

PREVALENCE OF TOXOPLASMA ANTIBODIES AMONG PREGNANT WOMEN AND ITS RELATIONSHIP WITH PREGNANCY WASTAGE

SWARNA KANTA, KASTURI LAL

SUMMARY

The prevalence of toxoplasma antibodies using IgM-ELISA technique in 200 obstetric patients divided in two groups 100 normal and 100 with bad obstetric history and its relationship with pregnancy wastage is evaluated. While healthy pregnant women had Toxoplasma antibodies in 5% cases, the patients with bad obstetric history had Toxoplasma antibodies in 20% of the cases. This suggestion a relationship between bad obstetric performance and maternal toxoplasmosis.

Toxoplasmosis is a cosmopolitan disease caused by an obligate intracellular protozoan "Toxoplasma gondii". Human infection of Toxoplasma have been reported to be cosmopolitan throughout the world, the prevalence rates of seropositivity being 3% in United States (Hershey D.W. and McGregor, J.A., 1987) to less than 10% Norway (Stray-Pedersen, B. Pederson, J.O. and Omland, T., 1979) and 20% to 40% in Canada (Carter, A.O. et al., 1983). The presence of Toxoplasma antibodies in pregnant women in India is reported to vary from 3.3 to 18.9%. Thus, the disease occurs in subclinical or clinical form on a large scale in our population which needs to be screened.

The effect of the disease on the fetus depends upon the gestational age, virulence of the parasite and immune status of the individual. When primary toxoplasmosis occurs during pregnancy, the risk of fetal infection increases from approximately 15% in the first trimester to 60% in the third trimester. However, the consequences of infection in the first trimester are more serious and include a threat to the fetus with possible spontaneous abortion, prematurity, still birth, congenital anomalies or overt clinical disease with chorioretinitis, hydrocephaly intracerebral calcification, hepatomegaly or growth retardation. In contrast more than 90% of fetal infections acquired in the third trimester are asymptomatic at birth. Such infants may go on to develop retinochoriditis, blindness, epilepsy or psychomotor and mental retardation, months or years later (Alford et al. 1974).

*Department of Obstetrics and Gynaecology,
Government Medical College/SMGS Hospital,
Jammu (J & K).*

Accepted for publication on 1/11/1989.

The significance of "Toxoplasma gondii" in cases of unexplained pregnancy wastage is the subject of considerable conjecture among workers in the field of obstetrics throughout the world. A significant correlation of an abnormal outcome of pregnancy in the form of habitual abortions, still births, premature labour and neonatal death with a high Toxoplasma antibody titre has been reported (Remington et al, 1964, Jones et al, 1966, Hingorani, V. et al, 1970). In contrast, other workers have not reported any correlation between maternal toxoplasmosis and reproductive disorders.

Seropositivity means that IgM antibodies exist in the patient. Various serological tests are available to detect these antibodies. Recently IgM ELISA (Enzyme Linked Immunosorbent Assay) technique for detection of IgM-Toxoplasma antibodies has been found to be the most specific sensitive and highly reproducible method of diagnosing toxoplasmosis (Engvall and Perlmann, 1971-72).

In present study the prevalence of toxoplasma antibodies using IgM-ELISA technique in obstetric population including normal and bad obstetric history and its relationship with pregnancy wastage is determined.

Material and Methods

The present study has been conducted in 200 patients who attended the antenatal clinics or sought admission to the antenatal wards of the Department of Obstetrics and Gynaecology, S.M.G.S. Hospital attached to the Government Medical College, Jammu. The patients were divided into two groups: Group I comprised of 100 women in the reproductive age group with history of spontaneous or recurrent abortion, premature delivery, still births or

congenital anomalies in their newborns and Group II comprised of 100 normal expectant women without any history of pregnancy wastage.

Detailed history, clinical evaluation and investigations were recorded on specially designed proforma.

Routine tests were performed on all subjects under study to exclude other commonly known etiological factors for fetal loss such as syphilis, diabetes mellitus, Rh incompatibility and renal diseases. These included examination of urine for albumin and sugar, blood for haemoglobin percentage, ABO and Rh grouping, serological test for syphilis and blood sugar estimation.

5 ml blood was drawn from each subject by clean cubital phlebotomy. The serum was separated as per standard procedure and stored at -7°C till use.

Serum samples from both groups of subjects were tested using the kit for qualitative immunoenzymic determination of IgM antibodies to Toxoplasma gondii (Sorin Biomedica S.P.A. 13040 Saluggia (VC) Italia.

Results

The data of observations and analysis with respect to these groups of subjects showed that the age of patient in both the groups ranged from 20-37 years with a mean 26.10 ± 0.44 years.

Twenty percent of subjects in group I showed presence of IgM antibodies in their serum by IgM-ELISA technique whereas only 5% of subjects in group II showed presence of IgM antibodies in their serum by the same technique (Table I). The difference has been found to be statistically significant (P 0.02).

TABLE - I
SHOWING PREVALENCE OF
TOXOPLASMA ANTIBODIES AMONG
CASES IN TWO GROUPS:

Groups	No. of sera tested	No. of sera positive	Percentage
Group I	100	20	20
Group II	100	5	5

$$X^2 = 5.143$$

$$P = 0.02$$

The cases who were positive for IgM Toxoplasma antibodies in group I presented with history of spontaneous or recurrent abortions, still births, congenital anomalies in their newborns and premature labour (Table II).

TABLE - II
SHOWING CLINICAL PRESENTATIONS
OF SUBJECTS IN GROUP I WHO WERE
POSITIVE FOR IGM TOXOPLASMA
ANTIBODIES.

Type of cases	No. of sera positive	Percentage
Abortions	9	45
Premature labour	2	10
Congenital anomalies	3	15
Stillbirths	6	30
Total	20	100

Twentyeight percent of cases in group I, who were positive for IgM Toxoplasma antibodies delivered full term live babies; whereas 72% of them ended in abortions, delivered preterm and still born babies and had congenital anomalies in their newborns.

TABLE - III
SHOWING PREGNANCY OUTCOME OF
CASES IN GROUP I WHO WERE POSITIVE
FOR IGM TOXOPLASMA ANTIBODIES.

Pregnancy outcome	No. of sera positive	Percentage
Abortions	6	33.3
Premature labour	2	11.1
Congenital anomalies	2	11.1
Still Births	3	16.6
Live births	5	27.7
Total	18	100.0

In 2 cases serum was tested for IgM Toxoplasma antibodies in the post partum period.

Discussion

Toxoplasma gondii are known to cross the placental barrier and invade the fetus in utero and this has been confirmed by various studies in animals and humans (Remington and Cavanaugh, 1964). The isolation of the parasite from the products of conception is the most reliable method to arrive at the diagnosis of toxoplasmosis. This is, however, not always possible. Therefore, one has to fall back on the serological tests. Majority of workers now prefer IgM-ELISA technique both for epidemiological surveys as well as for routine diagnosis of toxoplasmosis as this is the most specific sensitive and reproducible method available (Engvall and Perlmann, 1971, 1972).

Various studies were conducted in India to find out the prevalence of toxoplasmosis among healthy expectant women with good obstetric history (Table IV).

TABLE - IV
SHOWING PREVALENCE OF TOXOPLASMA ANTIBODIES AMONG
HEALTHY PREGNANT WOMEN FROM VARIOUS PARTS OF INDIA.

Place of study and author	No. of sera tested	No. of sera positive	Percentage
1. Delhi (Hingorani et al, 1970)	122	6	5.0
2. Pondicherry (Bhatia et al, 1974)	20	1	5.0
3. Chandigarh (Mahajan et al, 1976)	100	9	9.0
4. Rohtak (Prem Singh et al. 1978)	102	7	7.1
5. Trivandrum (Shamonugan et al, 1986)	280	66	23.6
6. Present series	100	5	5.0

While Hingorani et al, (1970) and Bhatia et al, (1974) reported prevalence of IgM toxoplasma antibodies in 5% of normal expectant women without any history of pregnancy wastage. Mahajan et al, (1975-76) and Singh et al, (1978) reported an incidence of 9% and 7.1% prevalence of IgM Toxoplasma antibodies in their normal antenatal cases, respectively. We have detected IgM Toxoplasma antibodies in

5% of normal pregnant women. This observation is more or less similar to other reports.

Women although asymptomatic but with a history of abortion, premature delivery, still birth and congenital anomalies have shown a significantly higher percentage (20%) of Toxoplasma antibodies as compared to women with good obstetric history. This suggests that a rela-

TABLE - V
SHOWING PREVALENCE OF TOXOPLASMA ANTIBODIES
IN THE SERA OF WOMEN WITH HISTORY OF FOETAL WASTAGE.

Place of study and author	No. of sera tested	No. of sera positive	Percentage
1. Delhi (Hingorani et al, 1970)	350	249	71.0
2. Delhi (Pal et al, 1975)	109	4	3.6
3. Chandigarh (Mahajan et al, 1975)	175	34	41.2
4. Rohtak (Saini et al, 1984)	200	38	19.0
5. Present series	100	20	20.0

tionship exists between bad obstetric performance and maternal toxoplasmosis. Various studies carried out in India to determine the relationship of maternal toxoplasmosis with history of pregnancy wastage have shown similar or higher incidence of *Toxoplasma* antibodies in the sera of women with history of fetal wastage (Table V).

Fifteen out of twenty cases with history of fetal wastage, with positive sera for IgM *Toxoplasma* antibodies had received antitoxoplasmic therapy in the form of a combination of Pyremethamine and sulphadiazine for a period of three weeks. A repeat examination of the sera after three weeks of therapy had shown that IgM *Toxoplasma* antibodies were absent. One case had received treatment during pregnancy. She was admitted as an emergency case with history of threatened abortion. Her sera was positive for IgM *Toxoplasma* antibodies on admission but became negative after treatment for three weeks. She delivered a normal baby at term. The baby was healthy.

Among the maternal infections, the presence of *Toxoplasma* IgM antibodies in the sera of antenatal population is significant. Even normal expectant mothers without any history of fetal wastage and without any evidence of toxoplasmosis would show IgM *Toxoplasma* antibodies in their sera. There is every reason for recommendation that a routine detection of IgM *Toxoplasma* antibodies be performed in prenatal clinics using IgM-ELISA technique. The women with positive sera for IgM *Toxoplasma* antibodies

with history of unexplained pregnancy wastage in various forms could be given prophylaxis against toxoplasmosis.

Acknowledgements

The authors wish to express their thanks to the Principal, Govt. Medical College, Jammu, for his kind permission to use the hospital records of the cases reported.

References

1. Alford, C.A., Stagno, S. and Reynolds, D.N. *Bull. New York Acad. Med.* 50:160, 1974.
2. Bhatia, V.N. Meenakshi, K., Madhavan, A.N. and Agarwal, S.C. *Indian J. Med. Res.* 62:1818, 1974.
3. Carter, A.O. and Frank, J.W. *Obstet. and Gynec. Survey.* 42:239, 1987.
4. Engvall, E., Perlmann, P. *Immunochemistry.* 8:871, 1971.
5. Engvall, E., Perlmann, P. *J. Immunol.* 109:129, 1972.
6. Hershey, D.W., McGregor, J.A. *Obstet. Gynec.* 70:900, 1987.
7. Hingorani, V., Prakash, O. Chowdhary, P. and Kamlan, T.S. *Indian J. Med. Res.* 58:967, 1970.
8. Jones, M.H., Sever, J.L., Baker, T.H., Hallatt, J.G., Goldenberg, E.D., Justus, K.M., Bonnet, C., Gilkeson, M.R. and Roberts, J.M. *Am. J. Obstet. Gynec.* 95:809, 1966.
9. Mahajan, R.C., Gupta, I., Chhabra, M.B. Gupta, A.N., Devi, P.K. and Ganguly, N.K. *Indian J. Med. Res.* 64:805, 1976.
10. Pal, M.N. *J. of Obstet. & Gynec. of India*, 31:249, 1981.
11. Remington, J.S. *Obstet. and Gynec.* 24:155, 1964.
12. Remington, J.S. Newell, J.W., and Cavanaugh, E. *Obstet. Gynec.* 24:25, 1964.
13. Saini, S.K., Sharma, D. and Sabharwal, V. *J. of Obstet. and Gynec. of India*, 34:167, 1984.
14. Singh, P., Chugh, T.O. and Garg, P. *Indian J. Pathol. Microbiol.* 21:125, 1978.
15. Stray-Pedersen, B., Pedersen, J.O. and Omland, T. *Scand. J. Infect. Dis.* 11:247, 1979.