toxoplasmosis.

Discussion

The present study showed a seroprevalence of 44.8% among 553 pregnant women. Therefore these pregnant women were not at risk for toxoplasmosis. The epidemiology of *T. gondii* incection in general, and in pregnant women in particular, had not been studied in Ilam yet. The obtained data here are higher than those of Isfahan and Sabzavar where the researchers found a prevalence of 20.1% and 19.2% in the studied pregnant women, respectively (7,8). Whereas lower prevalence rate was found compare to Tehran (84%) and Mazandaran (74.6%) (9, 10). Other studies of toxoplasmosis include 22.7% in pregnant women from Kermanshah and 46.9% in Kerman (11, 12).

One of the most important ways of *Toxoplasma* transmission in human is consumption of infected meat .Because of low socioeconomic condition and low consumption of meat in Ilam, the high prevalence of toxoplasmosis may be due to consumption of contaminated water or vegetable. The rate of seroprevalence of *Toxoplasma* IgG antibodies in north of Iran was reported 55.7% (13). High seroprevalence rates, reaching 82.2%, have been described previously in Iran (9). The rate of seroprevalence

of *Toxoplasma* antibodies in pregnant women in Bushehr was 37.8 % (14), Kashan 54.2% (15) and in Rafsanjan 48.3 % (16). Seroprevalence of toxoplasmosis differs throughout the world. In Europe, the highest rates are observed in the central and southern regions, while the lowest rates are found in the northern regions (17). The prevalence of infection in other countries includes Korea 79%, Turkey 30.1 % and Jordan 31.7% (3, 17, 18). These differences may relate to climate condition, nutritional behavior and possessing of cat but assay and sampling methods may involve in differences between seroprevalence in all countries. The preventive ways against toxoplasmosis are related to seroprevalence of infection with gestational age and health equipment. Regarding to the result, about half of the married women in the present study were at risk of infection with *T. gondii*, so preventive method should be considered.

Acknowledgments

This study was supported financially by Tehran University of Medical Science. The authors declare that they have no Conflict of Interests.

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