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ORIGINAL ARTICLE

SEROPREVALENCE OF TOXOPLASMA GONDII IN SPONTANEOUS ABORTIONS IN PREGNANT WOMEN

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ABSTRACT: INTRODUCTION: Toxoplasmosis is one of the diseases comprising the TORCH [Toxoplasma gondii, Rubella virus, Cytomegalovirus, Herpes simplex virus] infections. It is known to cause perinatal death if the organism is acquired during pregnancy. Toxoplasmosis during pregnancy can cause congenital infection which may result in mental retardation and blindness in the infant. The present study aimed to evaluate the seroprevalence of Toxoplasma gondii and it is associated risk factors among the women with history of spontaneous abortion. **MATERIALS & METHODS:** A total of 60 women with past or present history of spontaneous abortion and another 60 pregnant women without any bad obstetric history as control attending our hospital were included in the study. All the serum samples were tested for the presence of specific Toxoplasma IgM and IgG antibodies using the On Site Toxo IgG/IgM Rapid Test strip, a lateral flow chromatographic immunoassay. **RESULTS:** Total seroprevalence of Toxoplasma gondii in the study was 12.5%. Total seropositivity in women with history of spontaneous abortion was 12(20%) and 3(5%) among control group. More number of seropositivity was observed among women between 26 to 30 years (60%). Risk factor of having cat as pet animal had greater association of getting toxoplasmosis. **CONCLUSION:** This study revealed that the seroprevalence of toxoplasmosis was significantly high in the study population than in control group. There should be routine screening for antenatal women with bad obstetric history.
KEYWORDS: Toxoplasma gondii, Spontaneous abortion, Seroprevalence.

INTRODUCTION: Toxoplasma gondii is an obligate intracellular tissue protozoan parasite with a worldwide distribution, causing infection in humans as well as other warm blooded domestic and wild animals. Approximately one third of the world population is estimated to be exposed to this parasite.[1] The importance of Toxoplasma from the perspective of public health is mainly due to the risk of disease transmission during pregnancy.[2] The prevalence of toxoplasmosis in pregnant women in India is variably reported to be as low as 5 per cent to as high as 80 per cent.[3-7] Studies analyzing the role of maternal infection in the causation of bad obstetric history are less in number, probably due to lack of facilities in isolating etiological agents and the prohibitive cost of commercial diagnostic kits. Since testing for toxoplasmosis is not a routine activity in our country, information on this zoonotic infection, diagnosis and interpretation of test results is also lacking. In Odisha, so far, to the best of our knowledge, no study is reported in on seroprevalence of toxoplasmosis in women with spontaneous abortions. Therefore, the present study is designed to detect antibodies and find out the seroprevalence of Toxoplasma gondii in women with history of spontaneous abortions.

MATERIALS AND METHODS:

Study Area: This cross sectional study was conducted from June 2012 to June 2014 in Hi Tech Medical College & Hospital, Bhubaneshwar, Odisha.

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Study Subjects: The study group comprised women of reproductive age with past or present history of spontaneous abortion. The control group comprised antenatal women with no bad obstetric history attending the hospital.

Sample Size: In total 120 women were included in the study 60 with history of spontaneous abortion (Study group) and 60 without Bad obstetric history (BOH) (Control group).

Collection of Data: The women presenting to the Gynecological OPD with history of spontaneous abortions were included in the study. The inclusion and exclusion criteria were applied and the women who were eligible to participate were taken in the study. The nature and purpose of this study was explained to all women and those who gave the informed written consent were enrolled in the study. A total of 60 women who met the inclusion criteria were selected as study group and 60 pregnant women without BOH were taken as controls.

After selecting the patients who fulfilled the eligibility criteria in the OPD, detailed medical, obstetrical and gynecological histories were taken, and complete general physical examination was done. Socio-demographic data including age, residential place, educational level, was obtained from all subjects, as well as clinical data including previous bad obstetrics history, also data about risk factors like pet cat owning, dietary habits were taken from the subjects.

A total of 120 blood samples were collected using sterile disposable syringes under aseptic precautions. 5 ml of blood was withdrawn by venipuncture from all subjects and was transferred into plain vial. The serum was separated by centrifugation,. All the samples were screened for Toxoplasma specific IgG and IgM antibodies by On Site Toxo IgG/IgM rapid test strip. It is a lateral flow chromatographic immunoassay.

Analysis of Data: The data collected was systematically entered on specifically designed proforma. The results were then compiled on a masterchart and statistically analyzed using SPSS Software.

RESULTS:

Distribution of Result among Study and Control Groups: Table 1 shows that in the study group, out of 60 women 12 (20%) were found to be positive for Toxoplasma IgG antibody and in none IgM antibodies were detected. In the control group, 3 women (5%) were positive for Toxoplasma IgG antibodies and none were positive for IgM antibodies. Overall seropositivity of Toxoplasma gondii according to IgG antibodies in the study group was 20% and in the control group was 5%.

Result	STUDY GROUP		CONTROL GROUP	
	No	Percent	No	Percent
IgG Positive	12	20%	3	5%
IgM Positive	0	0%	0	0%
IgG & IgM Negative	48	80%	57	95%
Total	**60**	**100%**	**60**	**100%**

Table 1: Seropositive Women in Study & Control Group

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Distribution of Seropositivity in Relation to Age: Most (60%) of the women who were IgG seropositive in the study were between 26 to 30 years of age while 20% of the seropositive women were in between the age of 21 to 25 years and the rest 20 % of the seropositive women were in the age group of 31 to 35 years of age.

Age Distribution (yrs)	No. of women	Percent
21-25	3	20%
26-30	9	60%
31-35	3	20%
Total	15	100%

Table 2: Distribution of Igg Seropositive Women According to Age

Distribution of IgG Test Result in Women According to Bad Obstetric History: 12 women were seropositive for Toxoplasma IgG antibodies in the case group while only 3 women were positive in the control group. This is statistically significant (p <0. 013).

NATURE OF BAD OBSTETRIC HISTORY (BOH) (B. O. H)	NEGATIVE	%	POSITIVE	%	TOTAL	%	P VALUE
Abortion (study group)	48	80%	12	20%	60	50%	0.013
No b. O. H (control group)	57	95%	3	5%	60	50%	
Total	**105**	**87.5%**	**15**	**12.5%**	**120**	**100%**	

Table 3: Distribution of Igg Seropositive Women According to Their Bad Obstetric History

Distribution of seropositivity in relation to Risk factors: Various risk factors in relation to T. gondii infection was analysed and keeping cats as pet animal was found significant. Past history of spontaneous abortion was also found to be significant.

RISK FACTOR	RESULT	NEGATIVE	%	POSITIVE	%	TOTAL	%	P VALUE
No. of previous abortion	0	57	95%	3	5%	60	50%	0.000
	1	43	100%	0	0%	43	35.83%	
	2	4	57.14%	3	42.86%	7	5.83%	
	3	1	10%	9	90%	10	8.34%	
Contact with cat	Absent	56	86.15%	9	13.85%	65	54.17%	0.628
	Present	49	89.09%	6	10.91%	55	45.83%	
Owns cat	No	101	89.38%	12	10.62%	113	94.17%	0.012
	Yes	4	57.14%	3	42.86%	7	5.83%	
Contact with other animal	Absent	66	85.71%	11	14.29%	77	64.17%	0.429
	Present	39	90.7%	4	9.3%	43	35.83%	
Dietary habit	Nonveg	83	86.46%	13	13.54%	96	80%	0.490
	Veg	22	91.67%	2	8.33%	24	20%	
Frequency of	< than a	71	89.87%	8	10.13%	79	82.29%	0.069

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meat consumption	week							
	Once a week	12	70.59%	5	29.41%	17	17.71%	
Type of meat consumed	chicken	12	80%	3	20%	15	15.62%	0.821
	Fish	57	87.69%	8	12.31%	65	67.71%	
	Mutton	14	87.5%	2		16	16.67%	
Raw vegetable consumed	No	73	84.88%	13	15.12%	86	71.67%	0.168
	Yes	32	94.18%	2	5.88%	34	28.33%	
Source of water	Tap	73	86.9%	11	13.1%	84	70%	0.763
	Tube	32	88.89%	4	11.11%	36	30%	
Purification method	Boiling	84	87.5%	12	12.5%	96	80%	0.638
	Filter	21	87.5%	3	12.5%	24	20%	

Table 4: Toxo Igg test result in relation to risk factors

DISCUSSION: The prevalence of toxoplasmosis in pregnant women in India is variably reported to be as low as 5 per cent to as high as 80 per cent.[3-7] In our study, total seroprevalence of Toxoplasma specific antibodies was found to be 12.5%. In our study 120 women were included. Out of them 15(12.5%) were positive for Toxoplasma specific IgG antibodies. None of the women in the study were positive for Toxoplasma specific IgM antibodies. This is in accordance with the study done by Malarvizhi,[8] et al, Senthamarai S,[9] et al and Ebadi,[10] et al who reported Toxoplasma gondii seroprevalence of 13.8%, 15.67% and 16.47% respectively.

In our study, seropositivity for Toxoplasma specific IgG antibodies was found to be 20% in the women with history of spontaneous abortion and 5% in the women with no bad obstetric history. In our study we got a high seroprevalence of Toxoplasma specific IgG antibodies in women with bad obstetric history as compared to women with no past bad obstetric history. This finding is in accordance with studies conducted by Senthamarai S,[9] et al (13.09% Vs 8%), Ebadi P[10] et al (17.5% Vs 14%), and Suryamani,[2] et al (45% Vs 8.33%).

None of the women in our study were positive for Toxoplasma specific IgM antibodies, indicating that no one has acute infection.

Most (60%) of the women who were IgG seropositive in the study were between 26 to 30 years of age while 20% of the seropositive women were in between the age of 21 to 25 years and the rest 20% of the seropositive women were in the age group of 31 to 35 years of age. In this study, 80% of seropositive women were between 20 to 30 years of age. This is in accordance with the study done by Senthamarai S[9] et al who has also reported 76.46% seropositive women in the age of 20 to 30 years. This is so probably because women of child bearing age group commonly belong to the age group of 20 to 30 years.

In our study, association of various risk factors were analysed among the seropositive women. The present study showed that there was significant association between Toxoplasma seropositive cases and women who keep cats as pet animal. This is in accordance with study of Malarvizhi A[8] et al in 2012 who also reported that rearing cats as pet animals is associated with increased Toxoplasma seroprevalence.

There was no significant association seen between seropositive cases and women with contact with cat and other animal. This finding is not in accordance with study of Suryamani Chintapalli I,[2] et al in 2013 and study of Susann Sroka,[11] et al in 2010.

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There was no significant association seen between seropositive cases and frequency of meat consumption, type of meat consumption which is not in accordance with study by Srirupa Pal,[12] et al in 2007, Susann Sroka,[11] et al in 2010 respectively.

There was no significant association seen between seropositive cases with consumption of raw vegetables and source of drinking water which is in accordance with study by Srirupa Pal,[12] in 20007. No statistically significant association was found between method of purification of drinking water and Toxoplasma seroprevalence. This is not in accordance with a study of Susann Sroka,[11] et al in 2010.

CONCLUSION: In our study "Seroprevalence of Toxoplasma gondii in pregnant women with spontaneous abortions" we conclude that the seroprevalence of this parasite is more in women with history of spontaneous abortion than in the women who had no bad obstetric history. In our study, seropositivity of this parasite was found to be 20% in women with history of spontaneous abortion and 5% in women with no bad obstetric history. However, in our study the overall seroprevalence of Toxoplasma gondii comes out to be 12.5%.

In our study maximum seropositivity was found between 26 to 30 years. We noted that among the various risk factors keeping of cats as pet animal had greater association of risk of getting toxoplasmosis than the women who do not keep cat as pet animal.

In our study strong association of IgG antibodies in women with recurrent abortions was found, though no association between exposures to toxoplasmosis with premature termination of pregnancy was noted. So, it is suggested that all women especially those of child bearing age should be educated regarding risk factors contributing to toxoplasmosis as well as the importance of taking adequate preventive measures, especially during pregnancy.

We also recommend that studies with larger sample size may be undertaken to further evaluate the real prevalence of this parasite in our community. A compulsory Toxoplasma screening for the antenatal women with bad obstetric history should be done in all the primary health care setting in our country.

BIBLIOGRAPHY:

1. Singh S. Mother-to-child transmission and diagnosis of Toxoplasma gondii infection during pregnancy. Indian J Med Microbiol. 2003; 21: 69-76.
2. Suryamani Chintapalli, I Jyothi Padmaja. Seroprevalence of toxoplasmosis in antenatal women with bad obstetric history. Tropical Parasitology. 2013; 3 (1): 62.
3. Singh S, Pandit AJ. Incidence and prevalence of toxoplasmosis in Indian pregnant women: a prospective study. Am J Reprod Immunol. 2004; 52: 276-283.
4. Akoijam BS, Shashikant, Singh S, Kapoor SK. Seroprevalence of Toxoplasma infection among primigravida women attending antenatal clinic at a secondary level hospital in North India. J Indian Med Assoc. 2002; 100: 591-2, 594-6, 602.
5. Yasodhara P, Ramalakshmi BA, Naidu AN, Raman L. Prevalence of specific IgM due to toxoplasma, rubella, CMV and C. trachomatis infections during pregnancy. Indian J Med Microbiol. 2001; 19: 52-56.
6. Singh S, Nautiyal BL. Seroprevalence of toxoplasmosis in Kumaon region of Uttar Pradesh. Indian J Med Res. 1991; 93: 47-49.
7. Singh S. Prevalence of TORCH infections in Indian pregnant women. Indian J Med Microbiol. 2002; 20: 57-58.

8. Malarvizhi A, Viswanathan T, Lavanya V, Aarul Sheeba, Malar S and Moorthy K. Seroprevalence of toxoplasma gondii in pregnant women. Journal of public health and epidemiology. 2012; 4 (6): 170-177.
9. Senthamarai S, Sivasankari S, Apurba SS, Sandhya BK, Kumudavathi MSAnitha C, Amshavathani SK. Seroprevalence of toxoplasmosis in pregnant women with bad obstetrics history in a tertiary care hospital, kanchipuram-a pilot study. Disease. 2013; 3 (9): 29-32.
10. Ebadi P, Solhjoo K, Bagheri, Eftekhar F. Seroprevalence of toxoplasmosis among the women with recurrent spontaneous abortion in comparison with the women with uncomplicated delivery. Journal of Jahrom, University of Medical Sciences. 2011; 9 (1): 32-36.
11. Susann Sroka, Nina Bartelheimer, Andreas Winter, Jörg Heukelbach, Liana Ariza, Heliane Ribeiro, Fabíola Araujo Oliveira, Ajax Jose Nogueira Queiroz, Carlos AlencarJr. , and Oliver Liesenfeld. Prevalence and risk factors of toxoplasmosis among pregnant women in fortaleza, northeastern brazil. Am. J. trop. med. hyg. 2010; 83 (3): 528–533.
12. Pal S, Das N, Pal D. Sero-prevalence and risk factors of Toxoplasma gondi in pregnant women in kolkata, Indian Journal of Recent Advances In Applied Sciences Ijprb. 2011; 26:27-33.

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