

Seroprevalence of torch infection in pregnant women with bad obstetric history in and around Wardha, Maharashtra.

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Abstract

Bad obstetric history (BOH) may be caused by hormonal, abnormal maternal immune response, genetic, and maternal infection. Maternal infections caused by TORCH (Toxoplasma, Rubella virus, Cytomegalovirus and Herpes simplex virus) and other bacteria, virus can cause BOH. These maternal infections are difficult to diagnose on clinical ground, so the detection of the IgM antibody against TORCH is the best approach to diagnose and reduce perinatal morbidity and mortality. This current study was undertaken to detect the serological evidence of the acute TORCH infections in pregnant women with BOH. **Materials and Methods:** This current study was carried out from January 2019 to December 2019, in the department of microbiology, at Jawaharlal Nehru Medical College, Wardha, and Maharashtra, India. A total of 240 pregnant women attending antenatal department, who had TORCH test done at laboratory were included in the study. The patient clinical profile and history were collected from patient. The laboratory test for the detection of serum IgM and IgG specific antibodies for TORCH agents were done by using ELISA test (Euro immuno, Lubeck, Germany). **Results:** A total of 240 pregnant women, among them 60 pregnant women were with BOH and 180 were healthy pregnant women. Sero positivity rate for IgM in women with BOH is significantly higher than ($P=0.0001$) in healthy pregnant women. The sero positivity for TORCH IgM in toxoplasma Gondi was 21.7%, CMV 8.3% and rubella virus 11.7%. While in the healthy pregnant women the sero positivity for toxoplasma (10%), rubella (4.4%) and CMV was (2.8%). The highest sero positivity was seen in abortions with Toxoplasma Gondi (20%) followed by Rubella (10%). IUD in toxoplasma (20%) showed highest sero positivity followed by rubella (10%). In congenital anomalies and neonatal death and preterm labor toxoplasma showed highest sero positivity of 16.7% and 8.3% respectively. **Conclusion:** Primary infection with TORCH agents during pregnancy causes abortion, early neonatal death, and congenital malformation, intrauterine death, stillbirth and preterm labor. To prevent, It is recommended to screen for TORCH antibodies for antenatal cases with BOH infection and counseling for couple with if the pregnant women is having previous history of BOH to reduce the morbidity and mortality. To prevent congenital rubella syndrome, it is necessary to introduce vaccination and also health awareness programs at secondary school level.

Keywords: Bad obstetric history, Torch infections, ELISA.

Introduction

Torch (Toxoplasma, rubella virus, cytomegalovirus, and herpes simplex virus) is a heterogeneous group of infectious diseases that can cause infections in pregnant women and leads to congenital infections in new-borns. Bad obstetric history (BOH) implies previous unfavourable fetal outcome in terms of two or more consecutive spontaneous abortions, history of intrauterine fetal death, intrauterine growth retardation, stillbirth, early neonatal death, and/or congenital anomalies [1]. The causes of BOH may be hormonal, abnormal maternal immune response, genetic, and maternal infection. Maternal infections caused by TORCH and other bacteria, virus can cause BOH. TORCH agents usually cause asymptomatic or mild infection in pregnant women and causes severe

consequences in foetus, when they are acquired during the first trimester of the pregnancy [2,3].

Toxoplasmosis is a common parasitic infection in human as well as in warm-blooded animals. It is a self-limiting infection, but due to several factors, it may reactivate in healthy individuals leading to significant morbidity and mortality [4]. Usually, an acute Toxoplasma infection in pregnant women is asymptomatic and vertical transmission to the foetus leads to BOH.

In pregnant women, rubella causes miscarriage, stillbirth, or Congenital Rubella Syndrome (CRS). The sero positivity among pregnant women for rubella varies from country to country [5]. According to some studies in India, 10-20 percent of women are susceptible to rubella in childbearing age [6].

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CMV and HSV cause congenital viral infections, these viruses can get the infection from the mother to the foetus through the placenta, and it may be primary or recurrent infections. In the primary infection, there is a high chance to causes more damage in the foetus. In developing and in low socioeconomic countries the seroprevalence of CMV & HSV is high in pregnant women when compared to developed countries [7,8].

These maternal infections are difficult to diagnose on the clinical ground because these infections are initially in-apparent and asymptomatic. The detection of the IgM antibody against Toxoplasma, Rubella virus, and Cytomegalovirus and IgG antibody against herpes simplex virus (TORCH panel) is the best approach to diagnose these infections in pregnant women, can prevent and significantly reduce perinatal morbidity and mortality [9]. There is no data available regarding the correlation between the presence of an antibody in the TORCH panel and BOH. This current study was undertaken to detect the serological evidence of the acute TORCH infections in pregnant women with BOH.

Materials and Methods

This current study was carried out from January 2019 to December 2019, in the department of microbiology, at Jawaharlal Nehru Medical College, Wardha, and Maharashtra, India. A total of 240 pregnant women attending antenatal department, who had the TORCH tests done in the laboratory were included in the study. The patient clinical profile such as previous obstetric history, medical history, delivery outcome, abortion, congenital malformations, and pregnant women's

detailed demographic information and nutritional status and information on still birth were collected from patient. The laboratory test for the detection of serum IgM and IgG specific antibodies for the TORCH agents were done by using ELISA test (Euro immuno, Lubeck, Germany). The current study got approved from institutional ethics committee and informed consent was taken from study subjects. The statistical analysis was performed using Epi Info software en-US. Version 7.2.3.1. CDC (Center for Disease Control and prevention).

Results

A total of 240 pregnant women, among them 60 pregnant women were with BOH, and 180 were healthy pregnant women. The sero positivity rate for IgM in women with BOH is significantly higher than ($P=0.0001$) in healthy pregnant women, which is shown in the **Table 1**.

The sero positivity for TORCH IgM in toxoplasma Gondi was 21.7%, CMV 8.3%, and rubella virus 11.7%. While in the healthy pregnant women the sero positivity for toxoplasma (10%), rubella (4.4%) and CMV was (2.8%) which is shown in the **Table 2**.

The highest sero positivity was seen in abortions with Toxoplasma Gondi (20%) followed by Rubella (10%). IUD in toxoplasma (20%) showed the highest sero positivity followed by rubella (10%). In congenital anomalies and neonatal death and preterm labour, toxoplasma showed highest sero positivity of 16.7% and 8.3% respectively **Tables 3 and 4**.

Table 1. Seropositivity of anti-TORCH IgM antibodies in BOH and healthy pregnant women.

Group	Study population	Seropositivity for IgM Abs		P-value
		No. of Positive	Positive %	
BOH	60	25	41.66	0.0001
Healthy pregnant women	180	18	10	

Table 2. Seroprevalence of TORCH infections in BOH and control groups.

Sl. No	Torch agent	BOH Group (N=60)		Healthy pregnant women (N=180)	
		IgM Positive (%)	IgG Positive (%)	IgM Positive (%)	IgG Positive (%)
1	T. gondii	13 (21.7)	25 (41.7)	18 (10)	78 (43.3)
2	Rubella virus	7 (11.7)	22 (36.7)	8 (4.4)	180 (60)
3	Cytomegalo virus	5 (8.3)	40 (66.7)	5 (2.8)	96 (53.3)
4	Herpes simplex-2	--	7 (11.7)	--	18 (10)

Table 3. Seropositivity for anti-TORCH IgM antibodies among BOH group in relation to previous obstetric history.

Sl. No	Previous Obstetric History	Number of Pregnant women	Seropositive for anti-Torch IgM antibodies.	
			Number	Percent
1	Spontaneous abortion	40	15	38%
2	Intra uterine deaths (IUD)	10	3	30%
3	Congenital anomalies/ Neonatal death	12	4	33.30%
4	Preterm labour	12	3	25.00%

Table 4. TORCH agents with different clinical presentation of BOH cases.

BOH	Toxoplasma IgM positive n (%)	Rubella IgM positive n (%)	CMV IgM positive n (%)	Total
Abortions (40)	8 (20)	4 (10)	3 (7.5)	15
IUD (10)	2 (20)	1 (10)	-	3
Congenital anomalies/Neonatal death (12)	2 (16.7) 1 with Chorioretinitis, 1 with Hydrocephalus	1 (8.3) baby had Cleft lip ascites, pleural effusion, died in NICU	1 (8.3) baby had Microcephaly,	4
Preterm labour (12)	1(8.3)	1(8.3)	1(8.3)	3

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Discussion

A TORCH panel is used to detect the infections in pregnant women and these Infections are the major cause for BOH [10]. During pregnancy, these infections may be passing to a foetus and cause fetal and neonatal mortality and early and later childhood morbidity [11]. So, there is a need to perform screening tests for pregnant women to detect these infections, to reduce neonatal mortality and morbidity.

TORCH tests screen for immunoglobulin G (IgG) and immunoglobulin M (IgM). IgG antibodies represent past infection and are no longer acutely ill and IgM antibodies indicate present or acute infection. The sero positivity (IgM) rate in pregnant women with BOH statistically significant when compared to the normal healthy pregnant women ($P=0.0001$). Similar findings were seen in a study conducted by Rajendra B Surpam et al from Nagapur, India [12].

The different Indian studies showed seroprevalence from ranges from 11-55% for toxoplasma [13]. In the current study, the pregnant women with BOH were positive for IgM antibodies were 21.7% to *T. gondii*, in healthy pregnant women only 10% were positive. This is similar to other studies like Surinder Kaur et al 22% (1993), Jay Parikh et al 16%, and Nellimarla et al 20% [14,10]. In other studies like Rajendra Surpam et al., 14.66%, Turbadkar et al., 10.52%, Yasodhara et al., showed 13.1%, the prevalence of IgM Antibodies were low in toxoplasma this may be due to geographical variation, food habits, poor sanitation, lack of hygiene and contaminated water [15,16].

Rubella viral infection is very common during childhood with mild maculopapular rash. However, if rubella occurs during the early months of pregnancy, the virus may infect the foetus and cause congenital rubella syndrome (CRS). This can be prevented by the vaccine, so CRS has become rare in developed countries but still this is a major problem in developing countries [17]. A review of the literature identified that in India 5-45% of women of childbearing age were susceptible to rubella virus [18]. In the current study sero positivity rate for rubella was 11.7% while other studies reported the sero positivity rate ranges from 4 to 17.77% [12]. In Healthy pregnant women, the sero positivity rate for IgG antibodies was 40% and 63.3% in BOH pregnant women were at high risk for rubella during pregnancy; this study is similar to the Kusuma N et al and Turbadkar et al from India. Whereas other studies from other countries showed a high seroprevalence rate for rubella IgM antibodies, Tatjana et al., and, Hani Ghazi et al., 96.6% and 93.3% respectively. This variation may be due to a successful national vaccination program in those countries.

Cytomegalovirus (CMV) causes asymptomatic infection in adults, but in pregnant women it CMV infection leads to congenital infection, fetal loss, and disabilities among children. Primary CMV infection can result in a 30–40% risk to a new born when compared to reactivation which has a 1- 3% risk. In the current study, the percentage of active infection (IgM positive) among pregnant women with BOH is 2–4 times higher than the studies from Iran (4.35%), Belgium

(2.7%), and Croatia (2.2%) [19]. A similar active infection rate has been reported from India. The current study shows a prevalence rate of 66.7% for CMV IgG in women with BOH. A study from turkey reported that the prevalence of CMV IgG shows between 84.5-95% among pregnant women in Turkey [20].

Herpes simplex virus (HSV)-2 causes genital infection in humans, and also a potential source for neonatal herpes infection in pregnant women. In our study sero positivity for Anti –HSV IgG antibodies was 11.7% in pregnancy women with BOH. From other studies in India by Turbadkar et al 13.1%, Rajendra Surpam et al, 14.66% and, Yasodhara et al 13.1%.

Conclusion

Primary infection with TORCH agents during pregnancy causes abortion, early neonatal death, and congenital malformation, intrauterine death, stillbirth, and preterm labour. To prevent BOH, it is necessary to understand the seroprevalence of TORCH infections in pregnant women. It is recommended to screen for TORCH antibodies for antenatal cases with BOH infection and counselling for the couple with if the pregnant women are having the previous history of BOH to reduce the morbidity and mortality. To prevent congenital rubella syndrome, it is necessary to introduce vaccination and also health awareness programs at the secondary school level.

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