Rubella and Cytomegalovirus Infections in Women with Bad Obstetric History attending Omdurman Military Hospital

REHAB MOHAMMED AHMED[1]
M.Sc. Student
Microbiology Department
Faculty of Medical Laboratories Sciences
Al- Neelain University, Sudan
ADAM AHMED ADAM
Associate Professor
Microbiology Department
Faculty of Medicine Sciences
Al- Neelain University, Sudan

Abstract:

   Background: Rubella and Cytomegalovirus infections are frequently encountered infections and in women at reproductive age may lead to congenital infection that can result into congenital anomalies that can be devastating.

Aim of the study: The aim of the study was to determine the rate of Rubella and Cytomegalovirus infection among married women at the reproductive age with bad obstetric history attending Omdurman Military Hospital.

Materials and Methods: The study enrolled 88 married women with age ranging between 20 and 38 years with bad obstetric history. Serum specimen was collected from each woman and tested for IgM antibodies for Rubella virus and Cytomegalovirus by ELISA technique and the positive specimens were confirmed by Western blot technique.

Result: The seropositivity rates were 12.4% for Rubella and 10% for CMV in the study sample by ELISA technique while they were12.5% and 9% for Rubella and CMV respectively by Western blot technique.

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[1] Corresponding author: Hobaabdelgader@gmail.com

Conclusion: The study reflected the underlying transmission dynamics that are currently at work in Sudan and a practical way of tracking rubella and CMV infection.

The studied sample was high, CMV and Rubella vaccination and routine screening should be provided for all women of childbearing age and children.

Key words: Bad obstetric history, IgM antibody, ELISA, western blot technique Cytomegalovirus, Rubella

Introduction:

Rubella virus is a member of the togaviruse family .It is composed of one piece of single –stranded RNA an icosahedra nucleocapsid and lipoprotein envelope.

The rubella virus is the etiological agent of a disease known as (German measles[1]). The disease is generally benign and infection is often asymptomatic. As rubella virus is a potent, infection, virus infection of non-immunized women during the early stages of pregnancy, particularly during the first 16 weeks, can result in miscarriage, fetal death or an infant born with birth defects such as congenital rubella syndrome.

CMV is DNA virus. Human are only known host like other members of herpes virus family and cause latent infection and infect people on all age and Socioeconomic group .Human cytomegalovirus (HCMV) is existing throughout all geographic locations and socioeconomic groups, and infects between 50% and 80% of adults in the United States (Ryan et al., 2004). HCMV is the virus most frequently transmitted to a developing child before birth. HCMV infection is more widespread in developing countries and in communities with lower socioeconomic status and represents the most significant viral cause of birth defects in industrialized countries Stars et al., 2006). CMV is the most common cause of congenital infection

and its incidence has been estimated to be between 0.2- 2.2%of all live births in different parts of the world (Wong et al., 2000). Most congenital infections are asymptomatic; only10% of infected fetuses will develop clinical signs of CMV infection. Transmission of CMV infection to the fetus has been identified in all trimesters of pregnancy. Abortion can result from ascending CMV end ometritis and the virus has been isolated from post-abortion uterine discharge (Dehner et al., 1975).

Bad obstetric history (BOH) implies previous unfavorable fetal outcome in terms of two or more consecutive spontaneous abortions, history of intrauterine fetal death, intrauterine growth retardation, still births, early neonatal death and/or congenital abnormalities[1]. The Infections caused by Rubella virus, Cytomegalovirus (CMV) and others agents are the major causes of BOH[6, 7]. These pathogens are usually cause only a symptomatic or mild infection in mother, but may cause much more serious consequences in fetus [8].

The degree of severity of infection depends on the gestational age of the fetus; when a woman infected, the virulence can damage the fetus in the developmental stages and also increase the severity of maternal disease.

Material and method:

This study was a descriptive hospital-based one with non-probability convenience sampling. It was conducted in Omdurman Military Hospital during the period from January to March 2015. The study sample comprised 88 women with bad obstetric history attending the routine antenatal clinic. Data were collected using direct interviewing questionnaire; ethical clearance was obtained from research ethical committee of faculty of graduate studies Al-Née lain University, written consent also was obtained from patients.

5ml venous blood specimens were collected from each woman under aseptic condition, the blood was left to clot at

room temperature and then centrifuged at 5000rpm for 5min at room temperature; the obtained sera were kept at 20°C until used.

Serum specimen was collected from each woman and tested for IgM antibodies for Rubella virus and Cytomegalovirus by ELISA technique and the positive specimens were confirmed by Western blot technique.

Data analysis:

Data was analyzed by SPSS (Statistical Package of Social Science) software program version

Results:

The study enrolled 92 women, 88 of them with bad obstetric history were considered as the study group and four normal women as a control group. The seropositivity of rubella virus and cytomegalovirus were 11/88(12.5%) and 8/88 (9.1%) respectively. Study sample was divided into four age groups. The highest positivity was observed among (19-24) age group and (25-30) respectively (Table 1).

Most of Women in this study who had normal pregnancies 54/88 (61.4%) The highest positivity was observed among had first normal pregnancy for CMV and Rubella2\29 (6.8%), 4/29(13.7%) respectively.

Regarding number of miscarriage women divided into five groups .The highest positivity was observed among group had one miscarriage were 7 (87.5%), 5 (50%)for CMV and Rubella by western blot technique.

Women had still birth were 6 of all studied the positive result 1(10%) for Rubella and negative result for CMV.

All women participated in this study had no history of Intrauterine fetal death, congenital, Intrauterine growth retardation.

Table (1) Showed statistical relation of sero-positive Rubella and CMV virus with variable using ELISA technique

No	Variable			Frequency	Percentage	ELISA CMV result			p.Value	ELISA Rubella Result			p.value
							Positive	Negative			Positive	Negative	
1	Age	19-24		17	19.3%	Count	4(44.4%)	13 (16.5%)	0.17**	Count	4 (30.8%)	13(17.3%)	0.61**
		25-30		43	48.9%	Count	3(33.3%)	40(50.6%)		Count	5 (38.5%)	38(50.7%)	
		31-36		18	20.5%	Count	2(22.2%)	16(20.3%)		Count	2 (15.4%)	16(21.3%)	
		37-42		10	11.4%	Count	0 (0%)	10(12.7%)		Count	2 (15.4%)	8 (10.7%)	
		Total		88	100%	Count	9 (100%)	79 (100%)		Count	9 (100%)	79 (100%)	
2	Normal Pregnancy	Yes	once	54	61.4%	Count	2 (50%)	27 (54%)	0.93**	Count	5 (38.5%)	24 (32%)	0.82**
			Twice			Count	1 (25%)	15 (30%)		Count	1 (7.7%)	15 (20%)	
			Third			Count	1 (25%)	7 (14%)		Count	1(7.7%)	7 (9.3%)	
			four			Count	0 (0%)	1 (2%)		Count	0 (0%)	1 (2%)	
		No		34	38.6%	Count	5(55.6%)	24(36.7%)		Count	6 (46.2%)	28(37.3%)	
		total		88	100%	Count	9 (100%)	79 (100%)		Count	7 (53.8%)	47(62.7%)	
3	Number of miscarriages	once		56	63.6%	Count	8(88.9%)	48(60.8%)	0.57**	Count	5 (38.5%)	0 (0%)	0.73**
		Twice		22	25%	Count	1 (1.1%)	21(26.6%)		Count	5 (38.5%)	0 (0%)	
		Thrice		8	9.8%	Count	0 (0%)	8 (10.1%)		Count	2 (15.4%)	0 (0%)	
		Fourth		1	1.1%	Count	0 (0%)	1 (1.3%)		Count	1 (7.6%)	0 (0%)	
		Fifth		1	1.1%	Count	0 (0%)	0 (0%)		Count	0 (0%)	0 (0%)	
		Total		88	100%	Count	9 (100%)	79 (100%)		Count	13 (100%)		
4	Still Birth	Yes		6	6.8%	Count	0	6(6.8%)	0.39**	Count	1(7.7%)	5(6.7%)	0.88**
		No		82	93.2%	Count	0	82(93.2%)		Count	12(93.3%)	70(93.3%)	
		Total		88	100%	Count	0%	100%		Count	13(100%)	75(100%)	

**Not significant different at the 0.05 level.

Table (2) Showed statistical relation of sero-positive Rubella and CMV virus with variables using western blot Technique

No	Variable			Frequency	Percentage	Western Blot Rubella			p.Value	Western Blot CMV			p.value
							Positive	Negative			Positive	Negative	
1	Age	19-24		17	19.3%	Count	4(40%)	0 (0%)	0.01*	Count	3 (37.5%)	1 (100%)	0.49**
		25-30		43	48.9%	Count	4 (40%)	0 (0%)		Count	3 (37.5%)	0 (0%)	
		31-36		18	20.5%	Count	2 (20%)	0(0%)		Count	2 (25%)	0 (0%)	
		37-42		10	11.4%	Count	0 (0%)	1 (100%)		Count	0 (0%)	0 (0%)	
		Total		88	100%	Count	10(100%)	1 (100%)		Count	8 (100%)	1 (100%)	
2	Normal Pregnancy	Yes	once	54	61.4%	Count	4 (80%)	0 (0%)	0.33**	Count	2 (25%)	0 (0%)	0.82**
			Twice			Count	1 (20%)	0 (0%)		Count	1 (12.5%)	0 (0%)	
			Thrice			Count	0 (0%)	1 (100%)		Count	1 (12.5%)	1 (12.5%)	
			fourth			Count	5 (100%)	1 (100%)		Count	0 (0%)	0 (0%)	
		No		34	38.6%	Count	10(100%)	1 (100%)		Count	4 (50%)	1 (100%)	
		total		88	100%	Count	***(90.9%)	3 (9.1%)		Count	8 (100%)	2 (88.8%)	
3	Number of miscarriages	once		56	63.6%	Count	8 (88.9%)	48(60.8%)	0.57**	Count	7 (87.5%)	1 (100%)	0.70**
		Twice		22	25%	Count	1 (11.1%)	21(26.6%)		Count	1 (12.5%)	0 (0%)	
		Thrice		8	9.8%	Count	0(0%)	8(10.1%)		Count	8 (100%)	1 (100)%	
		Fourth		1	1.1%	Count	0 (0%)	1(1.3%)		Count	0 (0%)	0 (0%)	
		Fifth		1	1.1%	Count	0(0%)	1(1.3%)		Count	0 (0%)	0 (0%)	
		Total		88	100%	Count	9 (100%)	79(100%)		Count	8 (100%)	1 (100%)	
4	Still Birth	Yes		6	6.8%	Count	0	6(6.8%)	0.39**	Count	0	6 (6.8%)	0.88**
		No		82	93.2%	Count	8 (100%)	1(100%)		Count	0	82(93.2%)	
		Total		88	100%	Count	8(100%)	1(100%)		Count	0	100%	

**Not significant different at the 0.05 level.

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Table (3) Comparing the Rubella IgM results by ELISA to the results by Western blot

Cross tabulation		Western blot Rubella		Total
		Positive	Negative	
Elisa Rubella (IGM)	Positive	11 (12.50%)	2 (2.30%)	13 (14.80%)
	Negative	0	75 (85.20%)	75 (85.20%)
Total		11 (12.50%)	77 (87.50%)	88 (100.00%)
Chi square p value = 0.000**				

P-value less than 0.05 that's considered as statistically significant
**.Significant.

Table (4) Comparing the CMV (IgM) result by ELISA to the result by western blot

Cross tabulation		Western blot CMV		Total
		Positive	Negative	
Elisa CMV (IGM)	Positive	8 (9.10%)	1 (1.10%)	9 (10.20%)
	Negative	0	79 (89.80%)	79 (89.80%)
Total		8 (9.10%)	80 (90.90%)	88 (100.00%)
Chi square p value = 0.000**				

P-value less than 0.05 that's considered as statistically significant
**.Significant.
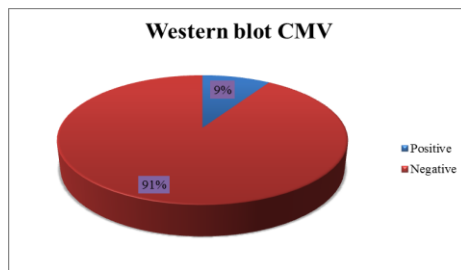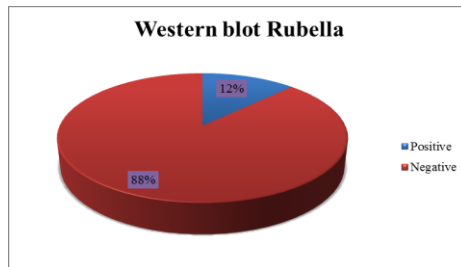
Discussion

Infection with rubella virus and CMV can be disastrous in early gestation. The virus may affect all organs and cause a variety of congenital defects. Infection may lead to intrauterine death, spontaneous abortion, or preterm delivery. Infection with rubella virus is initially inapparent and asymptomatic and it is difficult to diagnose on clinical grounds. Several studies showed the seroprevalence.

Our study of rubella infection showed 12.5% (11/88) as study done in India showed 4.66%-28.6% in women of reproductive age group. In Sudan, In raq (Baghdad), among 119 Aborted women there were 4.8% Rubella IgM recurrent spontaneous abortion and CMV IgM (8.3%). pregnant women belonging to low socioeconomic group may be exposed to a variety of infections due to poor environment and hygiene. Maternal infections such as rubella and CMV can be considered as a significant factor causing the poor pregnancy outcome.

The frequency of rubella virus infection in this study was 13 (14.8%) when used ELISA technique and 11(12.5 %) when western blot technique was applied, these results were lower than the prevalence of rubella virus in western Sudan which reported by Hamdan *et el.,* (65.3%)[9] and lower than Geren *et al.,* [10] study who reported 71.2% infection among Italian women . This variation might be due to differences in sample size, study duration and techniques used for detection of virus. although there was no significant association between age and rubella , cmv infections as P showed, and this results were agreed with Kearns et al., results but disagreed with Mitchell *et al.,*[11], Honarvar *et al.,* [12] and Hamdan et el[9] result whom reported significant association between age and rubella, CMV virus infections.

The present study also did not show significant association between the number of Normal pregnancy of Rubella, CMV virus infection. These finding were contrary to

that results obtained by Kearns et al[11] and agreement with Hamdan et el results where it was carried out in Sudan[9].

Conclusion:

This study demonstrated a strong association between (Rubella and CMV) infection and BOH in women. It is evidence that maternal infection plays a critical role in pregnancy wastage, and their occurrence in women with BOH is a significant factor. History of pregnancy wastage and a positive serological reaction during current pregnancy must be considered while managing BOH cases to reduce the adverse fetal outcome. Early detection and timely intervention can prevent morbidity and mortality of infants born to such mothers. All antenatal cases with BOH should be routinely screened for rubella and CMV so that early diagnosis and appropriate intervention of these infections will help in proper management of fetal outcome. In addition to this, there is a need to modify vaccine strategies to immunize all adolescent girls and/or women of child bearing age before conception to reduce incidence of congenital syndrome and bad obstetric outcome.

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