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Infections Among Women Suffered from Spontaneous Miscarriage Compared with Normal Delivery Women

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Abstract

Spontaneous miscarriage is the spontaneous ending from a pregnancy at a phase where the embryo is incapable of remaining independently, generally defined in humans at prior to 20 weeks from gestation. Overall, reported spontaneous miscarriage rates in recognized pregnancies are 10% to 20%. Pregnant women are exposed to many infectious agents that are potentially harmful to the fetus and an increased risk of miscarriage. The aims of the study were to evaluate the role of many pathogens (Parvovirus B19, Cytomegalovirus, Rubella, and Toxoplasma gondii), and urinary tract infections (UTI) as causes of spontaneous miscarriage. A case-control study conducted in Baghdad Teaching hospital during a period of ten months. A total of 120 women aged between (20 to 25) years were enrolled within the study, 80 with spontaneous miscarriage as a study group and 40 with normal delivery as a control group. A full history was taken, clinical examination was done and various laboratory investigations were carried out for all women in both groups. The study showed a statistically significant correlation between viral infection, Parvovirus (IgM, IgG), Toxoplasmosis (IgM), *Rubella* (IgM) and *Cytomegalovirus* (IgM, IgG), with spontaneous miscarriage (P-value 0.001, 0.005, 0.008, 0.014, 0.002). Bacterial, viral and protozoal infection may increase the risk of spontaneous miscarriage in comparison to healthy normal delivery ladies.

Keywords: Spontaneous Miscarriage, Urinary Tract Infection (UTI), Viral infection, Protozoal infection.

1. Introduction

Spontaneous miscarriage (SM) is defined as the loss of the intrauterine product before 20 weeks of intrauterine life, or fetal weight less 500 grams, occurring in approximately 12%–24% of clinically recognized pregnancies (Oliver-Williams and Steer [1]). The vast of miscarriages are sporadic and non-intermittent and are often regularly brought about by chromosome abnormalities in the fetus, in numerous instances many cases of miscarriage are unreported; particularly those including early fetal loss. Just a little proportion (<10%) from women who experience miscarriage report recurrent pregnancy loss (Qu, et al. [2]). Recurrent miscarriage (RM), characterized as three consecutive pregnancy failures, is estimated to influence ~1% of all couples attempting to conceive (Axmon and Hagmar [3]). The genuine chance that a woman will experience a subsequent pregnancy loss once she has had two spontaneous miscarriages has changed dramatically through the last 40 years, however, the causes of the majority of SM cases are unknown and may be related to autoimmunity (Li, et al. [4]). Unfortunately, the lack of properly controlled prospective studies complicates the role of infectious agents as the cause of spontaneous miscarriages. Over the past 10 years, the researchers have become persuaded that the single best agent to disrupt spontaneous chain miscarriages is a course of isolation of bacteria and broad-spectrum antibiotics. Many maternal diseases, most commonly caused by early pregnancy, may trigger fetal failure or malformation because the fetus's ability to cope with infectious organisms is poor and the fetal immune system cannot prevent the spread of infectious organisms to different tissues (Lalitkumar, et al. [5]).

2. Materials and Methods

A case-control study conducted in Baghdad Teaching hospital from the first of Sep. 2011 to Jun. 2012. 120 women were involved in this study, 80 women with spontaneous miscarriage were included as a study group compared to 40

healthy normal delivery ladies as a control group after taken a verbal concept from both groups to enroll in the study. Careful history was obtained from both groups according to a questionnaire that covers all information including name, age, miscarriage categories like complete, incomplete, missed miscarriage, gestational age at miscarriage, previous miscarriages, health status and history of miscarriage in the family. 10 cc of blood was taken under aseptic technique and sent for virological and parasitological investigations including IgM and IgG antibodies detection by using enzyme-linked immunosorbent assay (ELISA) kits. Those kits for quantitative, semiquantitative, and qualitative detection in human serum were supplied by Biocheck-England (Cytomegalovirus IgM and IgG, Rubella IgM, and Toxoplasma gondii IgM and IgG), Foresight- USA (Rubella IgG), Euroimmun (Parvovirus B19 IgM) and DRG-USA (Parvovirus B19 IgG). Midstream urine samples were taken for direct examination and culture (Vandepitte, et al. [6]). P-value of <0.05 was considered indicative of a statistically significant difference. All the statistical analyses were done by using the SPSS program (version-19) and the Excel application program.

3. Results

Table (1) demonstrates the frequency and percentage of women with miscarriage according to health status background compared with their control, there is a statistically highly significant correlation between the history of miscarriage in the family (mother or\and sister) in the study group. P-value was 0.002. According to urine examination and culture, 22.5 % of the study group had positive urine culture and the isolated bacteria were Staphylococcus aureus, Enterococcus Spp., Escherichia coli, Klebsiella Spp. and Streptococcus Spp. Compared with the control group, positive urine culture represent only 12.5 % and the isolated bacteria were Staphylococcus aureus, Escherichia coli, and Enterococcus spp.as

Table (1): Frequency and percentage of women with miscarriage according to health status background compared with their control

Variable		Cases (miscarriage)		Control normal delivery	
		n	%	n	%
History of miscarriage in the family	Yes	36	45.0	7	17.5
	No	44	55.0	33	82.5
	Total	**80**	**100.0**	**40**	**100.0**
	chi-square P-value	***0.002**			
Miscarriage in previous years	Yes	63	78.7	0	00.0
	NO	17	21.3	40	100.0
	Total	**80**	**100.0**	**40**	**100.0**
Trimester of recent miscarriage	First	72	90.0	0	00.0
	Second	8	10.0	0	00.0
	Total	**80**	**100.0**	**40**	**100.0**
Type of miscarriage	Complete	30	37.5	0	00.0
	Incomplete	29	36.2	0	00.0
	Missed	21	26.3	0	00.0
	Total	**80**	**100.0**	**40**	**100.0**

*** P value is high significant at < 0.01**

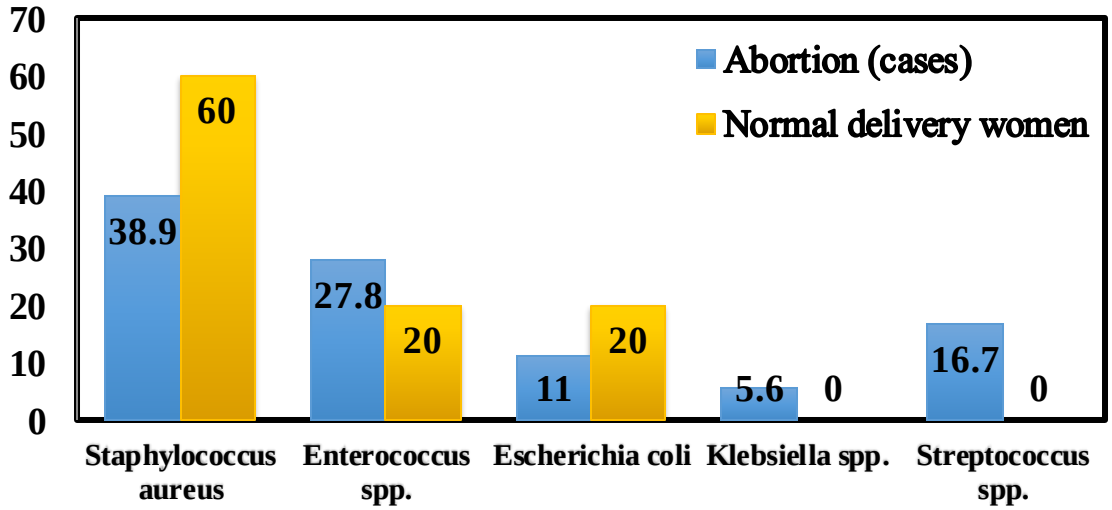

Figure (1): Bacteria isolated from urine of patients suffering from spontaneous miscarriage and from normal delivery women

Table (2): Statistical Analysis of Immunological Investigations among Studies Groups

Variable		Patients (N= 80) M ± Std	Control (N= 40) M ± Std	t-test	
				P-Value	Sig.
Parvovirus B19	IgM	0.4 ± 0.3	0.2 ± 0.098	0.001	H.S
	IgG	16.6 ± 17.98	5.8 ± 4.2	0.005	H.S
Toxoplasma gondii	IgM	0.4 ± 0.3	0.3 ± 0.1	0.008	H.S
	IgG	136.9 ± 242.99	57.03 ± 114.1	0.148	N.S
Rubella	IgM	0.4 ± 0.2	0.3 ± 0.1	0.014	S
	IgG	91.3 ± 84.3	61.3 ± 61.6	0.063	N.S
Cytomegalovirus	IgM	0.6 ± 0.3	0.4 ± 0.3	0.002	H.S
	IgG	29.3 ± 77.96	28.3 ± 54.7	0.931	N.S

N: Number of cases, M: Mean, Std: Standard deviation, Sig.: Significant, IgM: Immunoglobulin Mu, IgG: Immunoglobulin Gamma, H.S: Highly Significant, S: Significant, N.S: Non-Significant.

it is shown in figure (1). Table (2) show the statistical analysis of immunological investigations among studies groups, P-value is highly significant (P-value ≤ 0.01) in Parvovirus (IgM, IgG), Cytomegalovirus (IgM, IgG) and significant (P-value ≤ 0.05) in Rubella IgM while it is not significant in Rubella IgG and also in both Toxoplasmosis IgM and IgG.

4. Discussion

Recurrent pregnancy loss is commonly known as 3 or more miscarriages approximately 5% of couples trying pregnancy have recurrent pregnancy loss. During the past, some couples were diagnosed with a particular cause for miscarriage. During recent times, progress has been made in understanding, and knowing recurrent pregnancy loss approximately 10-15% of all first-time pregnancies can cause miscarriage. In most instances, a similar miscarriage rate in subsequent pregnancies is expected (Stenchever, et al. [7], Jaslow, et al. [8], Rai and Regan [9]) found there is a significant

relationship between the history of miscarriage in the family and the studied group this is may be estimated to be due to the lifestyle in the family and their health status these studies agreed with the current study. (Petrozza and Berin [10]) found in his study there is a positive correlation between the history of miscarriage and urinary tract infection and the main bacteria were Staphylococcus aureus. This is agreed to our study and this may be because urinary stasis is common in pregnancy and since most Staphylococcus strains prefer that environment, they may cause UTI. although there 2-5% of cases of bacteriuria are asymptomatic but when untreated may be associated with pyelonephritis and preterm labor. (Sadoon and Hasony [11]) reported that the overall prevalence of parvovirus B19 is higher in the studied group and this is agreed with our study and there is a statistically significant relationship between parvovirus B19 infection and miscarriage. Toxoplasma gondii in immunocompetent women happens almost especially when the infection is acquired during gestation (Montoya and Liesenfeld [12]). The finding of a high Toxoplasma Specific IgM antibody titer mixed with a high IgG titer most likely shows an acute infection within the past 3 months. A low to medium IgM titer and a high IgG titer might indicate an acute infection 3-6 months previously. However, IgM antibodies have been detected as long as 18 months after initial infection (Montaya and Remington. [13]). These results come in an agreement with the present study in which the IgG and IgM concentration were studied in this study regarding the standard curve, it was observed that the high number of patients falls between 32-60 IU/ml of concentration IgG and IgM were 55 and 30 respectively. There is considerable variation in the prevalence of these agents among the women of childbearing age in different geographical areas the rural background had been noted as a high percent risk factor for toxoplasmosis in other studies as well (Al-Hindi and Lubbad [14]). According to Rubella

infection, the results are in agreement with what was found by (Hahne, et al. [15]). The relationship between IgG seropositivity and history of exposure with CMV is known to have an intrauterine route of transmission with significant mortality and morbidity (Fisher, et al. [16]). The present study shows a low seropositivity rate of Cytomegalovirus IgM and a high rate of Cytomegalovirus IgG. In the Kingdom of Saudi Arabia, the incidence of CMV infection among pregnant women by detection of the IgG antibody using ELISA was 92.1% (Ghazi, et al. [17]). In another study (Sera, AA [18]) shows that CMV infection is endemic in Iraq, the prevalence rates of human cytomegalovirus IgM and IgG in non-pregnant women have been reported to be 1% and 84% respectively, and 2.5% and 90% in pregnant women. In this study, the prevalence of seropositivity for CMV was lower than in Western Europe, America, and Australia (Munro, et al. [19]).

5. Conclusion

Staphylococcus aureus was the main bacteria isolated from both aborted and control women. There is a significant role of many pathogens (Parvovirus B19, Cytomegalovirus, Rubella, and Toxoplasma gondii) on spontaneous miscarriage and the unclear relationship between urinary tract infection and spontaneous miscarriage. Finally, our findings on miscarriage may indicate the need for further specially designed health-promoting programs targeted towards the aborted group.

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Author Contribution

Qanbar FJ, performed the study, Ali SF, and Al-Bassam AN supervised the work.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Clearance

The study was approved by the Ethical Approval Committee.

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Biography

Farah Jihad Qanbar

She graduated from the Middle Technical University College of Health and Medical Technology, Baghdad, Medical Analysis Branch in 2007. She got a job in the clinical laboratory Department at Kamal Al-Samraay hospital in 2008, she got the Master degree in Microbiology branch at Health and Medical Technology College in 2013. She works in Medical City, Nursing Home Hospital since 2009, and occupied the manager position of the Virology unit there from 2013 to 2014, then she occupied the manager position of the laboratory department of the nursing home hospital from 2014 to 2015. She got the training and worked in the FISH (fluorescence in situ hybridization) technique unit from 2016 to 2018 and got the laboratory work license in 2018 from the Iraqi Ministry of Health and Environment. And now she works in the Molecular Diagnostic Unit (PCR) and occupies the position of assistant of laboratory manager department of Nursing Home Hospital.

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She received the B.Sc., the M.P.H, and the Ph.D. in public health from the American University of Beruit, Lebanon; University of Alexandria, High Institute of public health, Egypt. In 1973, 1974, and 1981 respectively. She was a teacher in the high institute of health professions 1974-1983. She worked in the central public health laboratory in Baghdad 1983-1995. She was a faculty member and assistant professor in the college of the medical and health technology department of medical laboratory technology in Baghdad 1995-2012. She is now a retired academic.

Dr. Anwar N. Al-Bassam

She graduated from Al-Mustansiriya University. In 1988. She occupied the position of rotator house officer in Al-kindy teaching hospital from 1988-1990. In 2009 she got the degree of consultant in Gynec. and Obst. and also the certificate for laparoscopic surgery. In 2011 she got the degree of supervisor in laparoscopic surgery (the highest level in training. she is a trainer for Iraqi and Arabic board residents since 2005 and supervisor for many theses for postgraduate follow since 2007. Trainer and lecturers for undergraduate medical students in Baghdad university since 2005. Director for Urogynecologyical program in Baghdad teaching hospital since 2016. She is a member of the Iraqi medical association, Iraqi society of Gynec. and Obst., Iraqi society in infertility, and RCOG associate. She had many publications and she was the responsible organizer for workshop for urogynecology in Baghdad teaching hospital with the Iraqi Liaison Group RCOG in 2017,2018.

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