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Seroprevalence of IgM Antibodies to Rubella and Cytomegalovirus among Pregnant Women with bad Obstetric History Attending Tertiary Care Teaching Hospital

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Abstract: Bad obstetric history has multifactorial etiology which can be genetic, hormonal, abnormal maternal immune response, and maternal infections mainly viral infections. To study Seroprevalence of IgM antibodies to Rubella and Cytomegalovirus among pregnant women with bad obstetric history. The study design is a prospective cross-sectional study conducted among antenatal women attending the antenatal clinics with BOH from October 2017 –March 2018. Serum samples were screened for rubella and CMV specific IgM Antibody by capture ELISA. Out of 85 pregnant women, 3.5% and 12.9% pregnant women were found to be seropositive for IgM Rubella antibody and Cytomegalovirus specific IgM antibodies respectively. The predominant clinical condition responsible for BOH was abortions. Screening of pregnant women for Rubella & CMV specific IgM antibodies and timely treatment of these infections can prevent the death of infants born to infected mothers.
Keywords: Cytomegalovirus, Rubella, BOH, Bad obstetric history, Seroprevalence, Pregnant women.

INTRODUCTION

Infections acquired in utero or during the birth process is a significant cause of fetal and neonatal morbidity and are important contributors to early and later childhood morbidity [1]. 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.

Bad obstetric history has multifactorial etiology which can be genetic, hormonal, abnormal maternal immune response, and maternal infection mainly viral infections [2].

Human cytomegalovirus (CMV) and Rubella virus are increasingly being recognized as important causes of congenital infection [3]. The major public health concern posed by Rubella is its teratogenicity, with maternal infection in early pregnancy leading to the congenital rubella syndrome (CRS) in infants [4]. Intrauterine transmission of CMV to the baby can occur irrespective of prior maternal exposure; whereas, in Rubella, a previous exposure actually prevents the virus from crossing the placenta by generating protective antibodies [3]. Congenital CMV infection, occurring in approximately 1% of all live births can cause birth defects and childhood disabilities [5].

Since these maternal infections are initially asymptomatic and the clinical diagnosis is unreliable, the diagnosis of these infections mainly relies on serological evidences. The detection of IgM antibody against viral infections is the best approach for the identification of these infections [6].

MATERIALS AND METHODS

This Prospective Cross-Sectional Study was performed in Modern Government Maternity Tertiary Hospital. The study was approved by Institutional ethical committee and informed consent was taken from BOH woman. The present study was conducted on 85 blood samples taken from antenatal women attending the antenatal clinics with BOH from October 2017– March 2018. Pregnant women in the age group of 19-40 years were selected based on the criteria of BOH i.e

previous history of pregnancy wastage. Serological testing was performed at Virology Research and Diagnostic Laboratory (VRDL) in Osmania medical college. All the kits and consumables were procured and utilised from the VRDL. ELISA was done for determination of IgM for Rubella & CMV. The test was performed according to manufacturer instructions (Novalisa for Rubella IgM Capture ELISA and Calbiotech for CMV IgM Capture ELISA).

RESULTS

A total number of 85 blood samples collected from antenatal women with BOH were processed in Virus Research & Diagnostic Lab from October 2017 to March 2018.

The major complication was abortions. Majority of BOH cases 56.5% were found in females aged 19 - 24 years followed by 25 – 30 years.

Age group of 19 - 24 years had the maximum serological evidence of Rubella & CMV followed by 25 – 30 years age group (Table-1).

Table-1: Obstetric history of BOH cases in various age groups (n = 85)

Clinical Presentation	Age in years (%)			Total (%)
	19 - 24	25 - 30	31 - >35	
Abortion	20	9	6	41.1
Intrauterine death (IUD)	13	6	3	26
Abortion & IUD	11	8	1	23.5
Congenital malformations	4	1	3	9.4
Total	48(56.5%)	24(28.2%)	13(15.3%)	100

Table-2: Positive serological evidence of Rubella and CMV Infections (n = 85)

Serological Test for	IgM Seropositivity(%)	(%)
Rubella	3	3.5%
CMV	11	12.9%

CMV infection shows high seropositivity.

Table-3: Positive serological evidence of Rubella & CMV infection in various age groups (n=85)

Age in years	Rubella IgM Seropositivity(%)	CMV IgM Seropositivity(%)
19 - 24	2 (2.35%)	6 (7%)
25 - 30	1 (1.2%)	4 (4.7%)
31 -> 35	---	1 (1.2%)
TOTAL (%)	3 (3.5%)	11 (12.9%)

Table-4: Obstetric history in Rubella & CMV seropositive cases

Clinical Presentation	Rubella (n =3)		CMV (n = 11)	
	IgM (%)	Total (%)	IgM (%)	Total (%)
Abortion	2	66.7	6	54.54
Intrauterine death (IUD)	-		3	27.3
Congenital malformations	1	33.3	2	18.2
Total	3	100	11	100%

The predominant clinical condition responsible for BOH was abortions.

DISCUSSION

Rubella and Cytomegalovirus are known to cause infection in the uterus and are responsible for abortion, stillbirth, premature infant, and congenital anomalies. In the present study among the 85 cases, the most affected age group was 19-24 years. With reference to BOH definition i.e. having two or more consecutive spontaneous abortion, history of intrauterine foetal death, intrauterine growth retardation, still births, and /or congenital anomalies majority of the pregnant females had previous history of two or more spontaneous abortions 35(41.1%) followed by intrauterine deaths 22(26%). Similar results were observed in studies done by Padmavathy M. *et al*. in 2013 with 47 (54.1%) spontaneous abortions and 20 (23.0%) intrauterine deaths and Janak Kishore *et al*. in 2011 with Abortions 28 (59.5%).

Diagnosis of Rubella is very often missed as the infection is mild, the rash and lymphadenopathies are transient. In India, the serological status of most women is not known before pregnancy. Hence pregnancy screening of Rubella serologically helps in differentiating highly immune women who are at relatively no risk of infection during pregnancy from non-immune or seronegative women who can primarily contract the disease during pregnancy. In the present study 3.5% pregnant women were found to be positive for IgM antibody Rubella. Recent studies

have shown that the majority of pregnant women in the Indian population are immune to Rubella there by leaving only a few susceptible to contract acute Rubella infection. Similar seropositivity was observed by H M M Hassan *et al*. (3.3%), S.chopra *et al.* from India (4.5%), P Yasodhara *et al*. (6.5%) from Hyderabad and Manju kumari (7.7%) in women with previous BOH. Highest sero-positivity of Rubella was observed in pregnant women with repeated abortions (66.7%) followed by intrauterine death cases. Arora Usha *et al.* (60.7%) and Kishore *et al*. 2011 (63.3%) observed association of Rubella has been maximum with abortions.

Cytomegalovirus is a leading cause of congenital infections and long-term neuro-developmental disabilities among children. Foetal damage is more likely to be severe when maternal infection occurs early in pregnancy. In the study out of 85 antenatal women with BOH 11 (12.9%) cases were seropositive for Cytomegalovirus specific IgM antibodies. Studies from India suggest seropositivity of Cytomegalovirus specific IgM in women with BOH ranges from 3 to 12.9% (12). Kapil A and Baroor S. 1992 reported 12.9% seroprevalence of primary Cytomegalovirus infection. Turbadkar D *et al*. in 2003 concluded a seropositivity rate of 8.4% for the Cytomegalovirus IgM in women with bad obstetric histories. In the present study the highest seropositivity for Cytomegalovirus was seen in women in the age group of 19 - 24 years. Denoj Sebastian *et al*. in 2008 observed major seropositive cases in 20 - 24 years age group.the present study revealed that, the highest seropositivity for Cytomegalovirus specific IgM antibodies seen in women with history of two or more spontaneous abortions (54.54%) which is comparable with study done by Sashi Chopra *et al*.

World Health Organization (WHO) still estimates over 100,000 children worldwide are born with congenital rubella syndrome (CRS) and more so in developing countries. Hence Rubella vaccination should be included in routine immunization program and there is need to strengthen the Rubella immunization amongst the adolescent girls and seronegative women in the postpartum period to avoid obstetrical mishap due to this potentially preventable cause of foetal wastage.

High seroprevalence of CMV specific IgM antibodies in our society reflects the low hygienic standards as well as faulty practices running in our society especially in low socioeconomic group. Follow-up tests of offspring to CMV IgM-positive mothers are essential, in order to detect the consequences of congenital infection and to allow treatment to occur as early as possible.

CONCLUSION

The study indicated that infection with CMV is more common than the Rubella virus. Screening of pregnant females for Rubella & CMV specific IgM antibodies is beneficial in alerting the clinician regarding possible infection to the new born and all the suspected new-borns can further be subjected to the testing for specific IgM antibodies.

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