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Research Article

Identification of Toxoplasmosis in Women by Serology in the Baghdad Province, Iraq

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I N F O

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A B S T R A C T

Introduction: Toxoplasmosis is one of the most common parasitic zoonoses around the world. It is caused by *Toxoplasma gondii*. This study aimed to detect the prevalence of toxoplasma in women in Baghdad province.

Method: One hundred and five blood samples were taken from women who had abortions or were at risk of abortion and were admitted to the clinic in the province of Baghdad during the period of 2021-2022. In accordance with the protocol, the blood samples were examined for *T. gondii* IgM and IgG using the ELISA method (Biotech, USA), with the latex agglutination test (LAT) serving as a screening test. Using sterile, disposable hypodermic traveler needles and tubes, patients' arms were used to collect around 3 ccs of venous blood samples. The serum was obtained by centrifuging obtained venous blood at 14,000 rpm for 20 minutes; it was then stored at 80 °C. All the necessary variables for analysis were included in the questionnaire that was created for data collection.

Results: The seropositivity of women who had undergone an abortion caused by *T. gondii* was 44.8% when using LAT, as opposed to 6.7% and 24.8% when using ELISA to detect *T. gondii* IgM and IgG, respectively. The proportion of patients who had previously had two abortions was significantly higher (55.3%). In contrast, only 31 out of 47 individuals (66%) tested positive during the winter-spring season, compared to 16 (34%) during the summer-autumn period.

Conclusion: The percentage of toxoplasmosis in Baghdad among women who had undergone two abortions was significantly high, and the infections occurred mostly during the winter-spring season.

Keywords: Toxoplasma, Percentages, Serology, Baghdad, Women

Introduction

One of the most well-known parasitic zoonoses around the world is toxoplasmosis, which is brought on by the apicomplexan protozoan *Toxoplasma gondii*.[1] Cats are the parasite's primary hosts, and warm-blooded animals serve as their intermediate hosts. There are three infectious stages that occur, namely, Bradyzoites, sporozoites, and tachyzoites.[2]

The parasite is typically detected in the lymph nodes, heart, lungs, and brain.[3,4] 33% of the world's population is affected by this illness.[5]

It is an opportunistic parasitic disease that affects individuals with weakened immune systems.[6] It was discovered that women who are pregnant, elderly people, and children are more likely to contract the disease.[7]

The illness has diverse manifestations, which vary depending on social and cultural norms, regional factors, and modes of transmission. Warm and humid environments are where the illness is most prevalent, and it is brought on by an obligate intracellular protozoan parasite.[8] People may get infected by eating raw or undercooked meat, ingesting cat oocysts that contaminate soil, water, or food, or through tachyzoite trans-placental transmission.[9,10] Pregnancy-related *T. gondii* infection in women may cause newborn mortality or a variety of inborn defects, including hydrocephalus, chorioretinitis, nervous system malformations, and sensory system defects.[9-11]

The protozoan parasite *Toxoplasma gondii* is the cause of the zoonotic illness toxoplasmosis. According to reports, the parasite has infected somewhere between 20% and 90% of adults worldwide. Infection with toxoplasma may occur either orally or congenitally.[12]

Toxoplasmosis was diagnosed using serological tests to identify specific antigens or antibody classes, such as the ELISA, dye test, modified agglutination test, IFAT, and indirect hemagglutination assays test; the prevalence of primary maternal *T. gondii* infection during pregnancy varies among populations in Europe, Asia, Australia, and the United States from about 1 to 310 per 10,000.[13]

This study aimed to detect the prevalence of toxoplasma in women in Baghdad province.

Materials And Methods

A diagnostic study was performed during 2021-2022 after obtaining informed consent from the participants. Ethical clearance for this study was obtained from the Ministry of Health, Iraq. One hundred and five blood samples were taken from women who had abortions or were at risk of abortion and were admitted to the clinic in the province of Baghdad. In accordance with protocol, the blood samples were examined for *T. gondii* IgM and IgG using the ELISA method (Biotech, USA), with the latex agglutination test (LAT) serving as a screening test. Using sterile, disposable hypodermic traveler needles and tubes, patients' arms were used to collect around 3 ccs of venous blood samples. The serum was obtained by centrifuging obtained venous blood at 14,000 rpm for 20 minutes; it was then stored at 80 °C. All the necessary variables for analysis were included in the questionnaire that was created for data collection.

Results And Discussion

As shown in Figure 1, the seropositivity of women who had undergone an abortion caused by *T. gondii* was 44.8% when using LAT, as opposed to 6.7% and 24.8% when using ELISA to detect *T. gondii* IgM and IgG, respectively.

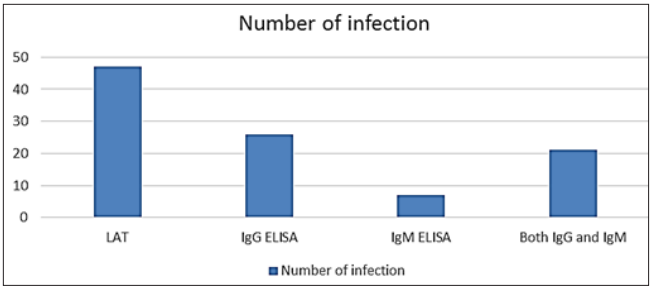

Figure 1.Number of Toxoplasma Cases found using Different Types of Tests

Our results corroborate those of Al-Masoudi,[14] who employed the LAT technique as a screening test and observed an infection incidence of 49.7%. According to the LAT test, the prevalence of toxoplasmosis was 44.8%, which is corroborated by the results of our investigation. Because of its low cost, high specificity, as well as ease of use, LAT offers a great format for routine serological screening, but because it cannot differentiate between immunoglobulin classes, it is not useful when there is a suspicion of congenital infection and it is necessary to distinguish between the maternal and infant IgG responses.[15] The prevalence of anti-toxoplasma IgG and IgM antibodies was assessed using the ELISA technique in women who had undergone an abortion and were referred with IgG higher than IgM based on the study's results. The increased blood IgG levels in women who had undergone an abortion might be a sign that toxoplasmosis manifests more commonly as a chronic infection. Additionally, as seen in Table 1, the proportion of patients who had previously had two abortions was significantly higher (55.3%).

The results of the present research were consistent with those of a study by Shaker et al. that showed that the number of women with two abortions was more than twice as compared to the number of women with single abortion.[16]

Only 31 out of 47 individuals (66%) tested positive during the winter-spring season compared to 16 (34%) during the

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summer-autumn period, thus the winter-spring infections were found to be more common than summer-autumn infections (Table 2).

Table 1.Frequency of Abortion among Infected Patients

Frequency of Previous Abortion	Number (Percentages) of Infected Patients
1	9 (23.7)
2	21 (55.3)
3	6 (15.8)
4	2 (5.3)
Total	38 (36.2)

Table 2.Percentages of Infected Patients during Various Seasons of the Year

Seasons	Number (Percentage) of Infected Patients
Winter-spring	31 (66)
Summer-autumn	16 (34)
Total	47 (44.8)

The prevalence of toxoplasmosis may be affected by a number of factors, including but not limited to management methods and production of livestock, slaughterhouse and food processing cleanliness, cat population density, consumer practices, geographical location, altitude, as well as weather.

It has been speculated that the occurrence of acute toxoplasmosis would decrease during warmer, drier seasons because there are fewer viable oocysts in the environment during those periods.[17] However, there is a striking discrepancy in the published data on how acute human toxoplasmosis varies with the seasons. In contrast to the present findings that acute toxoplasmosis decreases during warmer, drier seasons, another study showed a decline between September and November.[18] Surveillance data for toxoplasmic lymphadenopathy in England and Wales did not show a clear seasonal pattern,[19] although Meenken et al.[20] speculated that the risk of contracting toxoplasmosis could be higher in the Netherlands between March and May. Acute toxoplasma infections among pregnant women in Baghdad were shown to be more common in the winter and the winter/ spring than in summer/ autumn, corroborating the findings of earlier studies.

Pregnant women may be more likely to get acute toxoplasmosis in the winter because they are more likely to come in close contact with indoor-living cats, which may be infected with toxoplasma. The results suggest that this phenomenon should be taken into account when developing toxoplasmosis prevention programmes in this location, especially for pregnant women.

Conclusion

The percentage of occurrence of toxoplasmosis among women who had experienced abortion twice in Baghdad was significantly high. The infection was found to be more common during the winter-spring season.

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Conflict of Interest: None

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