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SERO - PREVALENCE OF TORCH INFECTION AMONG FEMALES OF PRODUCTIVE AGE GROUP AT TERTIARY CARE HOSPITAL, RAJKOT

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ABSTRACT

TORCH infection complex comprises of infections caused by Toxoplasma gondii, Rubella virus, Cytomegalovirus (CMV), and Herpes simplex virus (types 1 and 2). Syphilis and hepatitis B, Human Immuno-deficiency virus and Zika virus are sometimes included in this group. These infections are associated with adverse fetal outcomes and reproductive failure in pregnant females. Congenital infection by Toxoplasma is particularly severe if the mother acquires the infection during first or second trimester of pregnancy.1-6A trivial viral exanthematous disease in the adults, rubella may have a drastic outcome on the reproductive health and fetal outcome. The infants infected with rubella in utero are born with multiple congenital anomalies like sensory neural deafness, congenital heart disease, microcephaly, mental retardation cataract and blindness, etc. CMV a virus belonging to the herpes viridae family may be the major cause of congenital anomalies in the new born. Genital herpes caused mainly by herpes simplex virus type 2 and 1 during last trimester of pregnancy may be responsible for disseminated neonatal herpes. It is the intrauterine transmission of these infections to the fetus which produces multiple symptoms when the child is born. The diagnosis of these infections is mainly based upon the presence of serum antibodies, particularly IgM in patient's serum

INTRODUCTION

TORCH infection complex comprises of infections caused by Toxoplasma gondii, Rubella virus, Cytomegalovirus (CMV), and Herpes simplex virus (types 1 and 2). These infections lead to adverse fetal outcomes and reproductive catastrophes in pregnant females. They are a group of viral, bacterial, and protozoan infections that gain access to the fetal bloodstream transplacental through the chorionic villi. Hematogenous transmission may occur at any time during gestation or occasionally at the time of delivery through maternal to fetal transfusion. Early diagnosis and timely intervention will help in proper management of these cases. Congenital infection by Toxoplasma is particularly severe if the mother acquires the infection during first or second trimester of pregnancy[1-6]. A trivial viral exanthematous disease in the adults, rubella may have a drastic outcome on the reproductive health and fetal outcome. The infants infected with rubella in utero are born with multiple congenital anomalies like sensory neural deafness, congenital heart disease, microcephaly, mental retardation cataract and blindness, etc. CMV a virus belonging to the herpes viridae family may be the major cause of congenital anomalies in the new born. Genital herpes caused by herpes simplex virus type 2 and 1 may be responsible for disseminated neonatal herpes and further complications. It is the intrauterine transmission of these infections to the fetus which produces multiple symptoms when the child is born. The diagnosis of these infections is mainly based upon the presence of serum antibodies, particularly IgM in patient's serum. These maternal infections are initially in apparent or asymptomatic difficult to diagnose clinically. Diagnosis of acute TORCH infection in pregnant women is established by demonstration of seroconversion in paired sera or by demonstrating specific IgM antibodies[7].

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REVIEW OF LITERATURE

A past infection with one of these infectious agents can lead to positive IgG antibodies. Therefore, testing a second blood sample drawn two weeks later can compare the antibody level. Increased IgM antibody levels would suggest a recent

infection where as increased IgG indicates past infection or vaccination[8]. It is crucial to highlight that IgM antibodies are not always specific and may cross-react with other IgM and proteins. Reference ranges provided by various laboratories should be considered[9]. Ultrasound growth changes and active infection does not always go in parallel; therefore, ultrasound alone cannot serve as a diagnostic criterion for confirming or refuting the diagnosis of rubella.[10]

CMV infection during gestation increases the risk of acquiring symptomatic congenital infection, leading to spontaneous abortion[11]. Various researchers have recommended the serological evaluation of CMV-specific IgM during pregnancy[12]. PLHA patients should undergo a check for their toxoplasma antibody titers in pregnancy. If results are positive with a CD4 count below 100, it is advisable to administer prophylactic antibiotics along with antiretroviral therapy until the CD4 cell count elevates.[13] In neonates, a significant portion, about half, of the morbidity and mortality from HSV II originates from a primary infection that women acquire during gestation or from the reactivation of a previous infection.[14]

Rubella usually presents as a mild viral disease in children which occasionally infects adults. A primary viral infection during pregnancy may lead to harm to the fetus. This study is aimed to determine the various causative agents and sero-positivity of TORCH in reproductive age group women. These infections can induce a spectrum of symptomatic congenital disabilities in neonates, collectively called the TORCH syndrome.

Methodology:

- This Retrospective-cross-sectional study was carried out in virology lab, Department of Microbiology, PDU Govt. Medical College, Rajkot during year 2022-2023.
- Total 171 females of reproductive age group (15-49 years) with significant previous history or associated risk factors or clinically suspected cases are included in this study.
- The study population will mostly belong from individuals from various IPDs/OPDs of Obstetrics and Gynecology department.
- Samples were immediately transported to the laboratory where serum was separated and tested for presence of IgM antibodies against the Toxoplasma, Rubella, Cytomegalovirus, Herpes simplex virus 1 and 2 by μ capture ELISA method.
- The Bio wastes so generated were disposed as per the current standard Bio Medical Waste disposal guidelines.

The following kits were utilized:

1. Rubella IgG ELISA test kit Qualisa
2. Rubella IgM ELISA test kit Qualisa
3. CMV IgG ELISA test kit Qualisa
4. CMV IgM ELISA test kit Qualisa
5. Toxoplasma gondii IgG ELISA test kit Qualisa
6. Toxoplasma gondii IgM ELISA test kit Qualisa
7. HSV-IgG and IgM ELISA test kit Qualisa

RESULTS

Table 1. Age distribution of affected women.

Age group	Toxoplasma IgM	Rubella IgM	CMV IgM	HSV 1 & 2 IgM
15-24	4	2	4	16
25-34	2	6	4	24
35-44	1	4	1	5
45 and above	0	0	1	0
Total	7	12	10	45

Above table shows that maximum cases were from the age group 25 to 34 years, which constitutes about 48.64% cases of study, followed by 15-24 years of age group which consists of 35.13%, 14.86% cases from 35-34 years, and only 1.35% cases from 45 years & above.

Table 2. Demographic profile of affected women.

Locality	Infected reproductive age females
Urban	70.33%(n=52)
Rural	29.66%(n=22)

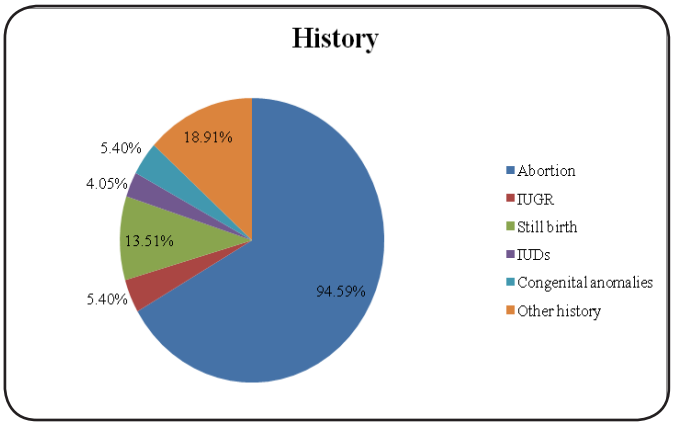

Figure1. Shows distribution of affected women on the basis of Bad obstetrics history (BOH).

Out of 171 women 94.59% had history of 2 or more abortions, 13.51% had history of still birth, 4.05% had history of intrauterine death, 5.40% had history of intra uterine growth retardation and 5.40% had congenitally abnormal child. 18.91% women had more than 1 condition of B

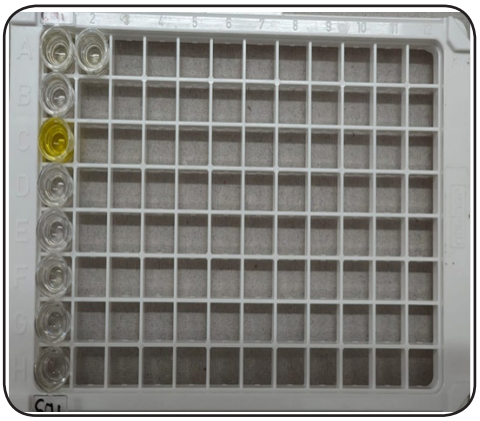

Figure 2. ELISA micro-titer plate for IgM testing

The present study consists of 171 reproductive women attended Obstetrics and Gynecology department.

In our study maximum cases were from the age group 25 to 34 years, which constitutes about 48.64% cases, followed by 15-24 years of age group which consists of 35.13%, 14.86% cases from 35-34 years, and only 1.35% cases from 45 years & above.

Padmavathy M. et al.[15] (51.78%) and M Rajani et al.[16] (36.51%) study reported maximum cases from the similar age group. In contrast to present study, Khayyam N. et al.[17] (62.4%) and Chattopadhyay S. et al.[18] (54%) reported maximum cases from the age group of 21-25 years.

Out of 171 women 94.59% had history of 2 or more abortions, 13.51% had history of still birth, 4.05% had history of intrauterine death, 5.40% had history of intra uterine growth retardation and 5.40% had congenitally abnormal child. 18.91% women had more than 1 condition of BOH.

Present study revealed maximum cases (94.59%) having history of abortion. Padmavathy M. et al.[15] (54.02%), Rohin Suryawanshi et al.[20] (38%), reported maximum cases had history of abortion, similar to present study.

In our study 70.33% of urban residential reproductive age females were infected and 29.66% of rural residential reproductive age females were infected. Which is similar to Mohammed Mohammed et al study.[21]

In patients with bad obstetric history (BOH), maternal infections are a significant factor in miscarriage. T. gondii encysted forms can cause fetal infection in the first trimester and result in recurrent miscarriages due persistent infections and subsequent rupture during placentation.[22] Therefore assessing IgM antibodies in maternal sera can signal the acute phase of maternal infection and the probability of congenital transmission.

It is recommended that pregnant women undergo testing for TORCH antibodies, those who experience unfavorable outcomes should take precautions to avoid infection, such as staying away from cat litter, ensuring them eat is thoroughly cooked, and washing their hands after handling raw meat.[19] Although it is still a common cause of blindness, congenital toxoplasmosis can be prevented by taking precautions, including avoiding contact with cats and raw meat.[12]

It is worth noting that TORCH screening can yield both false-positive and false-negative results.[15] IgM antibodies against TORCH organisms typically persist for about three months, while IgG antibodies remain detectable for a lifetime, providing immunity and preventing or reducing the severity of reinfection. Thus, the presence of IgM antibodies indicates current or recent infection, while the absence of IgM antibodies but presence of IgG antibodies without an increase on serial testing suggests previous infection or vaccination-induced immunity. Individuals lacking evidence of either IgM or IgG antibodies specific to the organism are at risk of infection due to the absence of demonstrable immunity.

CONCLUSION

Now-a-days predicting the outcome of pregnancies affected by TORCH infections and identifying the factors that will result in miscarriage remains challenging. The lack of accurate identification for pregnancies with anticipated miscarriage, leading to spontaneous abortion, may result in unnecessary and potentially harmful interventions or wasteful procedures. So, timely diagnosis and intervention will reduce associated morbidity and mortality. Additionally, psychological counseling and fetal surveillance should be offered to improve outcomes. It is crucial to engage patients and relatives in discussions regarding the increased likelihood of operative delivery.

Pregnant women should undergo TORCH antibody testing preferably at first trimester. Those with a history of unfavorable pregnancy outcomes should take preventive measures to reduce the risk of infection—such as avoiding contact with cat litter, consuming thoroughly cooked meat, and proper hand washing after handling raw meat.

Rubella is preventable by vaccination and linked with significant morbidity and adverse pregnancy outcomes. Implementing routine screening for rubella in all antenatal cases can enable early detection and appropriate management to enhance fetal outcomes. Congenital Herpes can be avoided by early detection during first trimester. Selective employment of cesarean delivery and antiviral treatment can assist in reducing incidence and improve outcomes in neonatal herpes cases.

Statements and Declarations

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