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Frequency of Torch Infections during Pregnancy in Peshawar, Pakistan

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ABSTRACT

Background and aim: *The purpose of this study was to find out the frequency of TORCH (Toxoplasma gondii, Rubella virus, Cytomegalovirus, Herpes simplex virus) infection during pregnancy, in Peshawar, Pakistan. In developing countries like Pakistan, TORCH infections cause serious complication during pregnancy. These infections can transmit from mother to fetus, causing congenital anomalies and intrauterine fetal death. Therefore, detection of TORCH infection is necessary during pregnancy. Primary infection has higher mortality than previous infection. Primary infection can be demonstrated by means of IgM antibodies as IgM antibodies indicate primary or recurrent infection.*

Materials and methods: *In the present study 800 samples were included which came to the Central Pathology laboratory for routine testing. For the detection of IgM ELISA method was used according to the manufacturer. This method is sensitive and specific for detection of IgM antibodies.*

Results: *The present study reveals that the frequency of TORCH infection during pregnancy is 6.99%. Frequency of anti-Toxoplasma IgM antibodies is 2.5%, rubella 1.5%, cytomegalovirus 1.8% and Herpes simplex virus 1.1%.*

Conclusion: *This study reveals that TORCH infections require serious attention as these infections cause serious abnormalities and anomalies in children as well as to pregnant females.*

Keywords: TORCH, Prevalence, IgM

INTRODUCTION

TORCH stands for Toxoplasmosis, Rubella virus, Cytomegalovirus and Herpes Simplex virus infection. These sorts of infections are the main cause of serious complications during pregnancy. In majority cases, the infection so severs, to cause serious damage to a fetus than his/her mother [1]. These infections enter into fetal circulation through trans-placenta. Transmission may also be possible at any time during gestation or sometime at the time of delivery [2]. Primary infection has high mortality than recurrent infection and may cause congenital anomalies, abortion, fetal death with uterus, growth retardation, prematurity and live born infants with the evidence of disease [3]. In developing countries, these infectious agents cause significant mortality and morbidity [4]. Abortion cause by TORCH infections ranges from 10-15% [5]. The prevalence of these infections varies country to country. These maternal infections can be detected by demonstration of specific IgM antibodies.

Toxoplasma gondii is an obligate intracellular parasite, which can cause infection in all mammals. On the basis of serological studies, *T. gondii* is one of those TORCH infections which are most prevalent [6]. Serological studies reveal that the exposure of *Toxoplasma gondii* throughout the world is high (30% in the US and 50-80% in Europe) [7]. Countries like Austria, France and Belgium, it is mandatory that pregnant females should be screen for TORCH infection during pregnancy [8]. The high prevalence of these infections during pregnancy had been reported in different region of the world like Latin America, parts of Eastern, the Middle East, parts of Southeast Asia and Africa [9]. Whenever a woman has infected with these infections, the immune system produces IgM antibodies against these

infections. TORCH infection IgM antibodies usually present for about 3 months. The presence of IgM indicates recent infection or recurrent infection [10].

Cytomegaloviruses are herpes viruses and are recognized as one of the causative agent of congenital infection [11]. A study from Australia reported that 9% of blood samples which were taken from newborn were PCR positive for CMV. Annually in the United States approximately 40,000 pregnant women are infected with CMV during pregnancy and probably an equal number in Europe. Out of those seroconverting during pregnancy approximately 20% these pregnant females' infants showed neurological abnormalities and hearing problems [12]. A recent study from Greece showed that there is increased level of CMV (16%) when compare to control 3% [13]. If the immune status before pregnancy is unknown, IgM antibodies against CMV infection can use for the determination of primary infection.

Rubella is one of RNA virus which belongs to paramyxovirus and is highly contagious. During the first 3 months of pregnancy 30%-50% fetuses become infected who contact with Rubella [10]. During infection, pregnant females show various symptoms such as fever, malaise, urinary tract infection (UTI), lymphadenopathy and conjunctivitis. Other complication such as arthralgia, arthritis, encephalitis, thrombocytopenia, hemorrhagic manifestations, neuritis, orchitis, etc. may also occur [14]. Rubella infection of the fetus causes birth defects and blindness, hearing loss and mental retardation. Manifestation of Congenital CMV, toxoplasmosis and rubella has similar with each other which include hearing problems, neurological symptoms, and disseminated infection to other organ like brain, lung, liver and brain [15]. The diagnosis of infection can be carried out using a virus, isolated from nasopharyngeal secretion and detect the presence of specific IgM. The IgM level can be estimated on the 23rd week of pregnancy.

Herpes simplex virus (HSV) infection is one of the most common transmitted infections. Herpes simplex type 2 is sexually transmitted virus and mostly causes genital infections [16]. Herpes simplex type 1 in non-sexually transmitted virus. Neonates usually acquire Herpes simplex viral infection from the mother's infected birth canal [10]. In India, the seroprevalence rate of HSV-1 is 33.3%, while that of HSV-2 rate is 16.6%. Those with both HSV-1 and 2 antibodies are estimated at 13.3% of the population [17]. Disseminated infection is a frequent cause of mortality. Usually HSV-2 causes most clinical significant disease in neonates. In developing country requirement for TORCH screening is increasing and it is the need of the day [18]. Many serological tests are available for the diagnosis of the TORCH infections which are sensitive and specific [19]. ELISA for detection of IgM antibodies against these infections is the best method because of its high sensitivity and specificity [7]. Current and recurrent infection can be identified by the presence of IgM antibodies [10].

Due to the lack of a national screening program, there is no baseline serological data regarding the presence of an antibody in the TORCH infection during pregnancy in Peshawar, Pakistan. This study was conducted to evaluate the sero-positivity of TORCH infections during pregnancy in this region.

MATERIALS AND METHODS

The cross-sectional study was conducted from 2013 to 2015 on samples that came to the Central Pathology Laboratory Peshawar, Pakistan. These samples were collected randomly using the simple random technique. In this study, 800 samples from pregnant females were collected that came to various clinics on routine checkup. Eight ml blood sample was collected in aseptic condition in plain tube without anticoagulant. Serum was separated and store at -20°C. These samples were tested for the presence of IgM Anti-Toxoplasma, Cytomegalovirus, Rubella and Herpes simplex antibodies by using ELISA technique according to the manufacture's instruction. Both positive and negative controls were proceeds with tests samples. In this study ELISA method was chosen for the detection of IgM antibodies as ELISA method is a sensitive technique for the detection of IgM antibodies. The test value more than 1.2 was considered as a positive sample while the value less than 1.0 was considered as negative. The values between 1.0 and 1.2 were considered equivocal. The test was repeated after 1-2 weeks for those patients whose sample results were in the range of equivocal. In the present study, we included those samples from pregnant females that were suspected of TORCH infection. Those females were excluded who had chronic infection of TORCH. Inform consent was taken from all the participants. The present study was approved by the ethical committee of the Khyber Medical University Peshawar, Pakistan.

RESULTS

In the present study 800 blood samples from pregnant females were collected. These samples were tested for the presence of IgM antibodies by using ELISA technique. Mean age of the females was 26.79 ± 6.01. These females were categorized from 15-20, 21-25, 26-30, 31-35 and more than 36 (Table 1). Fifty-six samples (6.99%) out of 800 were positive for TORCH infection. Out of fifty-six 20 (2.5%) were positive for Toxoplasma, 12 (1.5%) were positive for Rubella, 15 (1.87%) were positive for CMV and 9 (1.12%) were positive for Herpes Simplex Virus infections (Table 2). Eight out of 20 *T. gondii*

Table 1: Age wise distribution of TORCH infection

Age groups	Toxoplasma	Rubella	Cytomegalovirus	Herpes simplex virus
15-20	4	1	2	2
21-25	6	4	4	3
26-30	1	4	2	1
31-35	6	2	6	1
>36	3	1	1	2
Total	20	12	15	9

Table 2: Total number of positive cases from 800 samples for TORCH infection

Pathogen	Number of positive Cases	Percentage of positive cases
Toxoplasma	20	2.5%
Rubella	12	1.5%
Cytomegalovirus	15	1.87%
Herpes Simplex Virus	9	1.12%
Total	56	6.99%

Table 3: Total number of abortions in each TORCH species

Pathogen	No Abortion	Single Abortion	Two Abortion	More than two Abortions	Total number of Aborted Patients
Toxoplasma	08	6	4	2	12
Rubella	6	4	2	0	06
Cytomegalovirus	5	5	4	1	10
Herpes Complex virus	6	3	0	0	03
Total	25	18	10	3	31

infected females do not have any abortion while 6, 4 and 2 patients have single, double and more than two abortions respectively. During Rubella infection 4 cases have single abortion and 2 females have two times abortions. Ten aborted patients were recorded in cytomegalovirus infection, which include 5 single abortions, 4 double abortions and there was single patient who aborted more than 2 times. No multiple abortions were seen in HSV infection while in 3 patients single miscarriages were noticed (Table 3).

DISCUSSION

This study indicates that the frequency of TORCH infection in pregnant women in Peshawar is 6.99%. Studies conducted in India showed that the prevalence of TORCH infection is high up to 80% and low as 5% [20,21]. In the present study 20 samples (2.5%) showed presence of IgM antibodies against Toxoplasma infection. The prevalence of *T. gondii* diseases runs in the vicinity of 7.7% and 76.7% in various nations (UK, 7.7%-9.1%, India 45%, Norway 10.9%, Nigeria 75.4% and Brazil 50-76%) [22-24]. our result will close to the study conducted in India by in which they reported IgM antibodies against *T. gondii* which is 3.47% [25]. In India, Sen et al. [26] reported 19.4% of IgM antibodies specific to Toxoplasma which shows deviation from the current study. This difference is because they included those patients who had history of abortion.

We found in our study that 12 samples (1.5%) showed the presence of IgM antibodies against rubella. In turkey Tamer et al. [24] showed the sero-positivities of the pregnant women for anti-rubella IgM was 0.2%.

One of the members of herpes virus family is CMV which is present globally specially in those areas having conditions of low socioeconomic status. Majorly CMV infection remains asymptomatic and difficult to clinically diagnose. In the present study, the presence of IgM antibodies against CMV was 1.8%. This result is comparable to the study of Karad study [25] where the prevalence of IgM antibodies for CMV was 2.8%.

In the present study 9 samples (1.1%) showed presence of IgM antibodies to HSV, Crane et al. [27] showed that the seropositivity rate of HSV is 3.3%. In other studies, recurrent infection of HSV during pregnancy ranged from 0.6 to 3% in asymptomatic women. According to various studies conducted in India, the prevalence of HSV antibodies varies from 3.6% to 61.3% [28].

Primary infection by TORCH complex in pregnant women can prompt unfavorable results, which is at first unapparent or asymptomatic [29]. Pregnant females are at higher risk affected by these viruses for miscarriage [30]. In the current

study we observed that number of aborted patients due to TORCH complex was 31 out of 56 which shows high abortion rate due to TORCH complex.

CONCLUSION

In Conclusion the prevalence of *Toxoplama gondii* infection is high among TORCH infections and have high rate of abortion than others. It is possible that the prevalence of these infections may be increased in Peshawar, Pakistan, but due to lack of awareness, cultural limitation, and mostly people are reluctant to visit to doctors during pregnancy. We also concluded that TORCH has an adverse effect on child birth during pregnancy. We therefore, make an effort to find out the prevalence and the importance of these infections during pregnancy to reduce the risk of morbidity and mortality in our region.

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