Original article

Association of TORCH antibodies in women with spontaneous abortions

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Abstract

Background: The TORCH complex is a medical acronym for a set of bacterial, protozoal and viral infections (Toxoplasma, Rubella, Cytomegalovirus and Herpes simplex). Perinatal infection with TORCH can result in foetal complications depending upon the period of gestation, duration of infection, severity of infection and immune status of foetus. **Objective:** To determine the association of TORCH IgG and IgM antibodies in women with spontaneous abortion. **Methods:** It was a prospective observational study conducted in the Department of Obstetrics and Gynaecology of Tribhuvan University Teaching Hospital, IOM, Maharajgunj, Kathmandu, Nepal. The study duration was for one year - Baisakh 2067 to Chaitra 2067 (April 2010–March 2011). During the study period, 153 women with spontaneous abortion, fulfilling the inclusion criteria were taken for TORCH IgM and IgG serological study. **Results:** In the present study, highest occurrence of IgM only antibody was of Toxoplasma occurring in 16.3% of enrolled women. Both IgM and IgG were negative for Toxoplasma in 39.9% of enrolled women indicating risk for Toxoplama infection. IgG positivity to Cytomegalovirus was found in 124 (81%) women. Both IgM and IgG positivity for Rubella was found in 35.3% of enrolled women. **Conclusion:** In the present study on analysing the association of TORCH antibodies in women with spontaneous abortion, recent infection of Toxoplasma was most commonly associated. However a larger study should be carried out to confirm the finding of the present study.

Keywords: abortion, IgG and IgM antibodies, TORCH infection,

Introduction

Certain maternal infections, especially during early period of gestation, can result in foetal malformations or loss. The reason is that the foetal immune system is unable to resist the infectious organisms or to prevent the dissemination of infectious organisms. The degree of foetal affection depends upon period of gestation, duration of infection, severity of infection and immune status of foetus.[1] Studies have shown a significant association of maternal infections especially TORCH, in pregnancy wastage and BOH.[1, 2, 3] So, this study was conducted to find out the association of Toxoplasma, Rubella, Cytomegalovirus, Herpes Simplex 1 and 2 virus IgG and IgM antibodies in women with spontaneous abortions (≤22wks).

Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology of Tribhuvan University Teaching Hospital, Institute of Medicine, from Baisakh 2067 to Chaitra 2067 (April 2010- March 2011). Women with recent abortion ≤ 22 weeks period of gestation, blighted ovum and missed

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abortion were included and women with history of interference (medical / surgical) with the aim of termination of the present pregnancy, molar pregnancy and those unwilling to participate were excluded from the study.

Case selection was done by reviewing the admission records and registers of the Out Patients Department, admitted in the Gynaecological ward and the records of patients attended to in the Emergency Room with history of recent abortion and or post abortion complications such as abnormal bleeding, abdominal pain or fever. The patients then underwent gynaecological ultrasound scan to confirm the diagnosis of threatened/inevitable/ incomplete/complete/missed abortion or blighted ovum- by the radiologist. Informed consent was taken from those women who agreed to participate in the study. The prepared questionnaire was then filled. If blighted ovum was suspected, a repeat USG was done after 2weeks to confirm the diagnosis.

After case selection, 5 ml of venous blood was taken in a disposable syringe for TORCH IgG and IgM serology and sent to the laboratory of the Department of Microbiology of Institute of Medicine, Tribhuvan University Teaching Hospital. The serum was stored at 2-8^{0C}, and analysis for TORCH IgG and IgM antibodies was performed by the ELISA Human Kit. The test was done as per the instructions in the kit. All reports were traced from laboratory record file with the help of participant's bill number and IP or ID number along with their name. All cases and reports were entered on a master chart and analysis was done weekly.

The final data analysis was done using Microsoft EXCEL and SPSS 18 software. Descriptive statistics, diagrams, chi square test and chi square test (exact) were used for data analysis.

The ethical clearance was obtained from the Institutional Research Committee.

Results

The total number of pregnant women attending the Hospital during the study period was 4,145. The number of abortions (≤22 weeks) during the study period was 297 of which 153(51.5%) women were eligible for the study.
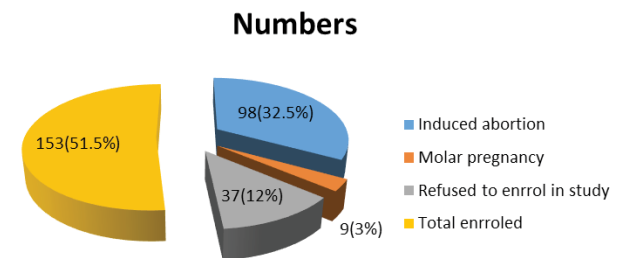
Figure 1: Types of the abortions.

The spontaneous abortions were higher in 1st trimester (75.8%).

Table 1: Age distribution of women with spontaneous abortions (≤22weeks)

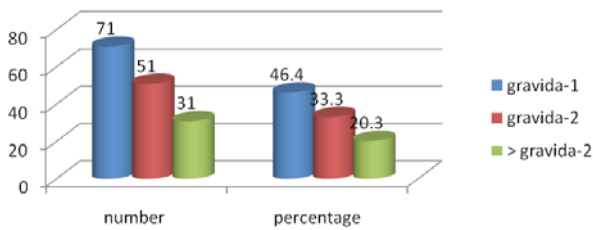| Age (years)	Number	Percentage (%)
<19	5	3.3
19-35	145	94.8
>35	3	2.0
Total	153	100.0

Women with early pregnancy complications were found to be more in the age group of 19-35 years (94.8%) followed by < 19 years (3.3%).

Table 2: Education status

Education	Number	Percentage (%)
Illiterate	6	3.9
< 5 class	7	4.6
5-10th class	53	56.9
> 10th class	87	100.0
Total	153	100.0

Table 3: Occupation

Occupation	Number	Percentage (%)
Student	24	15.7
Farmer	2	1.3
Job holder	25	16.3
Housewife	94	61.4
Business	8	5.2
Total	153	100.0

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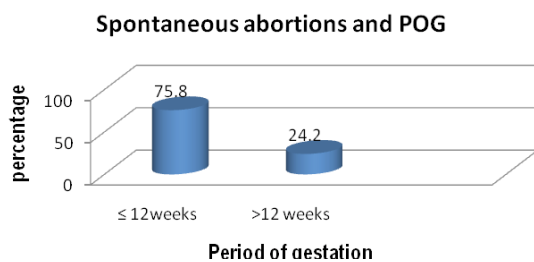**Figure 2:** Gravida and spontaneous abortions.

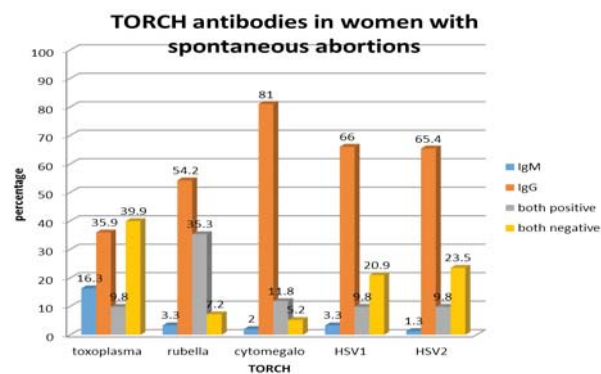Spontaneous abortions were higher (46.4%) in primigravidas
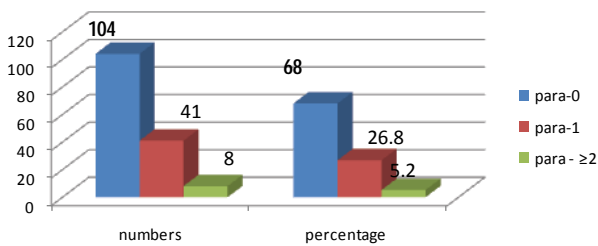
Figure 3: Parity of patients

Early pregnancy complications were higher in nulliparas (68%) i.e. either 1st conception or with history of previous abortion or abortions.
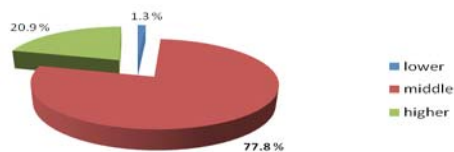
Figure 4: Distribution of socioeconomic status.

Figure 5: Gestational age and spontaneous abortions.

Figure 6: Analysis of TORCH serology in women with spontaneous abortions.

On analyzing the IgM and IgG serology, Toxoplasma IgM was the most frequent antibody found in16.3% of enrolled patients whereas Toxoplasma IgG was the lowest 35.9% compared to antibodies against other organisms. CMV IgG was positive in 81% of the women, which meant that majority of the cases were shown to have immunity against CMV.

Discussion

The total number of pregnant women attending the Tribhuwan University Teaching Hospital during the study period was 4,145 of whom 7.17% had abortions during the study period. In this study, spontaneous abortions were maximum (88) in pregnant women with gestational age less than 12 weeks (57.5%). This may be because the majority of the patients reporting with spontaneous abortion or with post abortion complications were in the 1st trimester. This finding was similar to the study, carried out by Srirupa pal and colleagues[7] in 2011 in Kolkata, India - who showed that the seroprevalence of Toxoplasma infection was more in the first trimester of pregnancy and was statistically significant (p<0.05).

Toxoplasma IgM antibodies appear within 1 to 2 weeks after the primary infection and usually disappear by 6 months. IgG antibodies appear within 1 to 2 weeks of the primary infection and remain positive lifelong. IgG antibodies in the absence of IgM indicates that the infection is chronic and occurred at least 6 months to one year of the primary infection. Women positive for both IgG and IgM antibodies indicates that the infection occurred either within 6 months duration or more. Further confirmation can be done by the Avidity test which can differentiate between the two conditions.[5] Both IgM and IgG negative means woman never exposed to that organism. In this study, isolated IgM antibody of Toxoplasma was seen in 25 (16.3%) cases indicating that they had active infection, which may be associated spontaneous abortion but other causes for spontaneous abortion need to be ruled out.

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Tamer and colleague conducted a study (2009)[8] to determine the seroprevalence of Toxoplasma gondii, Rubella and Cytomegalovirus among pregnant women in the Western Region of Turkey. In their study, out of 1972 pregnant women, 8 (0.4%) were positive for the anti-Toxoplasma IgM antibody.

A study was carried out by Ocak et al in 2007[9] to determine the seroprevalence of Toxoplasma gondii, Rubella and Cytomegalovirus among the pregnant women in southern Turkey. Of the1652 pregnant women tested, only 9 (0.54%) subjects were positive for Toxoplasma IgM which as compared to the present study is much less. Probably their low prevalence is because the women belonged to the low risk group.

Screening for TORCH infection in women was carried out also by Kaur et al in 1999[10] in Delhi. They reported that of the 120 women, seropositivity for toxoplasmosis was 11.6% which is lower than the present study.

Seroepidemiology of Toxoplasma gondii infection in pregnant women in a public hospital in northern Mexico (Durango City) was carried out by Alvarado-Esquivel et al in 2006[11]. None of the 343 women screened had IgM antibodies to T. gondii. They concluded that poor housing conditions consumption of turkey meat, exposure to soil floors and residence of other Mexican States might contribute to T. gondii infection.

Another study was carried out by Chopra and colleagues to determine the prevalence of IgM antibodies to Toxoplasma, Rubella and Cytomegalovirus infections in pregnant women over a period of one year in the Government Medical College, Amritsar (Punjab) India, in 2004.[12] Two hundred pregnant women with BOH (case) and 100 without BOH (control). They found that women with BOH, 137 (68.5%) were positive for Toxoplasma, Rubella and CMV alone or in combination. IgM seropositivity to Toxoplasma infection was 42.5%.The highest percentage of Toxoplasma IgM was found in cases of abortions (71.8%). In control group none of the women had IgM seropositive for Toxoplasma.

A study to determine the association of Toxoplasma antibodies in 1st trimester pregnancy was carried out in Turkey by Karabulut and co-workers in 2011.[13] They concluded that of the 1102 pregnant women evaluated for toxoplasmosis, 408 (37%) were positive for IgG. Their result is almost comparable to the present study which may be explained by the reason that in the present study 75.8% of women were in 1st trimester of pregnancy.

Ghazi and co-workers (2002)[14] conducted a study in 926 pregnant women, to determine the seroprevalence of IgG to TORCH infection in pregnant Saudi women. In their study, Toxoplasma IgG antibodies were detected in 35.6%.

Yashodhara and colleagues (2004)[15] studied 236 pregnant women of different socioeconomic status and reported that both IgG and IgM positive, indicating a recent active infection, was present in 18.2% of women belonging to low socioeconomic group and 5% in the high socioeconomic group.

Rai et al (1998)[16] randomly selected 345 pregnant Nepalese women aged 16-36 years and 13 pregnant women with bad obstetric history. They were tested for the presence of Toxoplasma antibodies using micro latex agglutination and ELISA methods. The seroprevalence of Toxoplasma infection was 55.4% (191/345) and was higher (59.0%) in the older age-group (27-36 years) compared with the younger age-group (16-26 years) (52.2%). In the present study, when the prevalence was analyzed in the different ethnical groups, no significant difference in antibody prevalence in women belonging to the two different ethnic-groups (Tibeto-Burman 57.8%, Indo-Aryans 52.7%) was observed.

A similar study was conducted by Singh and co-workers in the year 2004[17] in Indian

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pregnant women to differentiate between recent Toxoplasma infection and infection more than 4 months old by the IgG avidity method. The IgG seroprevalence rate of toxoplasmosis was 45%. Both antibodies seen in 7 women (3.3%). 2 of 7 showed low IgG avidity indicating recent infection of ≤4 months duration. They concluded that all IgM + IgG antibody positive pregnant must be tested for IgG avidity to test for recent primary infection.

A similar study was conducted by Hamdan and colleagues in 2011[18] to study the seroprevalence of Cytomegalovirus and Rubella among the pregnant women in western Sudan. They found that out of 231 pregnant women, 8 (3.4%) women were Rubella-IgM positive. Primary CMV infection during pregnancy is asymptomatic. CMV IgM antibodies persist for 6-9 months following primary infection. Recurrent infections are characterized by the absence of IgM antibodies and at least four fold increases in IgG titer.[5] The serologic finding in a relatively recent CMV infection is a mix of IgM and IgG antibodies.[19] HSV is known to have an intrauterine route of transmission with a significant risk of foetal and neonatal mortality and morbidity.[20, 21,22]

The present study has some limitations. Since there was time limit for the study so recruited sample size was small. The 'Avidity test' was not available in Kathmandu at the time of starting of the study which is the tool to differentiate the acute infection from the chronic infection. The study was conducted at only one centre (TUTH), so the result may need further study to support this.

Conclusion
On analysing the association of TORCH antibodies in women with spontaneous abortion recent infection of Toxoplasma was most commonly associated. So primary prevention, early diagnosis and proper management of TORCH infection should be considered. As foetal morbidity results in handicap children, which will be a great burden to individual, family, society and the country, screening for TORCH infection during preconception counselling and advice at first antenatal visit can be recommended from the present study.

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