

Original Research Article

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## A Study of Torch Screening in Women with Bad Obstetric History

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### ABSTRACT

Maternal infections have been considered as one of the significant factors in the causation of bad obstetric history. Infections caused by Toxoplasma, Rubella, Cytomegalovirus and Herpes simplex virus are benign. However, they may lead to serious complications, especially when they are acquired during the first trimester of pregnancy. These are associated with inadvertent outcomes like multiple abortions, intra-uterine fetal death, stillbirths and congenital malformations. Data regarding the detection of these infections is scanty as the risk requirement of expensive commercial diagnostic kit- Toxoplasma, Rubella, Cytomegalovirus and Herpes simplex IgM antibodies. This study was undertaken to assess the utility in pregnant women with bad obstetric history. The present study was undertaken as the case-control study at Princess Esra Hospital, Hyderabad between January 2015 and December 2017. A total of 50 pregnant women of age range in their first trimester attending Ante Nata Clinic were included along with 35 age matched control pregnant women with no bad obstetric history. After obtaining the institutional ethics committee approval serum samples were obtained aseptically from the enrolled cases and were tested for the identification of specific IgM antibodies for Toxoplasma, Rubella, Cytomegalovirus and Herpes using sandwich and capture ELIZA (Calbiotech lab USA). The assay was performed according to the manufacturer's instructions and the results were calculated in MS excel and test of proportion and Pearson's Chi square test. 23 women for IgM antibodies Toxoplasma, Rubella, Cytomegalovirus and Herpes either alone or in combination were identified in the group I. In the control group (Group II), IgM antibodies were detected in 11 cases. When compared with the control group, Rubella and Toxoplasma infection were found to have statistically significant difference with the p-value of 0.016 and 0.026 respectively. However, there was no statistically significant difference found between the two study groups. Detection of IgM antibodies performed reflects recent infection and there is high prevalence of infection caused by TORCH agents in women with bad obstetric history compared to healthy controls. Hence, all the anti-natal cases with bad obstetric history should be routinely screened as IgM antibodies detection is a reliable indicator of maternal infections and can be used as a screening test.

#### Keywords

TORCH, Screening,  
Pregnancy, Specific  
IgM, Antibodies

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## Introduction

Adverse fetal outcomes such as two or more consecutive spontaneous abortions, history of intrauterine fetal death, intrauterine growth retardation, stillbirth, early neonatal death, and/or congenital anomalies indicates bad obstetric history (Kumari *et al.*, 2011). Bad obstetric history can be caused due to varied reasons including genetic, hormonal, abnormal maternal immune response, and maternal infection (Turbadkar *et al.*, 2003).

TORCH is a group of prenatal infections which stands for Toxoplasmosis, Rubella virus, Cytomegalovirus infection and Herpes Simplex virus infection. These have milder impact on mother but can lead to devastating fetal outcomes. TORCH infections in pregnant mothers have the potential to cause congenital infections, abortions, intrauterine growth restriction (IUGR), still births and intrauterine deaths (IUD) (Maldonado *et al.*, 2011; Zhiyan *et al.*, 2009). The severity of the infection on fetus depends upon its gestational age (Boyer and Boyer, 2004). During first trimester of pregnancy, placental barrier is formed which helps to protect the fetus from cell mediated and immunological response. These organisms are transmitted due to lack of good hygienic conditions, contaminated blood, water and soil and airborne respiratory droplet (Pizzo, 2011). These maternal infections are initially asymptomatic. Thus, TORCH infections in pregnant women are usually established by demonstration of sero-conversion in paired sera or by demonstration of specific IgM antibodies (Daftary and Chakravarti, 1991; Newton, 1999).

## Aim

The present study was conducted to evaluate the association between seroprevalence of Toxoplasma, Rubella, Cytomegalovirus and Herpes Simplex virus among pregnant women

with strong clinical suspicion and control group attending Ante Natal Clinic by detecting IgM antibodies.

## Materials and Methods

The study was undertaken as case-control study at Princess Esra Hospital, Hyderabad between January 2015 and December 2017. The subjects were enrolled based upon the recent history of abortions, preterm labour, intra-uterine fetal death (IUFD), stillbirth or congenital anomalies. The study was initiated after obtaining the Institutional Ethics Committee clearance. Written informed consent was taken from the patients enrolled. A total of 85 subjects were included for the study. Group I comprised of 50 pregnant women with the age range of 18-35 years. Age matched control group of 35 healthy women with previous normal obstetric history were included in Group II. History was collected in the specially designed data collection form.

3ml blood was drawn from the subjects aseptically and centrifuged for 10min x 3000 rpm. After which serum was separated and divided into 0.5ml of aliquots and kept at -20°C. The sera samples were tested for the detecting the IgM antibodies by ELISA for Toxoplasma, Rubella, Cytomegalovirus and Herpes Simplex virus using IgM capture ELISA kit (Calbiotech Lab. Ltd, USA).

The assay was conducted according to the manufacturer's instructions and the results were calculated on the basis of the cut off Activity Index (AI). The results were read at 450nm in the ELISA reader (Merck) and interpreted as follows:

Cut off: 0.10+ average value of negative control

Positive: OD value equal to or greater than cut off

Negative: OD value less than the cut off.

### Statistical analysis

The data was maintained in Microsoft excel 2010 and the test of proportions and significance was carried out using Epi-info software.

### Results and Discussion

Maternal infections can have crucial consequences on fetus. In this study, ELISA testing was used to detect the TORCH infections. Prior studies have concluded that the micro-organism *Toxoplasma* is responsible for bad obstetric history in a wider range of race groups (Zhiyan *et al.*, 2009). But, its prevalence has not been clearly stated in Indian population. The rupture of encysted toxoplasma in the uterus of the pregnant women has disastrous ramifications on the developing fetus such as infections, and recurrent miscarriages (Surpam *et al.*, 2006).

In the present study the seroprevalence of Toxoplasma IgM antibodies is 14% (5/50) in the cases whereas the control group showed 0% (0/35) of seroprevalence. Janak K *et al.*, has reported the 8.3% seroprevalence of IgM antibodies of Toxoplasma gondii among 60% cases of patients with bad obstetric history (Janak *et al.*, 2011). Another study conducted by Kaur R *et al.*, has corroborated the results by concluding the seropositivity of IgM antibody as 11.6% (Kaur *et al.*, 1999). Furthermore, Sadik *et al.*, and Turbadkar *et al.*, has demonstrated the incidence rate as 18% and 10.5% respectively (Sadik *et al.*, 2012; Turbadkar *et al.*, 2003). The studies on Indian population has persistently revealed diverse results ranging between 5-80% for the seroprevalence of Toxoplasma IgM antibody (Singh, 2003; Yasodhara *et al.*, 2001). The statistical analysis in the present study showed that the difference between the cases and

controls is statistically significant. Hence, the significance of Toxoplasma screening cannot be diminished in cases with the clinical suspicion. In cases of Toxoplasma infections that are diagnosed in the initial stages of pregnancy helps to plan suitable strategies for the management of fetus related complications. The data could not draw out the association with the history of pet breeding to toxoplasmosis. Nonetheless, these women should be advised to keep away from the cats and dogs.

Our study has revealed 18% (9/50) of IgM positive Rubella cases among subjects with bad obstetric history and about 2.85% (1/35) in healthy pregnant women. A study has reported 5-50% incidence rate of congenital Rubella when the mother is infected in the first trimester of her pregnancy (Miller *et al.*, 1982). In a study, approximately 12% of pregnant women were found to be seropositive for rubella and about 10-20% of women in the child bearing age were susceptible for the rubella infection (Rubella and Pregnancy, 1993; Lever *et al.*, 1987). Our study has reported a statistically significant difference between the two groups i.e., cases and controls. The infection caused by Rubella is categorized as milder i.e., found in about 1 in 10 cases. (Singla *et al.*, 2004) The infection in the first trimester of pregnancy can result in miscarriage, fetal death, or an infant born with congenital birth defects known as congenital rubella syndrome (CRS). (Indian Association of Paediatrics (IAP) Committee on Immunization 2005-2006; Controlling rubella and preventing congenital rubella syndrome – Global progress, 2009) Its diagnosis is regarded as unreliable because large numbers of cases are in the subclinical stage (Singla *et al.*, 2004). The ramifications of Rubella infections can be kept under check when the “herd immunity threshold” is maintained above 83% among adults in the country without any regional imbalances. The first

dose of MMR vaccine should be started as early as 15-18 months of the age and second dose at 6-12 years in order to eradicate the CRS in India (Jayakrishnan Thayyil *et al.*, 2016).

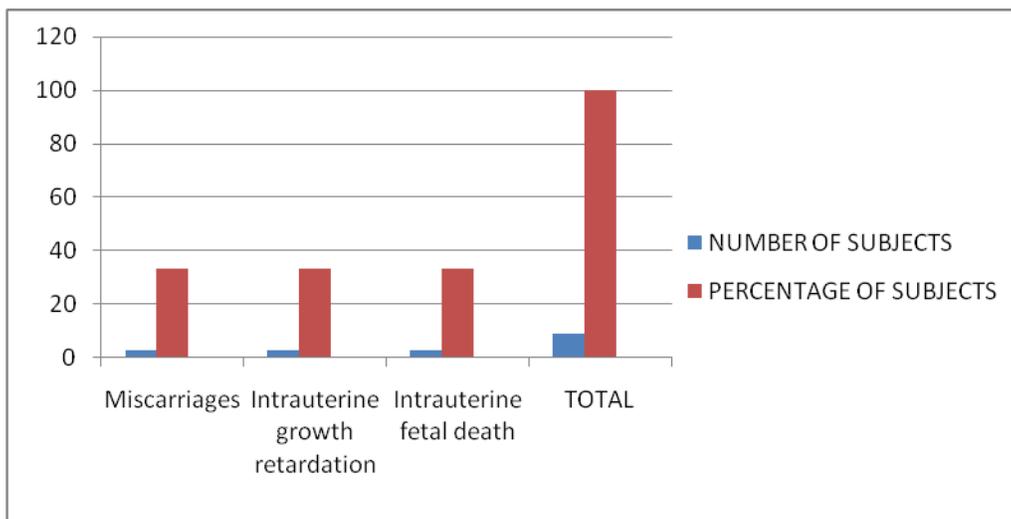
This study has shown 8% (4/50) of incidence rate of CMV in cases with bad obstetric history and about 14.2% (5/35) among controls. More adverse fetal outcomes have been associated with CMV primary infection. The incidence rate of IgM antibodies of CMV

among pregnant women with bad obstetric history is 8.4% (Turbadkar *et al.*, 2003). Another study has reported a total of 7 cases that were seropositive for CMV IgM antibodies among 150 samples and the percentage for its prevalence was 4.67% (Boppana *et al.*, 2001). Women of child bearing age were reported to have 2% prevalence rate of positive IgM antibody. Cytomegalovirus infection is asymptomatic, thus making its diagnosis more difficult (Turbadkar *et al.*, 2003) (Table 1 and Fig. 1).

**Table.1** Comparative Results of TORCH

SEROLOGICAL TESTS	No. of Seropositivity in Group I (%) (n=50)	Seropositivity in Group II (%) (n=35)	p- value
Toxoplasma	5 (14%)	0 (4%)	0.026
Rubella	9 (18%)	1 (2.85%)	0.016
Cytomegalovirus	4 (8%)	5 (14.2%)	0.17
HSV	5 (10%)	5 (14.2%)	0.27
TOTAL	23 (46%)	11 (31.42%)	0.08

**Fig.1** Incidence of adverse fetal outcomes among subjects



Herpes Simplex virus has been associated with increased mortality and morbidity. A both primary and secondary infection causes adverse fetal outcomes (Sebastian *et al.*, 2008). The risk for neonatal infection increases from 1% during first trimester to 30-

50% during third trimester of pregnancy. (Vounter *et al.*, 1982) The present study has shown about 10% (5/50) of positive HSV IgM antibodies and about 14.2% (5/35) among controls. When compared between two group p value was found to be not significant.

Hence, the serological diagnosis is unreliable and needs to be confirmed with tests of higher specificity.

The most common combination of infectious organism that led to the adverse fetal outcomes was that of Toxoplasma and Rubella, which was found to be present in about 5 subjects. In the present study, 10 adverse fetal outcomes were observed. Out of which 5 occurred in the first trimester, 3 in second trimester and 1 in third. The observed adverse fetal outcomes were as follows; 3 miscarriages, 3 intrauterine growth retardation and 3 intra uterine fetal death.

The present study has reported significant seroprevalence of IgM antibodies for TORCH organisms among pregnant women. TORCH infections have more detrimental effects on fetus than the mother such as intrauterine growth retardation, intrauterine death, early neonatal death, and congenital malformation. Hence, TORCH screening is recommended for the pregnant women especially those with the bad obstetric history. Early diagnosis helps to strategize the favorable interventions required.

### **Conflict of Interest**

Authors have no conflict of interest.

### **References**

- Boppana SB, Rivera LB, Fowler KB, Mach M, Britt WJ. Intrauterine transmission of cytomegalovirus to infants of women with preconceptional immunity. *New England Journal of Medicine*. 2001 May 3; 344(18): 1366-71.
- Boyer SG and Boyer KM. Update on TORCH Infections in the Newborn Infant, *Newborn and Infant Nurs. Rev.* 2004; 4: 70-80. 2.
- Controlling rubella and preventing congenital rubella syndrome – Global progress, 2009. *WklyEpidemiol Rec.* 2010; 85: 413–8
- Daftary SN, and Chakravarti S. Obstetric disorder in pregnancy. *Holland and Brews Manual of obstetrics.* 15<sup>th</sup> ed. New Delhi: B.I. Churchill Livingstone, 1991: 138.
- Indian Association of Paediatrics (IAP) Committee on Immunization 2005-2006. *Indian Association of Paediatrics.* 4th ed. 2007. Jan, pp. 23–4.
- Janak K, Richa M, Abhiruchi P, Yashodhra P. Adverse reproductive outcome induced by parvovirus B19 and TORCH infections in women with high risk pregnancy. *J Infect Dev Ctries.* 2011; 5(12): 868-73.
- Jayakrishnan Thayyil VK, Moorkoth AP, Rao B, Selvam P. Prevalence of rubella-specific IgG antibodies in unimmunized young female population. *Journal of family medicine and primary care.* 2016 Jul; 5(3): 658.
- Kaur R, Gupta N, Nair D, Kakkar M, Mathur MD. Screening for torch infections in pregnant women: a report from Delhi. *Southeast Asian J Tropical Medicine Public Health.* 1999; 30: 284-6.
- Kumari, N., Morris, N., Dutta, R., 2011. Is screening of TORCH worthwhile in women with bad obstetric history: an observation from Eastern Nepal. *J.HealthPopul.Nutr.*, 29(1): 77
- Lever AL, Ross MP, Baboonian C, Griffiths PD. The immunity to rubella among the women of the childbearing ages. *Br J GynecolObstel* 1987; 94: 208-12.
- Maldonado, Y.A., Nizet, V., Klein, J.O., Remington, J.S., Wilson, C.B. 2011. Current concepts of infections of the fetus and newborn infant. In: Remington, J.S., Klein, J.O., Wilson, C.B., Nizet, V., Maldonado, Y.A. (Eds), *Infectious Diseases of the Fetus and*

- Newborn Infant, 7th Edn. Elsevier, Saunders, Philadelphia, PA. Pp. 1-23.
- Miller E, Craddock-Watson J, Pollock T. Consequences of confirmed maternal rubella at successive stages of pregnancy. *The Lancet*. 1982 Oct 9; 320(8302): 781-4.
- Newton E. Diagnosis of perinatal TORCH infections. *ClinObstetGynecol* 1999; 42: 59-70.
- Pizzo JD. Focus on Diagnosis: Congenital Infection, *Ped. in Review* 2011; 32: 537-542.
- Rubella and Pregnancy. ACOG technical bulletin number 171-August 1992. *Int J. GynecolObstel* 1993; 42: 60-66.
- Sadik MS, Fatima F, Jamil K, Patil C. Study of TORCH profile in patients with bad obstetric history. *J Bio Med*. 2012; 4(2): 95-101.
- Sebastian D, Zuhara KF, Sekaran K. Influence of TORCH infections in first trimester miscarriage in the Malabar region of Kerala. *African Journal of Microbiology Research*. 2008 Mar 31; 2(3): 56-9.
- Singh S. Mother-to-child transmission and diagnosis of *Toxoplasma gondii* infection during pregnancy. *Indian journal of medical microbiology*. 2003 Apr 1; 21(2): 69.
- Singla N, Jindal N, Aggarwal A. The seroepidemiology of rubella in Amritsar (Punjab). *Indian journal of medical microbiology*. 2004 Jan 1; 22(1): 61.
- Surpam, R.B., Kamalakar, U.P., Khadse, R.K., Qazi, M.S., Jalgaonkar, S.V. 2006. Serological study for TORCH infections in women with bad obstetric history. *J.Obstet. Gynecol. India*, 56(1): 41-43.
- Turbadkar D, Mathur M, Rele M. Seroprevalence of TORCH infections in bad obstetric history. *Indian J Med Micro*. 2003; 21: 108-10.
- Vounter LA, Hickok DE, Brown Z, Reid L, Corey L. Recurrent genital herpes simplex virus infection in pregnancy: infant outcome and frequency of asymptomatic recurrences. *Am J Obstet Gynecol*. 1982; 143: 75.
- Yasodhara P, Ramalakshmi BA, Naidu AN, Raman L. Prevalence of specific IgM due to toxoplasma, rubella, CMV and *C. trachomatis* infections during pregnancy. *Indian journal of medical microbiology*. 2001 Apr 1; 19(2): 52.
- Zhiyan, L., Y Culling, L Ping - *ClinChimActa*, 2009. Prevalence of serum anti-bodies to TORCH among women before pregnancy or in the early period of pregnancy in Beijing. *ClinicaChimicaActa* 2009; 403: 212-15.

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