

## Immunological study of Parvovirus B19 in aborted women in Al-Ramadi city

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### ABSTRACT

**Background:** Infection of parvovirus is highly spread that may affect 1-5% of pregnant women mainly in normal pregnancy outcomes. Infection is almost sub-immunogenic level and the viral copies are usually under control of immune system especially the antibodies against B19 V. IgM of parvovirus appears with 2-3 days of infection and remain until 6 months, while IgG appears after few days of IgM detection and remain present for life. The aim of the study: To determine the prevalence of parvovirus B19 infection and if the women are immunized or not against this virus infection through testing process for both IgM and IgG. **Patients and methods:** Fifty pregnant women with spontaneous abortion were conducted in the study. Venous blood samples were collected from all participants after the abortion and parvovirus IgM and IgG titer were measured by ELISA method. **Results:** All participants of aborted women were negative IgM antibody, while IgG antibody was positive in 58% from total number and remaining percent was negative for IgG. **Conclusions:** Infection with parvovirus give the women immune response and become immunized against Parvovirus this mean the infection present in our community. Therefore, serological screenings must be involved to routine work to detect the infections in childbearing age group of women.

**Keywords:** Parvovirus B19, IgM, IgG, aborted women, ELISA.

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### INTRODUCTION

Parvovirus (B19 V) is a single-stranded DNA and small virus. B19 V is only the species of parvoviridae family genus Erythrovirus that infect the human. There are no animal strains of this virus cause disease to the human being<sup>1</sup>. This virus firstly discovered in 1975 through ordinary blood tests for detection of hepatitis B antigen and then was approved as a causative agent of erythema infectiosum in 1983. This virus was detected as a cause of nonimmune hydrops and fetal death<sup>2</sup>. Human infection of B19V mainly occur during childhood and the infection was known to be highly contagious<sup>3</sup>. The transmission of virus occurs by respiratory secretion also by other routes as blood transfusion of blood constituent's especially red blood cell from patients with pre-seroconversion viremic stage<sup>4</sup>. Infection of parvovirus is highly spread that may affect 1-5% of pregnant women mainly in normal pregnancy outcomes. Viral infection is higher in an epidemic area and may reach to 3 and 20% with a seroconversion rate of 3-34%<sup>5</sup>. The infection of Parvovirus in world population was 40-60%, this persistent infection is almost sub-immunogenic level and the viral copies is usually under control of immune system especially the antibodies against B19 V<sup>6</sup>. After the infection in pregnant women was occurring, the virus load in blood (viremia) reaches the maximum level within a week. Half of the infected cases may develop symptoms as erythema infectiosum, mild fever and headache after 10-14 days from reaching the virus its maximal load in

blood<sup>6</sup>. The infection has a complicated clinical picture in many situations as in patients with short-lived red blood cells as in thalassemia and other hemolytic diseases, pregnant women and immunocompromised patients<sup>7</sup>. The most suitable time of pregnancy for development of B19 virus- induced hydrops fetalis is 9-16 gestational weeks, this occurs because of shortened-life span of red blood cells during the hepatic period of fetal development in this period of pregnancy<sup>8</sup>. The infected women with parvovirus must determine if she is immune or not through the testing process for both IgM and IgG. IgM of parvovirus appears with 2-3 days of infection and remain until 6 months, while IgG appears after few days of IgM detection and remain present for life<sup>9,10</sup>. Anbar is one of Iraq provinces where the incidence of parvovirus infection was not known to be recorded in a previous study, therefore, this study was conducted in a group of aborted women to detect if the parvovirus is one causes of this clinical cases. Also to provide the basic information about immune status of this virus infection in our community.

### *Patients and Methods*

In a prospective study from February 2018 to August 2019, fifty aborted women with spontaneous abortion were enrolled in the study. Venous blood samples were collected from all participants after the abortion and parvovirus IgM and IgG titer were measured by ELISA method. After the separation of serum from blood samples, it was kept in -20°C freezer and IgM and IgG

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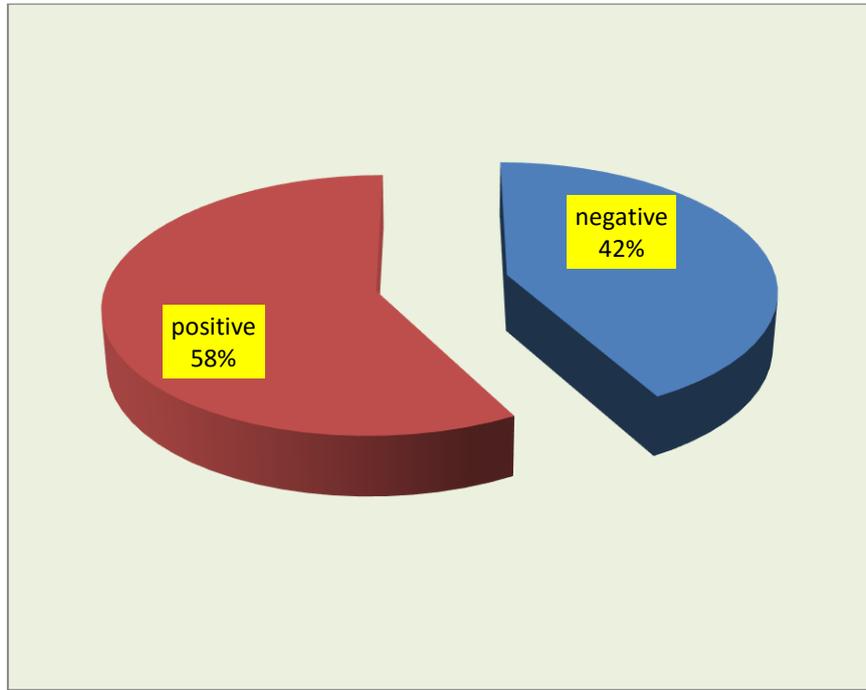


Figure 1: The percentage of positive and negative IgG antibody.

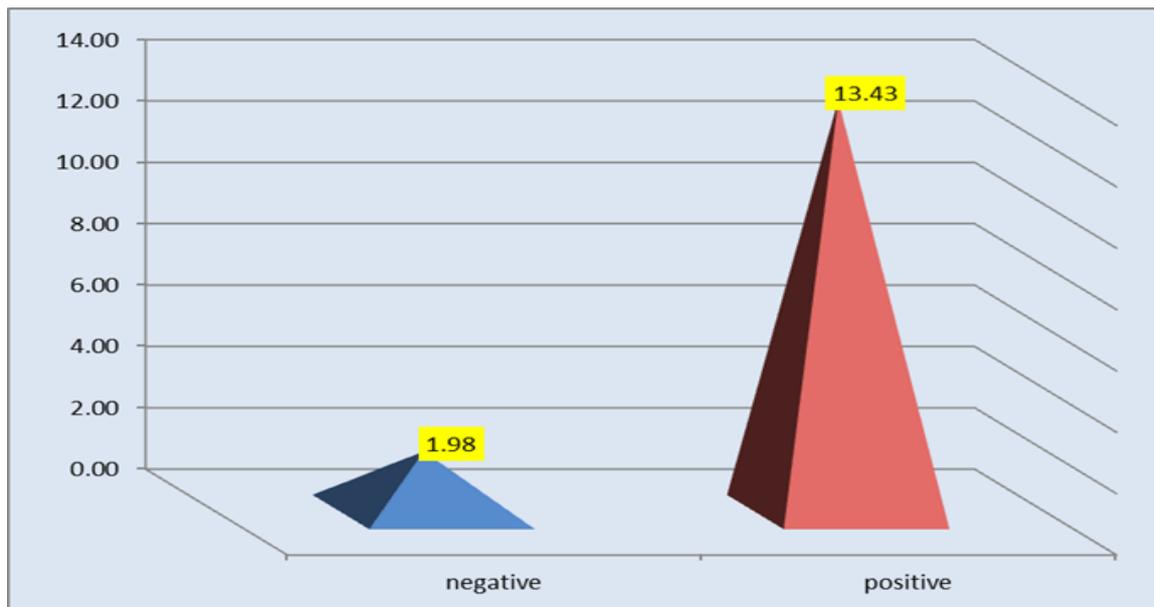


Figure 2: The differences between titer of positive and negative values of IgG antibody.

antibodies against Parvovirus B19 were measured by full automated instrument for ELISA by cheimmullesence ELISA kit.

### RESULTS

A total of 50 aborted women were evaluated for the prevalence of parvovirus specific antibodies (IgM and IgG). All participants were negative IgM antibody, while IgG antibody was positive in 58% from total number and remaining percent was negative for IgG as shown in Figure 1. By using T-test there is a significance differences (P value < 0.000 between the Mean value of positive and negative titer of IgG antibody as in table 1, figure 2.

### DISCUSSION

Diagnosis of parvovirus B19 in human remain an essential objective in pregnancy. There are few studies on the diagnosis of B19V in amniotic fluid by determination of viral DNA and then compared with serological tests of the mother or fetal serum<sup>11</sup>. Diagnosis of this viral infection can be measured by clinical symptoms, detection of viral DNA and serological assay of both IgG and IgM antibodies in blood samples<sup>12</sup>. When serological assay of IgM and IgG in pregnant women was occurred and the result shows positive IgG result and negative IgM this indicate past infection and this not harm the fetus. Positive IgG and IgM results indicate recent infection and

Table 1: The differences between positive and negative titer of IgG antibody.

	Mean	Std. Deviation	t test	Sig. (2-tailed)
positive	13.43	4.76	10.833	0.000
negative	1.98	0.94		

this result may has risk to fetus. Negative IgM and IgG results indicate that mother is not immune and there is no acute infection is present<sup>13</sup>. This present study showed that IgM antibody in all aborted women was negative while IgG antibody was positive in 58% of aborted women. This result not consistent with Areej<sup>14</sup> in the result of IgM antibody (11.11) and IgG (13.3) . Also the results of this study were not consistent with Shahram et al<sup>15</sup> because their study shows the percent of IgG was (69.1%). Also present result not consistent with other study accomplished in Saudi women<sup>16</sup> and Nigeria<sup>17</sup>. The result of IgM in this study was agreed with Ayse and Aytal<sup>18</sup>, they are found negative IgM alone in their study group. These differences in results may be due to that studies were carried in different groups and in different regions would contribute to different epidemiologic data<sup>18</sup>. The constructed study found that 58% of women are positive of IgG antibodies, this results indicate that these women were immunized against this virus which acquired through past exposure to viral infections<sup>19</sup>. Specific IgM antibody appear only in early infection, then decline or persist for 90 weeks after acute infection this due to slow clearance of virus in blood, therefore this results must be trusted with other tests as PCR method to detect acute infection of parvovirus B19<sup>20,21</sup>.

The results of this study conclude that 58% of women in this area are infected in the past but the infection are asymptomatic in high percentage. Although this infection give these women immune response and become immunized against Parvovirus this mean the infection present in our community. Therefore, serological screenings must be involved in routine work to detect the infections in the childbearing age group of women.

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