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RESEARCH ARTICLE

A serological study of cytomegalovirus infection in patients presenting with bad obstetric history attending Assam Medical College and Hospital

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ABSTRACT

Objective: To study the seroprevalence of Cytomegalovirus (CMV) infection in patients with bad obstetrics history (BOH). **Methods**: This study was carried out for a period of one year, from June 2012 to May 2013. A total of 80 cases were screened by Enzyme Linked Immunosorbent Assay for the presence of Cytomegalovirus specific IgG and IgM antibodies. The study population was divided into two groups - 40 randomly selected women with BOH and 40 normally pregnant women without any BOH attending Assam Medical College and Hospital. **Results:** CMV specific IgG antibodies were detected in 37(92.50%) of the patients with BOH and in 32(80%) of those without any BOH. IgM antibodies were positive in 8(20%) of the patients with BOH, while none of those without BOH were IgM seropositive. IgM seropositivity was found to be significantly associated with the patients with BOH ($p<0.05$). Significantly higher prevalence rates of IgG were observed with increasing age (p value<0.05) and declining socio-economic conditions. **Conclusion:** This study revealed high prevalence of seropositivity for CMV in women presenting with bad obstetric history. All these findings indicate that Cytomegalovirus infection is not uncommon in our local population and may play a vital role in determining the foetal outcome. Hence screening and prevention of CMV infection, especially in the pregnant women is very essential.

Keywords: Cytomegalovirus, bad obstetric history, screening.

Bad obstetric history (BOH) implies previous unfavourable fetal outcome in terms of two or more consecutive spontaneous abortions, early neonatal deaths, stillbirths, intrauterine fetal deaths, intrauterine growth retardations and congenital anomalies. There might be different causes of BOH like genetic, hormonal, abnormal maternal immune response and maternal infection [1]. Cytomegalovirus (CMV), the largest member of the virus family *Herpesviridae* is a ubiquitous virus and one of the important causes of intrauterine infections [2]. Cytomegalovirus infections in pregnancy are major causes of maternal and foetal morbidity and mortality [3]. Maternal infections with Cytomegalovirus play a critical role in pregnancy with bad obstetric history and ultimately in the loss of foetus [4].

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Serological surveys, in India have shown the prevalence of CMV antibodies in adult population to be about 80-90% [5, 6]. This study was undertaken to see the seroprevalence of Cytomegalovirus (CMV) infection in patients with bad obstetrics history.

Materials and Methods

This study was carried out for a period of one year, from June 2012 to May 2013 on patients presenting with or without bad obstetric history attending the Outpatient Department of Obstetrics & Gynaecology as well as admitted in the Obstetrics & Gynaecology ward of Assam Medical College & Hospital. The ethical clearance was obtained from the Ethical Committee (Human) of Assam Medical College & Hospital. Informed consent was obtained from all the women included in the study. A total of 80 cases were screened by Enzyme Linked Immunosorbent Assay (ELISA) for the presence of Cytomegalovirus specific IgG and IgM antibodies during the study period. The study population was divided into two groups as detailed below -

Group I (Study Group): This group comprised of 40 randomly selected women with bad obstetrics history (both past and present). This group of women presented with history of bleeding per vagina (included patients presenting with recurrent spontaneous abortion, threatened abortion, missed abortion), Intrauterine Growth Retardation (IUGR), Intrauterine Foetal Death (IUFD) and Preterm delivery.

Group II (Control Group): This group comprised of 40 randomly selected women attending Department of Obstetrics and Gynaecology, Assam Medical College and Hospital, Dibrugarh, without any past or present bad obstetrics history.

Five ml of venous blood was collected aseptically in a sterile vial. The serum was separated by centrifuging the blood in a centrifuge machine at 1000 revolutions per minute for 5 minutes to avoid haemolysis. The separated serum was then transferred to a sterile vial, labelled and stored at -20^{0}C till tested. The IgM capture ELISA and indirect IgG ELISA was done for all serum samples of the study using Platelia CMV IgM ELISA Kit and Platelia CMV IgG ELISA Kit from BIO-RAD, France for detection of serum IgM and IgG CMV antibodies following manufacturer's guidelines.

Data were analyzed, using Microsoft office 2010 and Graphpad Prism version 5.0. Statistical analysis was done with Chi-square test, Fischer's exact test with and without Yates correction wherever applicable.

Results

In our study, out of the 40 cases with bad obstetric history the maximum number of cases (70%) belonged to the age group of 20-29 years and 50% of the cases were from the lower socioeconomic class. The history of the BOH cases consisted of abortion in 14 (35%), intrauterine death in 12 (30%), intrauterine growth retardation in 11 (27.50%), and premature delivery in 3 (7.50%).

In this study, out of the 40 cases in the study group, 20% were found to be positive for CMV IgM antibody and 92.50% were found to be positive for CMV IgG antibody. In the control group, out of 40 cases 80% were positive for IgG antibody whereas none of the cases were found to be positive for CMV IgM antibody. IgM seropositivity was found to be

Table 1: Serological profile of study and control group

Group	Total number of sera tested	IgG Positive	IgM Positive
		No (%)	No (%)
Study group	40	37(92.50%)	8(20%)
Control group	40	32(80.00%)	0

Table 2: Showing seropositive cases in the different age group

Age group (in years)	Study group			Control group		
	Serra tested No	IgG No (%)	IgM No (%)	Serra tested No	IgG No (%)	IgM No (%)
<20	7	4(66.66%)	1(14.28%)	9	5(55.55%)	0
20-29	28	28(100%)	6(21.42%)	23	19(82.60%)	0
30-39	5	5(100%)	1(20.00%)	8	8(100%)	0

significantly associated with the study group of patients with bad obstetric history ($p<0.05$) (table 1).

Table 3: Seropositive cases in different socioeconomic groups

Socioeconomic status	Study group			Control group		
	Serra tested	IgG No (%)	IgM No(%)	Serra tested	IgG No(%)	IgM No(%)
Lower	2	2(100%)	1(50%)	2	2(100%)	0
Upper lower	20	20(100%)	6(33.33%)	25	20(80%)	0
Lower middle	14	13(92.80%)	1(7.14%)	11	9(81.80%)	0
Upper middle	4	2(50%)	0	2	1(50%)	0
Upper	0	0	0	0	0	0

In the study group, IgG seropositivity was found to be significantly associated with increasing age ($p < 0.05$). A decline in seropositivity with rising socioeconomic status was observed and the difference between the upper and lower class was statistically significant ($p <0.05$) (table 2, table 3). The seropositivity according to the presenting features among the cases with bad obstetric history for IgG and IgM antibodies is shown in table 4.

Table 4: Seropositive cases according to different presenting features

Presenting features	Serra tested	IgG No(%)	IgM No(%)
Bleeding per vagina	14	14(100%)	3(21.40%)
Preterm delivery	3	3(100%)	0
IUFD	12	11(91.6%)	3(27.30%)
IUGR	11	9(81.8%)	2(22.22%)

Discussion

It is evident that maternal infections play a critical role in pregnancy wastage and their occurrence in patients with BOH is a significant factor [7]. Primary CMV infection during pregnancy carries a high risk of the intrauterine transmission which may result in severe fetal damage, including growth retardation, jaundice, hepatospleenomegaly and CNS abnormalities [8]. The prevalence of HCMV antibodies in women in childbearing age varies greatly in different population groups. Lower rates of HCMV-IgG antibody prevalence (40-80%) have been reported in developed countries whereas higher rates of HCMV-IgG antibody prevalence (90-100%) have been reported in developing countries. These rates mostly depend on the variability of viral accessibility and its circulation rate in the community [9].

In the present study, 37 cases (92.50%) out of total 40 cases, in the study group were found to be positive for CMV IgG antibody indicating past infection. This finding is similar to Sadik MS [10]. The seropositivity of CMV IgM, in the present study was found in 8 out of 40 cases (20%) indicating primary or recurrent infection. This finding was found to be similar with Hama SA [11]. Moreover, in the present study 8 patients in the study group who had positive serology for CMV IgM were also seropositive for CMV IgG. Thus the prevalence of IgM antibody to CMV in the study population is evidence of recurrent infection i.e reactivation of latent CMV infection or re-infection with a different strain of the virus.

Age is one of the risk factors that affect the seroprevalence of both CMV IgM and IgG antibodies [6]. In the present study, the highest seropositivity for CMV IgG (100%) and CMV IgM (21.40%) was found in the 20-29 years of age group. These findings are in accordance with other finding from India and abroad. In this study, statistically significant difference in CMV IgG seropositivity was found in the lower socioeconomic group including both lower and upper lower group and the lower middle and upper middle socioeconomic group. Similar observations have been reported from other studies [12]. Various factors associated with lower socioeconomic status such as crowding, low household income and poor hygiene were all associated with CMV seropositivity [13].

Conclusion

This study revealed high prevalence of seropositivity for CMV in women presenting with bad obstetric history as compared to women without any

obstetric complications. All these findings indicate that cytomegalovirus infection is not uncommon in our local population. Nevertheless, it is well documented risk factor for BOH and may play a vital role in determining the foetal outcome. The screening of pregnant women for CMV infection by serological testing is currently not routinely recommended. But in areas like Assam where there is high prevalence of CMV infection screening can play an important role in alerting the physician/pediatrician regarding possible infection to the newborn.

Conflict of interest: None. **Disclaimer:** Nil.

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