

Detection of Toxoplasma Antibodies (IgG, IgM) in Pregnant Women With Bad Obstetric History

Mubashir A. Sheikh, Sabiha Karim and Asima Malik

Department of Clinical Pathology, Jinnah Post Graduate Medical Center Karachi (MAS), Department of Pharmacology, Fatima Jinnah Medical College Lahore (SK) and Department of Biochemistry, Fatima Jinnah Medical College, Karachi (AM).

SUMMARY

Toxoplasmosis is a zoonotic disease caused by Toxoplasma gondii. It infects 5-95% of various human population. It has been frequently incriminated in the causation of abortion, repeated abortion, premature or still birth and congenitally infected babies. Purpose of study was to find out the prevalence rate of toxoplasmosis in different areas of Pakistan as a possible cause of infection and correlate it with toxoplasma IgM and IgG antibodies in expectant mothers and their neonates. Study observed positive cases in large number of aborted women (60%) as compared to those with full term delivery where as in neonates positive cases were 23%. Prevalence rate was 50-55% in most areas of Pakistan. It may be concluded and suggested that as the prevalence rate of toxoplasmosis is quite high in Pakistan so there is a need to recognize the possible sources of this infection and take preventive measures.

Key Words: Toxoplasma gondii, Pregnancy, IgG and IgM.

INTRODUCTION

Toxoplasmosis is a zoonotic disease caused by *Toxoplasma gondii*. It is a parasite of endothelial cells, mononuclear leukocytes, body fluids and tissue cells of host. It is found to infect 5-95% of various human population and is considered to be one of the most prevalent disease of human being which may not manifest clinically.¹ In human infection the organisms are found in smears of exudates and in granulomatous tissue either singly, free or intracellular or in cyst like masses. It has been frequently incriminated in the causation of abortion, repeated abortion, premature and still births and congenitally infected babies.² Continued observations have proven that infection is much more frequent in man. Colonies of organisms in non nuclear or endothelial cells may almost fill the cytoplasm and appear to lie in large vacuole. Such cells are often observed in peritoneal exudates of infected animal.³

Clinical character of disease varies with the organ attacked, which itself varies depending on whether the disease is congenital or acquired. Acquired form is usually seen in adults where the most common manifestation are lymphadenopathy and low grade fever. In pregnant animals fetus is commonly invaded via an initial placentitis, which may results in abortion and if fetus is carried to term, It is commonly born dead or affected with congenital toxoplasmosis. Infection during pregnancy is almost asymptomatic.⁴ Spontaneous abortion following toxoplasmosis in pregnancy occurs in <10% of patient infected during first trimester.⁵ Prevalence of antibody titers in adult population varies, depending on age, geographical location and test method used. It is more prevalent in hot climates and almost insignificant in dry and cold climates.⁶ Magnitude of disease in Pakistan is still unknown although incidence of abortion, still birth, congenital malformation and intrauterine death is quite sizeable.

PURPOSE OF STUDY

1. To find out the prevalence of toxoplasma infection as possible cause of abortion.
2. To find out the carrier rate of antitoxoplasma antibodies in pregnant women.
3. Correlate clinical signs and symptoms related to toxoplasmosis with toxoplasma IgG, IgM antibodies in expected mother.

MATERIALS AND METHODS

Total of 200 women were included in this study. Subjects were those women who attended the antenatal clinic in a period of six months. They were arranged according to the following groups.

- **Group A:** Pregnant women with abortion (n=100).
- **Group B:** Pregnant women with full term normal delivery (n=100).

Cases were collected from the department of Obstetric and Gynecology of Jinnah Hospital Karachi. 4-5 ml of blood was drawn from the subjects of group A and B. All samples were tested for specific IgG and IgM antibodies against *Toxoplasma gondii* using the technique of ELISA and Lab system (Lab system of Pultide 8,00880 Finland).⁷ Only those samples were considered as positive whose CV% (Coefficient Variation) was <10%. Absorbance value of each positive sample was converted to enzyme immunoassay unit (EIU) according to formula.

$$\text{EIU} = \frac{\text{Abs of sample}}{\text{Apc-Arb}} \times 100$$

Arb = Mean absorbance of reagent blank

Apc = Mean absorbance of positive control

Values of EIU for IgM were considered to positive when these were in range of 25-59 and considered to be negative in a range of 10-19. The values of EIU for IgG were considered to be positive in a range of 60-130 and were negative at <20.

RESULTS

Prevalence of *Toxoplasma* antibodies in different groups is shown in Table 1. Positive cases were detected in higher number of women who had abortion (60%) as compared to those with full term normal delivery (46%).

Table 1: Toxoplasma seropositive cases in different groups (n=200).

Groups	Total Tested	Seropositive	% Of Positive
A (Aborted)	100	60	60
B (Normal delivery)	100	46	46

Table 2 shows the prevalence of *Toxoplasma* antibodies in different groups according to permanent place of residence. Majority of cases belonged to Karachi followed by those who came from Punjab and had a stay in Karachi from 2-3 years. In cases from NWFP and Sindh, the positivity rate was also 50-55%. Baluchistan group was the exception which might be due to the vary small number (n=5) included in this study.

Table 2: Seropositivity against toxoplasma in pregnant women from different areas of Pakistan (n=200).

Group According To Residence	Total Tested	Sero-positive	Total % of Positive
Karachi	110	88	50.8
Other part of Sindh	20	11	55.0
Punjab	40	21	50.0
N.W.F.P	25	14	48.2
Baluchistan	05	05	100.0
Total	200	139	51.6

Levels of IgM and IgG specific antitoxoplasma antibodies is shown in Table 3. There were most more positive cases of IgG as compared to IgM in abortion and normal delivery cases but the difference was not valuable. Pregnant undelivered cases were more in IgM category.

Table 3: Comparison of toxoplasma IgG and IgM antibodies cases (n=100) and controls (n=100).

<i>Toxoplasma</i> antibodies	Group A (n=100)	Group B (n=100)
IgG +ve	48%	31%
IgM +ve	42%	29%
Both +ve	29%	14%
Both -ve	40%	52%

DISCUSSION

Study observed an overall positivity rate (55%) of toxoplasma in women (including aborted and normal pregnant). It was observed that almost whole of the population belonged to low socioeconomic status and more than one third of the subjects had abortion which may give an idea that both low socioeconomic status and abortion are known to contribute to high *Toxoplasma* prevalence.

Reported figure in different parts of Pakistan during the last 10 years for toxoplasma infection tend to be low. Comparing our results with reported figure in literature the prevalence rate is higher when compared to London (rate 22%)⁸, Egypt (25%)⁹, and Saudi Arabia (31.2%)¹⁰. However this rate tend to be low when compared to prevalence of 58% in Kuwait¹¹ and 84% in France⁵.

Prevalence rate of toxoplasmosis from different parts of Pakistan was reported by a number of workers^{12,13,14} who reported a prevalence rate of 15-16% in Peshawar. 43% in Lahore and 50-53% in Karachi. In present study it was observed that titer of IgG antibodies were more in all groups of women as compared to the titer if IgM antibodies.

This shows that IgG antibodies play an important role in toxoplasmosis as compare to IgM antibodies but IgM antibodies may contribute in infection of toxoplasmosis along with IgG antibodies.

Out of 100 women who aborted or gave still birth, 60% were found to have antitoxoplasma antibodies as compared to 46% of those who gave full term delivery. This indicates that toxoplasmosis was probably a significant contributory factor in abortion. Our findings are in confirmation of other reports.^{13,14} In 100 normal pregnancy cases (full term normal delivery) 31% had IgG. IgM was present in 29% of these women. According to a report⁴ approximately 40% of the pregnant women who acquire *Toxoplasma* infection the parasite invades the placenta and may cause abortion, still birth or congenital disease.

CONCLUSION

It may be concluded that prevalence of toxoplasmosis is quite high in Pakistan and it plays a significant role in abortion, repeated abortion and possibly in congenital malformation in the form of mental retardation, speech and hearing defects etc. There is a need to recognize possible sources of infection are recognized so that therapeutic measures are adopted well in time.

REFERENCES

1. Legnain MM, Singh R. and Parweeka M. Prevalance of *Toxoplasma* antibody and pregnancy wastage among women in Benghazi with pertinent review of literature. *Garyounis Med J* 1982; 6: 69-77.
2. Langer H. Repeated congenital infection with *Toxoplasma Gondii*. *Obstet Gynaecol* 1963; 21: 318-29.
3. Beaveor PC, Jung RC, Cupp EW. *Clinical Parasitology* 9th ed. Lea and Febriger. Philadelphia: 1984; pp. 162-73.
4. Foulén W, Naessans A, Votckaert M et al. Congenital toxoplasmosis. A perspective survey in Berssels. *Br J Obstet Gynaecol* 1984; 91: 419-423.
5. Desmonsts A, Courveur J. Toxoplasmosis in pregnancy and its transmission in fetus. *Bull NY Acad Med* 1974; 290: 1110-16.
6. Faust EC, Beaver PC, Jung RC. *Animal agents and vector of human disease*. 4th ed. Lea and Febiger Philadelphia: 1975; pp. 92-6.

7. Ballfour AH, Harford JP. Detection of specific IgG and IgM antibodies to toxoplasma gondii with a commercially available enzyme immunoassay kit system. J Clin Pathol 1985; 38: 679-89.
8. Rouss CF, Bourne GL. Toxoplasmosis in pregnancy. J Obstet Gynaecol Br Commonwealth 1972; 79: 1116-18.
9. Fikry MF, Riffat MA, Sadek MSM, et al. The prevalence of Toxoplasma antibodies in human female in the reproductive period at Cairo. J Egypt Hlth Assoc 1980; LV: 23-35.
10. Basalmah AH, Serebour EK. Toxoplasmosis in pregnancy. Saudi Med J 1984; 2: 125-30.
11. AL-Naqib W, Ibrahim MEA, Hathout H, et al. Seroepidemiology of viral and toxoplasma infection during pregnancy among Arab women of child bearing age in Kuwait. Int J Epidemiol 1983; 12: 220-23.
12. Uppal TB, Iqbal SM. Incidence of toxoplasmosis in ocular lesion in Peshawar region. Pakistan J Med Res 1983; 22: 1-4.
13. Lodhi MSA. Seroepidemiological study on Toxoplasma gondii infection among women of child bearing age in some localities of Lahore. Thesis of M.Phil degree, University of Punjab, Collage of community Medicine Lahore, Pakistan. 1988
14. Mughis A. Surveillance of toxoplasmosis among our population in high risk groups. Thesis of M.phil degree, University of Karachi, Pakistan. 1988

The Authors:

Mubashir A. Sheikh,
Associate Professor
Department of Clinical Pathology,
Jinnah Post Graduate Medical Center
Karachi

Sabiha Karim
Demonstrator
Department of Pharmacology,
Fatima Jinnah Medical College
Lahore

Asima Malik
Assistant Professor
Department of Biochemistry,
Fatima Jinnah Medical College
Lahore

Address for correspondence:

Mubashir A. Sheikh,
Associate Professor
Department of Clinical Pathology,
Jinnah Post Graduate Medical Center
Karachi