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Original Research Article

Seroprevalance of ToRCH Infection - A Laboratory Profile

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Abstract

Background: ToRCH infection (*Toxoplasma gondii*, Rubella virus, Cytomegalovirus, Herpes simplex virus) causes severe consequences in child in ongoing pregnancy. Screening for ToRCH etiologies are sought for those females who have had bad obstetrics history and in children born with birth defects. Such screening helps the couple and the clinicians to develop a consensus for preparedness of adverse fetal outcome, future prevention and planning for next conception.
Objectives: This retrospective study was conducted to have an understanding on the burden of ToRCH infection in various clinically suspected cases encountered in BPKIHS.
Methods: Laboratory record of 52 serum samples submitted from August 2012 to July 2013 for screening of ToRCH infections was analyzed.
Result: Among 52 adult female serums, most (50) were positive for Cytomegalovirus (CMV) IgG, but none were reactive for Rubella IgM. Both IgG and IgM were positive for CMV in 10 cases, Herpes Simplex Virus (HSV) in 1 case and *Toxoplasma* in 1 case.
Conclusion: This study shows, CMV as the most common and *Toxoplasma* as the least common etiology among the ToRCH profile, in our setup.
Keywords: IgG, IgM, Pregnancy.

1. Introduction

ToRCH (*Toxoplasma gondii, Rubella Virus, Cytomegalo Virus, Herpes Simplex Virus*) infection, may cause serious consequences in developing fetus, though it may remain mild or asymptomatic in expecting mothers.[1] Clinical entity from intrauterine growth retardation, congenital anomalies to spontaneous abortion may occur.[2] Generally chances of transmission of infection is highest in third trimester but infection during first trimester, the period of organogenesis, brings more serious consequences.

Toxoplasma gondii is the only non-viral member among ToRCH pathogens. Human may acquire infection by ingestion of food and water contaminated by feline feces or by consuming meat of other accidental host. Infected mothers are generally asymptomatic but still birth, miscarriage and child disability may occur. [3] The incidence of *Toxoplasma* seropositivity in woman with bad obstetrics history ranges from 17.5% to 52.3%.[4] In a study done by Chopra *et al* from India an IgM seropositivity of 42.5% was observed.[5] Regarding Nepal a seropositivity of 38.5% was observed in women with bad obstetrics history in the capital city.[6]

Rubella is caused by single stranded RNA virus. Airborne transmission via tiny droplets is common in school going children. Though the infection may be mild with cutaneous manifestations or remain asymptomatic, fetus may suffer from low birth weight to congenital rubella syndrome (CRS). [7] IgM seropositivity to rubella in females with bad obstetrics history was found as high as 86.90%, in a study from India. [8] In 2015 a total of 50 congenital rubella syndrome cases were reported from Nepal. [9]

Cytomegalovirus is the most common amongst ToRCH agents and it is transmitted by direct contact with saliva, urine and genital secretion of an infected person.[10] The developing fetus may suffer from IUGR, microcephaly, loss of vision & hearing and cognitive impairment.[11,12] Prevalence of CMV in developed and developing countries was found to be around 45% and 100% respectively.[13]

Prevalence of CMV IgG was seen as high as 90% in some part of India.[14] Regarding CMV IgM, seropositivity in India ranges from 0.8% to 34.7% in women with bad obstetrics history.[15,16] In a study conducted in a hospital from central Nepal the seropositivity to CMV in women was found to be 63.9% and 0.1% for IgG and IgM respectively.[17]

Herpes Simplex Virus infection is common. HSV-1 is common amongst children, transmitted non-sexually and presenting as herpes labialis, while HSV-2 is sexually transmitted and causes genital herpes.[18,19] In almost 3/4th of cases, genital herpes remain asymptomatic but spontaneous abortion and prematurity may occur in ongoing pregnancy.[20-22] HSV 2 causes almost 2/3rd of the cases of congenital herpes.[23] Its prevalence has been found to be higher in sub-saharan Africa(>80%).[24] IgM seropositivity as high as 33.5% was seen in a study from India.[16] 96.1% positivity to anti HSV antibody was seen in a study from Nepal.[25]

Though it is seen that ToRCH infection contributes much for adverse fetal outcome, other factors such as environment, genetics, and nutrition are also crucial in wellbeing of fetus in utero and in many of the cases, relation between causation and adverse fetal outcome may not be established. [26]

1.1 Aims and objectives

1) To determine the burden of ToRCH infection in various clinically suspected cases encountered in BPKIHS, a tertiary care hospital in eastern Nepal.
2) To observe the distribution of ToRCH pathogen among different age groups.

2. Methodology

2.1 Study setting

This study was conducted in serology unit, department of Microbiology, BPKIHS, Dharan, a tertiary care hospital serving the population of eastern Nepal.

2.2 Study design: A retrospective study.

2.3 Data collection

Laboratory record of 52 serum samples submitted from August 2012 to July 2013 for screening of ToRCH infections was included in this study. Demographic information such as age along with seroreactivity to IgM & IgG antibodies against ToRCH pathogen were recorded and analyzed.

2.4 Statistical Analysis

Data were entered in Microsoft excel & analyzed using SPSS (statistical package for social sciences, version 15).

3. Result

The age of females ranged from 16-39 years as shown in table 1, mean age being 28 yrs and the mode 26yrs.

Table 1: Showing age range of the female

Age range	15-20yrs	21-25yrs	26-30yrs	31-35yrs	36-40 yrs
Number	6	18	12	11	5

Serum specimen from female showed highest positivity to CMV IgG (96.15%), followed by Rubella IgG (80.76%) and positivity to IgG was least in Toxoplasma (19.23%). Regarding positivity to IgM highest was seen to CMV (23.07%) but none were positive to Rubella IgM. In many cases equivocal results were seen as shown in table 2.

Table 2: Showing ToRCH Profile Result

SN	Test (ELISA)	Positive	Negative	Equivocal	IgM & IgG Positive
1.	CMV IgG	50	2	-	10
2.	CMV IgM	12	33	7	
3.	HSV IgM	3	45	4	1
4.	HSV I IgG	41	10	1	
5.	HSV II IgG	12	36	4	
6.	Rubella IgG	42	8	2	-
7.	Rubella IgM	-	46	6	
8.	Toxoplasma IgG	10	36	6	1
9.	Toxoplasma IgM	3	46	3	

Both IgM and IgG was positive in 10 cases for CMV and one each for HSV and Toxoplasma. Both of the cases, positive for HSV and Toxoplasma IgM and IgG fall under age group 21-25 yrs, while 6 such cases of CMV fall under that age group.

Out of remaining 4 cases positive to CMV IgM and IgG two cases fall under age group 26-30 yrs and one each in age group 31-35 and 36-40 yrs.

4. Discussion

This study, been conducted at BPKIHS Dharan, a tertiary care hospital, aims to reflect the ToRCH infection status of eastern Nepal. In our study laboratory record of 52 serum specimen were retrieved and analyzed. This study has found 19.23% of serum specimens positive for Toxoplasma IgG while seropositivity to Toxoplasma IgM was 5.765%; though seropositivity to IgG was within the range, seropositivity to IgM was far below the overall seropositivity of 17.5% to 52.3% for Toxoplasma [4]. The IgM seropositivity was further less than quoted by Chopra et al (42.5%) from India [5]. Our findings were even non consistent with previous finding from Kathmandu, Nepal [6] which showed an overall seropositivity of 38.5%.

Regarding Rubella, we have found IgG seropositivity of 80.76% indicating high rate of exposure to Rubella virus but in contrary no recent or ongoing Rubella infection was found. In a study IgM seropositivity as high as 86.9% was seen in India [8].

As stated in the literature, our study has also showed Cytomegalovirus as the most common amongst ToRCH pathogen; 50 seropositivity to IgG among 52 specimens [10]. This result is also consistent with the report of almost 100% seropositivity in developing countries [13]. In some parts of India as well, 90% seropositivity to IgG was reported [14]. Even seropositivity to IgM, in our study (23.07%) fall within the range observed in India, 0.8% to 34.7 % [15,16]. But our findings were much higher than previous study from Nepal, which found 63.9% and 0.1% seropositivity to cytomegalovirus IgG and IgM respectively [17].

Our study has found seropositivity of 78.84%, 23.07% & 5.76% respectively to HSV-I IgG, HSV-II IgG & HSV IgM. Our result was almost similar to previous study from Sub Saharan Africa and even Nepal which has showed overall seropositivity to HSV as >80% and 96% respectively[24,25]. But seropositivity to HSV IgM in our study was much less than the findings from India, which showed 33.5% seropositivity to HSV IgM [16].

Though we have tried to reveal the status of ToRCH infection in Eastern Nepal, this study might have missed many likely cases who had taken medical help from other institutions and many specimens may have been tested elsewhere. More extensive studies, if done, may reveal more reliable data of our region and conduction of such studies throughout the nation may bring the true status of ToRCH infection in Nepal.

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