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Study of Serological Profile of Torch Infections In Women With Bad Obstetric History

KEYWORDS: IgG, IgM, TORCH, BOH, seropositive

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ABSTRACT *Introduction: The primary infections with TORCH agents, remain a major problem in the women with Bad Obstetric History (BOH). Prenatal screening for antibodies to TORCH infectious agents by serology is an important tool for diagnosis.*

Aims and objectives: To determine the occurrence of IgM and IgG antibodies status against TORCH infections in sera of women with BOH in a tertiary care hospital of North India.

Material and method(s): In this prospective observational study, 130 women with BOH were included. Serology by detecting IgM and IgG antibodies specific to TORCHagent was carried out either by ELISA or Chemiluminesense method.

Result: The overall IgM antibodies seropositivity of TORCH were 99(76.15%). The IgM/IgG sero positivity to Toxoplasma, Rubella, CMV and HSV were 21.54/27.69%, 35.38/60.00%, 19.23/78.46%, and 18.46/23.85% respectively. Maximum number of IgM seropositives cases of abortion 39(39%) and congenital malformations 08(28.57%) were associated with Rubella, still birth 04(23.52%) and preterm 03(16.67%) were associated with Toxoplasma and Rubella.

Conclusion(s): A previous history of pregnancy wastage and the serological reaction for TORCH infections during current pregnancy must be considered while managing BOH cases so as to reduce the adverse fetal outcome.

Introduction

Bad Obstetric History (BOH) implies previous unfavorable outcome in terms of two or more consecutive spontaneous abortions, intrauterine growth retardation, still birth, history of intrauterine fetal death and congenital anomalies.[1] Cause of BOH may be genetic, hormonal, abnormal maternal immune response, and maternal infection.[2] Maternal infection in pregnancy occur at any time during gestation and the severity depends upon virulence of agents, susceptibility of mother, gestational age of fetus and route of infection.[3] Pregnant women are more susceptible to a variety of infections. TORCH group of organisms include Toxoplasma gondii, Rubella virus, Cytomegalovirus (CMV), and Herpes simplex virus (HSV).[4]TORCH group of infections are important in women with bad obstetric history as all these organisms are capable of crossing placental barriers and causing fetal infection and abnormalities. Toxoplasma gondii is an obligate intracellular parasite. Infection caused by Toxoplasma gondii is known as toxoplasmosis. It is asymptomatic and if acquired during pregnancy, especially as a primary infection may cause damage to the fetus. Apart from being transmitted through infected cats feces, it is now shown also to be transmitted through contaminated vegetables, fruits, and milk.[5] Rubella virus belongs to the family Togaviridae and genus Rubivirus. It has a positive sense single strand RNA genome, icosohedral capsid, enveloped virus. It causes disease of minor importance in the absence of pregnancy but has been directly responsible for pregnancy wastage and other congenital malformations. Congenital abnormality depends upon trimester of pregnancy during which infections take place.[6] CMV is a Double standard DNA β-herpes virus**.** In adults, it is usually asymptomatic but its significance is increased during pregnancy.[7] HSV is a double stranded DNA virus which is of two types HSV-1 and HSV-2. Fetal and newborn infections due to HSV are usually transmitted from infected mothers.[8] There diagnosis is usually established by seroconversion in paired sera or by the presence of specific antibody. So this study was undertaken to determine the seroprevalence of TORCH infection in a group of women with bad obstetric history.

Materials and Methods

Present study was carried out in Microbiology central lab of SMS hospital during the study period (May 2014- April 2015), a total of 130 serum samples were collected from pregnant women with bad obstetrical history attending the antenatal clinic of associated hospitals, Jaipur. Patients included in our study were with history of any of the bad obstetric outcome like still births, habitual abortions, preterm, intrauterine growth retardation and neonatal deaths. Aseptically collected blood sample from the study subjects were kept at room temperature for 20 -30 minutes and after clotting, sera were separated and stored at – 20βC until tested.[9] Determination of antibodies (IgG and IgM) against TORCH was done by using commercially available ELISA kits [DIA.PRO Diagnostic Bioprobes Srl(Milano)ITALY][10] /Chemiluminesense (Cobas-E 411)[11] method. Absorbance was taken at wavelength of 450 nm, and results were calculated and interpreted according to the instructions.

Results

In our study, out of 130 women with BOH, 99(76.15%) were seropositive for TORCH infections on the basis of IgM antibodies.(Table I)

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Table-I: Seropositivity of TORCH on the basis of IgM antibodies (n=130)

TORCH	No. of IgM positive (percentage)
Seropositive	99 (76.15%)
Seronegative	31 (23.85%)
Total	130 (100%)

Table II shows the results of IgG and IgM antibody assays in all patients included in the study. A total of 46 (35.38%) were positive for IgM Rubella. Toxoplasma IgM positive were 28 (21.54%), CMV IgM positive were 25 (19.23%) and 24 (18.46%) were positive for HSV.

Table-II: Seroprevalence of TORCH organisms in study population (n=130)

Organism	Pos. IgM antibody (%)	Pos. IgG antibody (%)	Both IgM+IgG Neg. (%)
Toxoplasma	28 (21.54%)	36 (27.69%)	66 (50.77%)
Rubella	46 (35.38%)	78 (60.00%)	06 (04.61%)
CMV	25 (19.23%)	102 (78.46%)	03 (02.30%)
HSV	24 (18.46%)	31 (23.85%)	75 (57.69%)

Table III shows that IgM antibodies of TORCH agents in abortions, stillbirths, preterm and congenital anomalies. In our study 100(76.92%) women were having history of abortions, 17(13.08%) women of stillbirths, 18(13.85%) women of preterm and 28(21.54%) women having history of congenital anomalies.

Table-III: Association between IgM antibody to TORCH agents in women with BOH and their previous clinical outcomes*

Organism	Abortions (%)	Still births (%)	Preterms (%)	Cong. Anomalies (%)
Toxoplasma	22 (22.00%)	04 (23.52%)	03 (16.67%)	04 (14.28%)
Rubella	39 (39.00%)	04 (23.52%)	03 (16.67%)	08 (28.57%)
CMV	21 (21.00%)	02 (11.76%)	01 (05.56%)	05 (17.86%)
HSV	21 (21.00%)	03 (17.65%)	02 (11.12%)	01 (03.57%)

*multiple response table

Discussion

Primary infection with TORCH group of organisms in pregnant women are hazardous and can lead to abortion, still birth, preterm deliveries, congenital anomaly in fetus and even intrauterine fetal death.

In table I, out of 130 total cases 99(76.15%) were IgM seropositive and 31(23.85%) were seronegative for TORCH infections. Our results were comparable with the study conducted by EAK Mohammad et al[12] who found it 71.82%. This is seen even higher in studies done by other workers. Prevalence of seropositivity has varied from 33.33% by Surpam RB et al[13] to as high as 93.4% by Kaur et al.[14] It shows that the TORCH infection is quite common in women with BOH in child bearing age.

In table II, out of 130 cases, IgM antibodies to Toxoplasma were seen in 21.54%. It is found ranging from as low as 3.3% by Singh et al[15] to as high as 55.5% by Ali HM Al-Marzoqi et al.[16] IgG antibodies in our study were 27.69%. In studies carried out by others, these IgG antibodies ranged from 8% by Padmavathy M et al[17] and up to 55% by Thapliyal et al.[18]

Rubella, acquired during the first trimester of pregnancy, can do more damage to the developing fetus. The IgM and IgG, antibodies positive for Rubella in our study were 35.38% and 60% respectively, which in studies of other authors were found ranging from 1.6% and 10.1% by Khalil H. Al- Jeboori[19] to 53.9% by Ali HM Al-Marzoqi et al[16] and 93.3% by H O Ghazi et al[20] of IgM and IgG respectively. The reason for this difference in immunity may be due to factors such as net birth rate, population density, opportunities for entry of virus and ethnicity of the population may be responsible for this variation as mentioned in literature.[21] The observation therefore suggests an increased prevalence of Rubella infection in women with BOH.

CMV IgM and IgG positivity in our study were 19.23% and 78.46% respectively, which in studies by other authors were found ranging from least to highest as 0% by MS Sadik et al[22] and 13.4% by Khalil H. Al- Jeboori,[19] to 57.2% Ali HM Al-Marzoqi et al[16] and 96.5% by Rashid Mahmood et al[23] for IgM and IgG antibodies respectively. Transplacental transmission of CMV in women with preexisting seropositivity may be secondary to virus reactivation or to infection with a new different CMV strain (reinfection) during pregnancy. Previous immunization by natural infection with CMV is not perfectly protective against either reinfection or vertical transmission of infection from mother to fetus.[24]

HSV IgM and IgG in our study were found 18.46% and 23.85% respectively compared with other studies where it is from 2.1% by O Ahmed et al[25] to 33.5% by Sen MR et al[26] of IgM antibodies and 2.38% by EAK Mohammad et al[12] to 70% by Kaur et al[14] of IgG antibodies. The above differences in the prevalence of these antibodies may be due to different geographical regions.

Positive IgM test result indicates acute/early infection. Positive test result for both IgG and IgM indicates recent infection, and negative IgM with the positive IgG test indicates remote infection.

Toxoplasma, Rubella and CMV are known to cause infection in utero and are often responsible for abortion, still birth, premature delivery and congenital malformations. In our study 100 women have history of abortions, of these according to Toxoplasma gondii, Rubella, CMV and Herpes were 22%, 39%, 21% and 21% respectively. Maximum cases of abortions were observed due to Rubella in our study. While study done by Surpam RB et al[13], Toxoplasma, Rubella, CMV and HSV IgM antibodies were positive in 27.27%, 2.27%, 11.36% and 13.63% and in study by N Saxena et al[27] IgM antibodies were positive in 20%, 10%, 23.33% and 10% cases respectively who had abortions. These differences may be due to different geographical areas of studies and difference in seroprevalence of TORCH infections responsible for abortions. Still birth cases in our study were positive for IgM antibodies in 23.52%, 23.52%, 11.76% and 17.65% respectively for Toxoplasma, Rubella, CMV and HSV. Study by Surpam RB et al[13], 17.64% stillbirth due to Toxoplasma and 5.88% each due to Rubella, CMV and HSV while Kishore et al[28] found still birth due to Toxoplasma and Rubella were 5% each and maximum 35% with CMV. In our study, 18 cases of preterm, of these 16.67% were due to toxoplasma and Rubella each 11.12 % and 5.56% were HSV and CMV respectively. Study by Sur-

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pam RB et al[13] reported preterm due to Toxoplasma were 18.18% and 9.09% due to Rubella and CMV each.

In our study, 28 cases of congenital anomalies, of these 14.28%, 28.57%, 17.86% and 3.57% due to Toxoplasma, Rubella, CMV and HSV respectively. Which is reported 33.3% by Kishore et al[28] and 20.6% by Ali H. M. Al-Marzoqi[16] for Rubella. It is evident that the seropositivity in congenital anomalies cases due to TORCH may vary much. It was suggested that pregnancy may reactivate the latent virus leading to further reproductive wastages.

Conclusion

From our study we recommend that all antenatal cases with BOH be screened for TORCH infections as early diagnosis and appropriate intervention of these infections will help in proper management of these cases.

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