

## Original Research Article

# Fetomaternal outcomes of mothers with detectable cytomegalovirus (CMV)-specific IgM antibodies

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### ABSTRACT

**Background:** Human cytomegalovirus (CMV) infection is the most common cause of perinatal viral infection. congenital CMV infection can produce varying degrees of neurodevelopmental disabilities. Aims and objectives were to study the fetomaternal outcome in CMV-Specific IgM antibodies.

**Methods:** The study was prospective for a period of one and a half year. Hundred high risk patients with hundred controls were screened for CMV serology IgM. Maternal & fetal outcomes were noted.

**Results:** Out of 100 cases in study group 27(27%) were positive for CMV IgM while in control group 6(6%) were positive( $p<0.05$ ). Primary CMV infection in mothers led to abortion in 2(7.4%) patients, pre-term labour in 5(18.5%), Postpartum hemorrhage in 6 (22.2%), fetal distress in 11(40.7%) while 37% had uneventful outcome. Among CMV positive cases 48.1% were born term live, 6(22.2%) were preterm, 1(3.7%) had IUD, Intrauterine growth restriction in 10 (37%), 6(22.2%) with congenital defect and 4(14.8%) with neonatal manifestations.

**Conclusions:** CMV remains a significant public health concern. Education of young women in our community regarding hygienic and behavioral approaches that can help prevent CMV transmission is mandatory.

**Keywords:** Abortion, Cytomegalovirus, Feto maternal outcome, Pregnancy

### INTRODUCTION

Ribbert in 1904 first identified histopathological evidence of CMV probably in tissues from congenitally infected infant and inactively named it *Entamoeba mortinatalium*. Stagno S et al, in 1986 stated that intrauterine occurs in 40% of primary maternal infection with delivery of 10-15% symptomatic new born and late neurological sequelae in 10% of those asymptomatic.<sup>1</sup> Adler SP in 1989 observed that day care workers were at increased risk of acute CMV infection, especially those who work with children under 2 years of age.<sup>2</sup> Ista AS et al 1995, stated later in pregnancy CMV infection causes premature delivery and in 25% of affected fetus IUGR.<sup>3</sup> The

outcomes are often associated with placental pathology. Fisher S et al 2000, stated human CMV is the leading cause of prenatal viral infections affected individuals may suffer intrauterine neurological impairment.<sup>4</sup> Analysis of spontaneously aborted conceptus shows that CMV infects the placenta before the embryo or the fetus. Maine GT et al 2001, described screening of pregnant women with cytomegalovirus IgM, IgG and CMV IgG avidity serological tests led to more accurate diagnosis of CMV infection.<sup>5</sup> Most common cause of congenital neonatal infection is cytomegalovirus with incidence of 0.5 to 2.2%. As 50-90% of women of childbearing age have antibodies to CMV but only rarely does CMV reactivation result in neonatal infection. Primary CMV

infection during pregnancy creates risk of congenital infection in 40% of cases, of which 10-15% infants are symptomatic at birth. Ornoy (2006) described features of congenital CMV infection as IUGR (40%), prematurity 35%, petechiae (80%), hepatosplenomegaly (75%), jaundice (65%), microcephaly (50%), chorioretinitis (12%). CMV infection results in IUGR, sensorineural hearing loss, intracranial calcifications, microcephaly, hydrocephalus, delayed psychomotor development and optic atrophy. We aimed to study the fetomaternal outcome of CMV positive patients in our population. Aims and objectives were to study the fetomaternal outcome in CMV-Specific IgM antibodies.

**METHODS**

The study Fetomaternal outcomes of mothers with detectable CMV-specific IgM antibodies was conducted in department of obstetrics and gynecology L.D Hospital, G.M.C Srinagar. The study was prospective for a period of one and a half year. The Study was prospective for a period of one and a half year from 2008 march to Sep 2009.

**Inclusion criteria**

Hundred high risk patients with hundred controls were screened for CMV serology IgM. The high risk patients were included in the study group if they fulfilled one or more of the following criteria. History of fever with rash in past or present pregnancy, history of jaundice in past or present pregnancy, history of past or present preterm delivery, congenital malformation in past or present pregnancy, history of spontaneous abortion, still birth, intrauterine death or early neonatal death and pregnancy with history of high risk behavior. Pregnant women without any of the above mentioned criteria were included in the control group.

**Exclusion criteria**

Woman with pregnancy of medical disorders like heart disease, liver disease, renal disease, CNS disease, Blood dyscrasia etc. were excluded.

**Methodology**

A detailed and comprehensive history was taken from each patient according to proforma which includes history, physical examination (General, Local and systemic). Cytomegalovirus (CMV) IgM antibody EIA Test was done in all patients besides routine investigations. Feto maternal Outcomes were noted.

**Statistical analysis**

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. P Value less than 0.05 was considered significant.

**RESULTS**

The mean age of the women in the study group was 26.2+3 {range18-36years} and in the controls was 26.2+4 {range19-36years} (p>0.05). Out of 100 cases taken, 33(33%) were having history of abortions, while 16(16%) had history of pre term labour, 17 (17%) had history of IUD, 4(4%) had history of still birth and 6(6%) had history of congenital malformations. The controls were of low risk group and had no such history. The difference was statistically significant between the two groups (p<0.05) as shown in Table 1.

**Table 1: Distribution of studied subjects in relation to past clinical history.**

Distribution of studied subjects in relation to past clinical history						
		Study		Control		p value
		N	%	n	%	
Abortion	No	67	67.0	100	100.0	0.000
	Yes	33	33.0	0	0.0	
Preterm Labor	No	84	84.0	100	100.0	0.000
	Yes	16	16.0	0	0.0	
IUD	No	83	83.0	100	100.0	0.000
	Yes	17	17.0	0	0.0	
Still Birth	No	95	96.0	100	100.0	0.043
	Yes	4	4.0	0	0.0	
Congenital Malformation	No	94	94.0	100	100.0	0.013
	Yes	6	6.0	0	0.0	

Out of 100 cases in study group 27(27%) were positive for CMV IgM while in control group 6(6%) were

positive(p<0.05). The studied 100 cases showed following relation with history. Out of 33 cases of

abortion 12 were CMV IgM positive, out of 16 cases of preterm labour 4 were CMV IgM positive, out of 17 cases of IUD 1 CMV IgM positive, out of 4 cases of still birth 3 were CMV IgM positive, out of 6 cases of congenital malformation 4 were CMV IgM positive, out of 7 cases of high risk behavior 2 were CMV IgM positive, out of 28 cases of symptomatic infection 10 were CMV IgM positive. Primary CMV infection in mothers in high risk pregnancies led to abortion in 2(7.4%) patients, pre-term labour in 5(18.5%), Postpartum hemorrhage in 6 (22.2%), fetal distress in 11(40.7%) while 37% has uneventful outcome. Among CMV positive cases 48.1% were born term live, 6(22.2%) were preterm, 1(3.7%) had IUD, intrauterine growth restriction in 10( 37%), 6(22.2%) with congenital defect and 4(14.8%) with neonatal manifestations as shown in Table 2.

**Table 2: Fetomaternal outcome in CMV positive patients.**

Outcome	CMV IgM positive	
	n	%
Abortion	2	7.4
Preterm Labor (n=22)	5	18.5
IUD	1	3.7
IUGR	10	37.0
Still Birth	0	0.0
PPH	6	22.2
Fetal Distress	11	40.7
Uneventful	10	37.0
Maternal Death	0	0.0
Congenital Defect	6	22.2
Neonatal Manifestations	4	14.8

**DISCUSSION**

In present study cytomegalovirus was found to be implicated in adverse pregnancy outcome. Present study showed that primary CMV infection in mothers led to abortion in 7.4%, pre-term labour in 18.5%, intrauterine death in 3.7%, intrauterine growth restriction in 37%, fetal distress in 40.7% while 37% has uneventful outcome. Rahav G et al, reported 7% miscarriage rate in CMV IgM positive pregnant women, which is consistent with our study.<sup>6</sup> Kolsotva IG in 1990, reported rate of pregnancy losses in CMV positive women to be 18.9%.<sup>7</sup> In present study reproductive losses were 11.1%. He

reported pre-term delivery rate of 4.3%, which is less than our study. Istas A et al, reported that in pregnancy, CMV infection causes pre-mature delivery and IUGR in 25% of infants.<sup>3</sup> The same were the outcomes in CMV positive pregnant women in present study. Fowler KB et al, reported that congenital CMV infection led to IUGR in 40%, pre-term labour in 35%, abortion in 20%, which is consistent with present study.<sup>8</sup> Griffith P and Baboonian CA in 1984, reported that 15% of women with CMV abort spontaneously, which is consistent with our study.<sup>9</sup>

**Fetal outcome**

Among CMV positive cases 48.1% were born term live, 22.2% preterm, 3.7% had IUD, 19% had IUGR, 9.5% with congenital defect and 4.8% with neonatal manifestations. Gumber S et al, reported neonatal manifestations in 14% of infants born to CMV IgM positive mothers.<sup>10</sup> The manifestations which were seen were hepatosplenomegaly, jaundice and purpura. The same were seen in our study. However, the incidence of neonatal manifestations was only 4.8%, which is less than the above mentioned study. This is consistent with the congenital defects seen in our study. Ornoy A et al, reported IUGR, microcephaly, petechia, jaundice, hepatosplenomegaly in 10 to 20% of infants born to CMV IgM positive women.<sup>11</sup> In present study the incidence of IUGR was 19% which is consistent with above study. Turbadkar D et al, reported CMV infection in mothers led to congenital malformations and fetal losses.<sup>12</sup> The same was seen in our study. Istas AS et al, reported that incidence of IUGR in CMV IgM positive as 25%, which is consistent with present study.<sup>3</sup> Duff P in 1994, reported that 5 to 18% neonates at birth are symptomatic.

In present study 14.3% neonates were symptomatic and is thus consistent with the above study.<sup>13</sup> Fowler KB et al, reported symptomatic disease in 18% of infants born to CMV infected mothers, which is consistent with present study.<sup>8</sup> Congenital CMV can have devastating consequences for affected infants and their families, as infection often leads to deafness, severe neurological impairment, and also learning difficulties. A major systematic review of sensorineural hearing loss showed that 10-20% of cases were due to congenital CMV, and thus, additionally, it has a significant health economic impact.<sup>14</sup> Recently Kimberlin and colleagues reported a benefit associated with early antiviral treatment of cCMV, in particular on hearing loss.<sup>15</sup>

**CONCLUSION**

CMV remains a significant public health concern. Education of young women in our community regarding hygienic and behavioral approaches that can help prevent CMV transmission is mandatory. Obstetricians can lead the way in ensuring that appropriate counseling about the risks of CMV becomes a mainstay of prenatal care.

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