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Seroprevalance of Parvovirus B19 among Kidney Transplant in Libya

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A B S T R A C T

Parvovirus B19 is a single strand DNA virus belongs to the Parvoviridia family and only parvovirus known to be a pathogen in human. It is causing several problems in human especially in immunosuppressed patients such as organ transplant recipients. In kidney transplant patients parvovirus B19 can continue for years due to failure of the immune response and it may be associated with chronic clinical manifestations such as anemia and another reticuloncytopenia. Fifty renal transplant patient who checked up in two main kidney transplant centers in Libya. During the 2017 in different years post transplantation, the blood samples were collected support by questioner include some information about patient. All samples were analyzed by enzyme-linked immunosorbent assay technique (ELISA) for antibody detection of Parvovirus B19 IgM and parvovirus B19 IgG depended on indirect ELISA principles. The seropositive of Parvovirus B19 rate was 6% for IgM (acute infection) and 66% for IgG (chronic infection). Seropositive of ParvovirusB19 in Libyan kidney transplant (Both IgM, IgG) depends on age; most age affected was between 20-39 years old. The conclusion demonstrated that ParvovirusB19 common among kidney transplant in Libya and 35% of Libyan kidney transplant patients were susceptible to the infection by B19 (do not have antibodies).

Introduction

Parvovirus B19 is a single stranded DNA virus member of Parvoviridae family of viruses that consist of many types of animal parvoviruses such as the canine parvovirus and feline panleukopenia virus. Specific parvovirus B19 only infect human, the virus replicates in rapidly dividing erythroid progenitor cells. Other target cells are less well defined and may include myocardial tissue. Infection with parvovirus is very common and worldwide. The conquestion is often during childhood and continues at lower

rates throughout adulthood between 70 and 85% of adults show serologic evidence of past infection. Infectivity shows seasonal variation in temperate climates, being more common in winter and spring. Transmission of infection usually occurs by inhalation of virus in aerosol droplets. Infection also can be transmitted vertically from mother to fetus and less commonly through transfusion of blood products bone marrow transplants, and organ transplants[1].

In immunocompetent B19 is causes erythema infectiosum (fifth disease), in pregnant women it leads to hydrops fetalis. In immunosuppressed patients such as organ transplant recipients, B19 virus can continue for years due to failure the immune response and it may be associated with chronic clinical manifestations such as anemia and another cytopenia. B19 infection in transplanted patients B19 infection is transmitted through the donor organ or blood products, during transfusion. Increased susceptibility due to immunosuppressive therapy is likely establishment of infection B19 is not frequently regarded as a cause of anemia in immunosuppressed Patients, though anemia without previous blood loss or reticulocytopenia should alert for potential B19 infection. Red cell aplasia and severe anemia are also manifestations of B19 infection in organ transplant recipients and is directly related to the virus tropism for human erythroid precursor cells. Presence of virus in bone marrow leads to prolonged suppression of erythropoiesis in spit many cases of B19 infection in renal transplanted patients and various infection-related complications have been reported; only a few studies have been performed to evaluate the incidence of active B19 infection in anemic transplanted patients, reported incidences of this infection vary from 23 to 31.1% of the cases. In particular, KT recipients may acquire symptomatic parvovirus B19 infection from the donor, from the community, or from reactivation of endogenous latent or persistent[2, 3]

Materials and Methods

Study was case series descriptive study done in in two main kidney transplant centers in Libya, Tripoli city (Tripoli Central Hospital), and Benghazi city (General Hawari Hospital) during the period from first of January 2017 to end of December 2017 in different years post transplantation. The kidney donors came from their families, the kidney recipients originated from different region of Libya. Fifty renal transplant patient (10 women and 40 men) age ranged between 12-64 years old were checked up and the blood samples were also taken to investigate for presence of IgG, and IgM antibodies for Parvovirus B19. The samples undergo to analysis by ELISA, and CBC equipment to detect the seropositively of Parvovirus B19, and find relationship between anemia and parvovirus B19 infect.

All blood KT samples were collected in 5ml blank tube and lifted for 15 minutes to clot; then the tubes centrifuged for 5 min at 3000 RPM to separate the serum. The separated sera were transferred to other tubes; every tube given number corresponds to patient name on the questionnaire and kept frozen at -20 until transferred) till analyses. Human serum IgG and IgM antibodies to parvovirus B19 were detected by enzyme-linked immunosorbent assay (ELISA) (The Alegria-parvovirus B19 IgG (ORG-Germany), and The Alegria parvovirus B19 IgM kit(ORG-Germany), all test data are transferred to the system through individual barcodes on the AlegriaTest Strip. Calculation and interpretation of results will be performed automatically. As mention before taking blood, some relevance data was taken by questionnaire for each subject this data was collected through direct interview by senior officer doctor working with kidney transplant

department during the work of study, and blood was taken by phlebotomist and stored in kidney transplant center laboratory until analyzed.

Data analysis was performed with computer software (SPSS version 23) Frequencies, percentages were computed and the comparison was made by Chi Squire Analysis to examine significant relationship between different variables in the data. Statistical significance was taken at a ***p*** value of less than 0.05.

Results and Discussion

In this study, 66% kidney transplant recipients were positive to parvovirus B19 and 6% were positive to parvovirus B19. The results showed a significant association between prevalence of IgG and age groups, $\chi 2$ (2, n = 50) = 5.236, p = 0.022 (Table 1), While there was no significant association between prevalence of IgM and age groups, $\chi 2$ (2, n = 50) = 1.106, p =0.240 (Table 2). There was no significant between seropositivity of both IgG and IgM sex groups, respectively $\chi 2$ (1, n = 50) = 1.252, p = 0.263, $\chi 2$ (1, n = 50) = 2.214, p = 0.080 (Table 3 and Table 4).

The results showed non-significant different with post transplantation period for IgG for B1 $\chi 2$ (1, n = 50) = .128, p = 0.720 (Table 5).

Non-significant different with post transplantation period to IgM for B19 $\chi 2$ (1, n = 50) = 0.345, p =0 .542. In case of IgM prevalence all of infection occur during of first five years after transplantation due to highly immunosuppressant (Table 6).

According to the level of hemoglobin, the study was showed no significant association of anemia and both IgG, and IgM for B19 respectively $\chi 2$ (1, n = 18) = 1.507, p =0 .119, $\chi 2$ (1, n = 18) = .000, p = 1.000 (Table 7 and 8).

Table.1 Prevalence of IgG according the age groups

			Age		Total
			Less than 38 years old	38 years and above	
B19 IgG	Negative	Count	26%	8%	34%
	Positive	Count	28%	38%	66%
	total	count	54%	46%	100%

Table.2 Prevalence of IgM according the age groups

			Age		Total
			Less than 38 years old	38 years and above	
B19 IgM	Negative	Count	48%	46%	94%
	Positive	Count	6%	0%	6%
Total		Count	54%	46%	100%

Table.3 Prevalence of IgG according the sex groups

			Sex		Total
			Male	Female	
B19 IgG	Negative	Count	24%	10%	34%
	Positive	Count	58%	8%	66%
	Total	count	82%	18%	100%

Table.4 Prevalence of IgM according the sex groups

			Sex		Total
			Male	Female	
B19 IgM	Negative	Count	80%	14%	94%
	Positive	Count	2%	4%	6%
	Total	count	82%	18%	100%

Table.5 Seroprevalence of B19 IgG according the time post transplantation

			Time passed since plantation		Total
			Less than seven years	From seven years and above	
B19 IgG	Negative	Count	22%	12%	34%
	Positive	Count	46%	20%	66%
Total		Count	68%	32%	100%

Table.6 Seroprevalence of B19 IgM according the time post transplantation

			Time passed since plantation		Total
			Less than seven years	From seven years and above	
B19 IgM	Negative	Count	62%	32%	94%
	Positive	Count	6%	0%	6%
total		Count	32%	68%	100%

Table.7 Prevalence and hemoglobin gm% according to (B19 IgG) test

			Hb gm%		Total
			Mild	Sever	
B19 IgG	Negative	Count	14%	0%	14%
	Positive	Count	14%	8%	22%
Total		Count	28%	8%	36%)

Table.8 Prevalence and hemoglobin gm% according to (B19 IgM) test

			Hb gm%		Total
			Mild	Sever	
B19 IgM	Negative	Count	24%	8%	32%
	Positive	Count	4%	0%	2%
Total		Count	28%	8%	36%

Infection with parvovirus is common worldwide, affecting both sexes, and all ages with different percentages; 15% of children below 5 years old; 60% of those between age of 5 and 19 years old, up to 60% of all adult are seropositivity, and more than 90% of the elderly. About 45% of women of childbearing age do not possess protective IgG antibodies against B19. The incidence of acute B19 infection in pregnancy is approximately 2% in endemic periods, but in epidemic periods, the infection rate may rise to 10 %.[5]

The most common manifestations of B19 infection in immunosuppressed patients are anemia and other cytopenias. Thus, this diagnosis should be considered in transplant recipients with unexplained anemia and reticulocytopenia or pancytopenia. Anemia is a common problem after renal transplantation and affects more than 40% of recipients.[6,7]

The prevalence of IgG Parvovirus B19 in kidney transplant in Libya and other countries in the North Africa has not been described previously. However in other country like Iraq was (18%) Saudi Arabia (75%), Iran (69.2%) in this study prevalence of IgG was (66%) a similar study was done in Libya in 2009 to detection B19 in pregnant women showed prevalence of IgG (61.3%).[8,9,10,11]

The prevalence of IgM in our study was 6% three samples were positive out of 50 all of the cases occur in the first years after transplantation due to high immunosuppressant. The rate was slightly higher than another study in 2009 in the same area (5.3%)[11], while it was (10%) in Iraq[8], Saudi Arabia (20.5%).[9] Seroprevalence of both IgM and IgG in KT in Libya is among the global rates of B19 prevalence.

In particular, KT recipients may acquire symptomatic PV B19 infection from the donor, from the community, or from reactivation of endogenous latent or persistent virus. Even though numerous cases of B19 infection in renal transplant patients have been reported. The clinical onus of B19 infection is not well characterized. Moreover, the association between B19 infection and anemia in KT recipients remains not fully.[12] Even though 26% of positive B19 have anemia 1, our study failed to find relationship between anemia and B19 infection.

The present study concluded that the seroprevalence of B19 in Libya was common in KT. This study (as a pilot) demonstrated, in spite of small sample were used due to financial difficulty, that B19 is common among KT and may cause anemia, and other serious problems.

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