

Seroprevalence of Toxoplasmosis (By Detecting IgM Antibodies) in Women with Repeated Abortions

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ABSTRACT

Objective: To determine seroprevalence of Toxoplasmosis in women with repeated abortions in our local population.

Study Design: Prospective Cross- sectional study

Place and Duration of Study: This study was conducted in the Department of Microbiology Basic Medical Sciences Institute (BMSI) Jinnah Postgraduate Medical Centre (JPMC) Karachi from April 2006 to May 2008.

Materials and Methods: Sera from 130 pregnant and post-aborted women with history of repeated abortions (group A) and 50 pregnant women with no history of abortion (group B – as controls) were analyzed for Toxoplasma IgM antibodies by ELISA technique to see the prevalence of toxoplasmosis.

Results: 24% of women of group A and 14% of women of group B were seropositive for Toxoplasma IgM antibodies. Most of the cases with toxoplasmosis have had their abortions in the first trimester. Gradual increase in Toxoplasma antibody positivity with increasing gravida was observed.

Conclusion: Women with negative serological status are at risk of acquiring a primary infection during pregnancy, hence education regarding preventive measures should be provided to them and every pregnant woman may be advised for Toxoplasma IgM antibodies investigation.

Keywords: Toxoplasmosis, Repeated abortions, Toxoplasma gondii, ELISA.

INTRODUCTION

Toxoplasmosis, a parasitic and zoonotic disease caused by *Toxoplasma gondii*^{1, 2}, is a world-wide health problem³ affecting mainly pregnant women and their fetuses⁴. This maternal infection with adverse outcome is initially in-apparent and is thus difficult to diagnose on clinical grounds^{5, 6}. It is mostly asymptomatic⁷, but its clinical implications in pregnant women are manifold. Such patients may have abortions, repeated (two or more than two)⁸ abortions, still birth or premature delivery in addition to various foetal anomalies in the form of mental retardation, eye, speech and hearing defects^{1,9}. These complications can lead to a significant burden on economic and social structure; hence it would be relevant to determine the prevalence of this infection in local population¹⁰.

According to one estimate over 500 million humans around the world are infected with *Toxoplasma gondii*. The prevalence of toxoplasmosis is 7% to 51.3% in pregnant women, 17.55% to 52.3% in females with history of abnormal pregnancies and abortions worldwide². In cases of females with history of repeated abortions, the seroprevalence is not similar in different countries like 19% in Egypt¹¹, 49.47% in Srinagar⁸ and 53.14% in Indian occupied kashmir¹. High prevalence of toxoplasmosis was reported in women with repeated abortions in many other studies¹². Hence, prevalence is different in different countries, even it varies in different parts of the same country^{1, 13}. The

prevalence also varies in people of different areas of Pakistan. This study was therefore, conducted to determine the prevalence of toxoplasmosis in women with history of repeated abortions.

Today the impact of toxoplasmosis on the health of the unborn child is being discussed worldwide. The availability of sensitive serological methods, the possibility of prenatal diagnosis and treatment of developing foetus are the reasons why World Health Organization (WHO) has encouraged countries to consider the introduction of preventive programmes for pregnant women¹⁴.

MATERIALS AND METHODS

This study was conducted in the Department of Microbiology, Basic Medical Sciences Institute (BMSI) Jinnah Postgraduate Medical Centre (JPMC) Karachi.

130 sera of multi-gravida having 10-20 weeks of gestation and recently aborted females with history of repeated abortions were included as group A in this study. 50 sera of multi-para pregnant females, with same gestational period (10-20 weeks) with no history of abortions, were included as group B.

All the specimens were analyzed for IgM antibodies against *Toxoplasma gondii* by solid phase indirect Enzyme Linked Immunosorbent Assay (ELISA) technique. All the subjects were selected from the Department of Obstetrics and Gynaecology, JPMC, Karachi. Mostly they were housewives and belonged to

low socio-economic group. The age of these women ranged from 18-45 years. Both groups were matched for age, multi-gravidity and socio-economic status.

The sera were collected aseptically and were separated by centrifuging at 1500 rpm for 10 minutes and were stored in refrigerator at -20°C till tested according to the manufacturer's instructions of commercially available kit [Index Toxo IgM EIA kit by EQUIPAR Diagnostic Saronno (Va), Italy]. The results were read by a microwell-reader compared in a parallel manner with calibrators and controls. Toxo IgM activity index (I.A) of less than 0.90 was taken as negative, 0.91 to 1.10 as equivocal and more than 1.10 was taken as positive for IgM antibodies against *Toxoplasma gondii* and indicative of a probable current or recent Toxoplasmosis.

RESULTS

Out of 130 sera, from women with repeated abortions (group A), 31 (24%) were found to be positive for *Toxoplasma* IgM antibody while in controls (group B) 7 out of 50 (14%) were found to be positive (Table-1). Statistically these results were not significant by Chi-square method ($P > 0.05$).

It is observed that most of the positive cases with Toxoplasmosis have had their abortions in the first trimester i.e., 24 out of 31 (77.4%) as compared to those second trimester i.e., 7 out of 31 (22.6%) as shown in Table-2. Statistically this highly significant finding indicates that the Toxoplasmosis causes most abortions in the first trimester.

It is also observed that toxoplasma antibodies positivity increases with increase in the number of gravida (Table-3).

Table No.1: Seroprevalence of *Toxoplasma* IgM antibodies in Women with Repeated abortions (group-A) and Women with no history of abortion (group-B)

Groups	No. of cases tested	Toxoplasma IgM positive		p value
		Total	Percentage	
A	130	31	24%	> 0.05 N.S
B	50	07	14%	

N.S= Non-significant

Table No.2: Relationship between Toxoplasmosis and Duration of Pregnancy at which Abortions occurred in repeated abortion cases

Group A (n=130)	First trimester	Second trimester	P value
Toxoplasma IgM positive (n=31)	24 (77.4%)	07 (22.6%)	< 0.01 H.S
Toxoplasma IgM negative (n=99)	42 (42.4%)	57 (57.6%)	

n = Number of subjects

H.S = highly significant

Table No.3: *Toxoplasma* IgM Positive cases in relation to Number of gravida in group A and B

Group	No. of Gravida	IgM positive cases	Percentage
A (130)*	2-3 (42)*	08	19%
	4-6 (61)*	15	25%
	7-10 (27)*	08	30%
B (50)*	2-3 (23)*	02	09%
	4-6 (24)*	05	21%
	7-10 (03)*	--	--

*Figures mentioned in parentheses are Number of subjects

DISCUSSION

The intracellular protozoan *Toxoplasma gondii* is a wide spread opportunistic parasite of humans and animals. Normally *Toxoplasma gondii* establishes itself within brain and skeletal muscles, persisting for life of the host¹⁵. The domestic cat is the greatest source of human infection¹⁶. Toxoplasmosis is a primary infection in pregnancy, which can cause foetal infection in 40-50% cases and severe disease in about 10% of babies. It is generally believed that intrauterine transmission of parasites cannot occur in immunological normal female, if she is infected before conception¹⁷. Transmission of *Toxoplasma* tachyzoites to the foetus occurs only in mothers who acquire active infection during pregnancy¹⁶. About one-third of all women infected during pregnancy will transmit the parasite to the foetus. Intrauterine transmission occurs in approximately 15%, 30% and 60% of untreated women who develop acute Toxoplasmosis during first, second and third trimester respectively^{1, 2}. Degree of damage depends on the gestational age, since the greatest risk of congenital toxoplasmosis occurs during the first trimester of pregnancy. However, it is during the third trimester that the highest level of transmission occurs but foetal injury is much less severe¹⁸.

In this study, 24% (31/130) women having a history of repeated abortions were positive for *Toxoplasma* IgM antibodies while 14% (7/50) women having no history of abortion (as controls) were IgM positive. Although statistically non-significant ($P > 0.05$), these results are rather intermediate when compared with the reported figures in literature, being higher when compared to a study carried out in Egypt by Sahwi and colleagues on 100 cases of repeated abortion, showing 19% of repeated abortion cases and 7.5% of controls seropositive for toxoplasma IgM antibodies¹¹. In another study in United Arab Emirates (UAE) by Singh, the prevalence was very low and only one case out of 2,343 women of repeated abortion was positive for acute Toxoplasmosis¹⁴. In this study, prevalence tends to below when compared with two separate studies conducted by Zargar and colleagues in Indian occupied Kashmir where 49.47% and 53.14% were reported in women with repeated abortions^{1, 8}. Abdel Hafez from North Jordan reported the presence of anti-Toxoplasma antibodies exceeding two times in habitually aborting women than in non-aborters¹⁹.

The cause of abortions in cases of toxoplasma IgM negative women with history of repeated abortion might be rubella virus, cytomegalovirus, herpes virus, hepatitis virus or others.

In this study, most of the selected cases with toxoplasmosis have had their abortions in the first trimester (24/31) than second trimester (7/31). This highly significant finding indicates that Toxoplasmosis causes more abortions in the first trimester. This is in agreement with Sahwi, who also found most aborted IgM positive cases in the first trimester¹¹. It is also found that Toxoplasma positivity increases as the number of gravida increases both in females with history of repeated abortion as well as in control group. This may be due to decreased immunity or increased exposure to organism with increasing age. This is in agreement with Lodhi from Lahore²⁰ and Ashrafunnessa from Dhaka²¹.

CONCLUSION

Our prevalence rate of Toxoplasma IgM antibodies is 24% in women with the history of repeated abortion that is not significant statistically ($P > 0.05$). As our study is restricted to only those patients attending the out-patient department of Obstetrics and Gynaecology, JPMC, Karachi, and the number of subjects is also less as compared to other studies, so a multi-centered study, including large number of subjects and multiple parameters, should be conducted. Women with negative serological status are at risk of acquiring a primary infection during pregnancy, hence education regarding preventive measures should be provided to them. The extent to which Toxoplasmosis causes repeated abortion is still controversial; therefore, a detailed study to correlate Toxoplasmosis with repeated abortions may be done to recommend the mandatory screening of Toxoplasma IgM antibodies in cases of repeated abortion.

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