DOI Number:10.37506/v20/i1/2020/mlu/194339

Detection of Parvovirus B19 Infection in Thalasemic Patients in Tikrit City, Serological Study

Hala Mohamed Majeed

Department of Microbiology, College of Veterinary Medicine, Tikrit University, Tikrit, Iraq.

Abstract

Background:-ParvovirusB19, a member of the genus Erythrovirus virus of the Parvoviridae family, causes several clinical diseases including infectious erythematosus, joints, fetalis hydrops or chronic hemolytic anemia like thalassemia syndrome, transient aplastic crises. B19 can be transmitted through respiratory secretions, blood products, and blood transfusions.

Objective: To identify the seroprevalence of Human Parvovirus B19 virus in Patients with thalassemia major in Tikrit city.

Material and method:- This lessons is a cross-sectional case control study that included 130 Patients infection with beta thalassemia attendance the Tikrit Military Hospital Department of Blood Diseases Unit as of 1/7 /2018 to 1/12/2018 major age ranging from 1-60 years and 50 healthy patients as control grouping. Blood sample were obtain for determination of specific antibodies IgG and IgM for HPV-B19 by enzyme linked immunoassay (ELISA).

Results:- HPV B19 IgM antibodies were detected in 15 of 130 thalassemic patient(11.5%),and not detected in any patient of control group, P value (0.02).While anti-HPV B19 IgG antibodies were detected in 50 of 130 of thalassemic patient (38.5 %)and 2(4%) of 50 in control group(5%), P value(0.003).. the range age of the thalassemia patient was (2 –58 years) and B19 infection was highest in the 20-to-40 year range. And the result show the highest percentage to infected to virus during the blood transfusions once a month per month was 30(100%) anti-B19IgG and 8(26.7%) anti-B19IgM.

Conclusion:-In this study, acute B19 infections were detect in patients with beta thalassemia major. showing of such high-risk groups can significantly reduce the incidence and prevalence of B19 infection; thus, screening is required for epidemiologic surveillance and disease-prevention measures.

Keyword: *Detection, Parvovirus B19, Infection, Thalasemic, Patients, Tikrit, serological, study.*

Background

Human Parvovirus B19(HPV B19)is a small, naked virus belonging to the family Paravaviridae [1]. Parvovirus B19 (Latin means small) is a newly emerging DNA virus discovery in Austarlain, When the giver sera tested for HBV, but found the B19 virus in the sera, 19 in row 19B (bank donation number) and labeled B19, later the B19 virus was implanted in the Erthrovirus genus of the Parvovirade family [2].

Corresponding author:
Assist. Prof Hala Mohamed Majeed
m.hala17@yahoo.com

Infection with this virus is very frequent and can lead to a broad range of scientific lesions depended on the immunity and hematological state of the patients, in immunologically qualified individuals, B19 infection can be symptomatic or benign and may cause Erythema infection (V disease), and arthritis [3]. However, in patients reduced production or increased loss of erythrocytes, such as syndrome Thalassemia and other chronic hemolytic anemia, B19 infection lead to lower drops of hemoglobin level and anemia that can threaten life [4].

Parvovirus B19 is common throughout the world, and 15% of children aged 15 years have IgG positive

and is spread in late coldness and early spring. The virus is transmit through contact to drops or infected blood that is minimum and vertically from mother to fetus cause Congenital anemia and fetalis hydrops. [5]

The Infection incubation period is 4-14 days but can be up to 21 days, but viremia can persist for up to a week, after which the IgM Abs suddenly rises to the peak and at 21 days, IgG Abs virus then rises and remains high.[5]

Major thalassemia patients with beta-thalassemia, due to chronic hemolytic disease, have an excessive blood transfusion system and are thus at elevated risk of obtaining B19 transmission, but contain rarely been study by detect Abs to B19. [6,7].A rapid decline of anemia, reticulocytopenia, and cessation of erythropoiesis in the bone marrow describe the transient aplastic crisis. It is probable that the non-induced crisis that occurs in B19 is often diagnosed as complicating the underlying disease.[8]

In addition, these patient are at elevated risk for transfusion-borne disease. Similarly, the B19 infection was also report from multiple hemorrhagic transfusions patients, recipient of Factor VIII concentrate, and children with congenital malformation. [9,10].In addition, the B19 transmission problem is compounded by repeated contamination of the coagulation centers. B19 transmission leads to non-spitting of red cells, neutrophils, and thrombocytopenia. [11].

HPV B19 had a strong predominance of the hematopoietic stem cell [12]. The virus is integrated into a specific location in the human genome. The infected cell fails to divide, weakening the production of new red blood cells, and the retic number is often reduced to less than 0.1 to 0.5% of the 6-20% routine values in the patient with hemolytic anemia. HPV B19 infects mature erythroid progenitor (CFU.E), preventing further reproduction and maturity, and the most primitive precursors (BFU.E) are affected as a minimum [13].

Objective

To identify the seroprevalence of Human Parvovirus B19 virus in Patients with thalassemia major in Tikrit city

Material and Method

This study is a cross-sectional case control study that included 130 Patients infection with beta thalassemia attending the Tikrit Military Hospital Department of Blood Diseases Unit from 1/7 /2018 to 1/12/2018 major age ranging from 1-60 years and 50 healthy patients as control group. Demographics Obtained from the patient group such as age, gender, duration of disease, Numbers of blood transfusion units, Serological status of HBs Ag , H CV, HIV. Anti-HPV B19 IgM and Anti- HPVB19 IgG has also been obtained by Using the ELISA test kits.(DRG International, Inc. United States, Catalog Number EIA-3504 IgM ELISA and Catalog Number EIA-3503 directed IgG). the control set included 50 non Thalassemia occurs at the same hospital for a different reason with a negative history of transfusions. Anti-HPV B19 IgM and Anti-HPVB19 IgG were also done. IgM refers to a recent infection while IgG refers to the previous infection.

Data Analysis

Implemented using the SAPPS program Version 14.0.Chi-Square and Fisher's exact test were used to determine the statistical significance of the differences between the patient control group (case) according to Anti-HPVB19 IgM and IgG. The value of $P < 0.05$ was considered to significant .

Results

In this study, we found only 15 0ut of 130 patients have positive thalassemia Anti-HPVB19 IgM (11.5%), while no any positive case of anti-HPVB19 IgM was detected in the control group with the value of P (0.02). We also found 50 patients 0ut of 130 in the thalassemia patient positive for anti-HPVB19 IgG (30.4%), while only 2 out of 50 patients in control group it is positive to anti-HPVB19 IgG (4%) with P value (0.003) As shown in Table (1)

Table (1) Distribution of serological markers from IgG Abs HPVB19 and IgG in Thalassim patients and Control Group

Patients group	No of sample	Ab HPVB19 IgM	Ab HPVB19 IgG
thalassemic group(130)	130(72.2%)	15(11.5%)	50(38.5)
Control groups (50)	50(27.8)	(0) (0)	2(4%)
Total	180(100)	15	52
P value	-	0.02	0.003

Also we found only 1 cases in thalassemic group (6.7%) were positive for Anti-HPVB19 IgM had number of blood transfusion once every two month, 30 cases (60%) had number of blood transfusion once mouth were positive for Anti-HPVB19 IgG and 8 cases (53.3%) were positive Anti-HPVB19 IgM. while cases number blood transfusion two times per mouth were 15(30%) positive for Anti-HPVB19 IgG and 5 cases(33.3%) were positive Anti-HPVB19 IgM and we found 5 cases (10%) were positive for Anti-HPVB19 IgG had number of blood transfusion Three times per mouth and 1 cases (6.67%) were positive Anti-HPVB19 IgM as shown in table (2).

Table (2) Anti-B19 Abs and total number of transfusion received by thalassaemia

Number of transfusion	Positive % Anti-B19 IgG	Positive % Anti-B19 IgM
Once every two monthly	0 (0)	1(6.7%)
Once a month	30(60%)	8(53.3%)
Two times per month	15(30%)	5(33.3%)
Three times per month	5(10%)	1(6.7%)

Total 65 thalassemia major patients test by in-house ELISA, anti-B19 IgM antibodies were detect in 15(23%) thalassemia patients and 50 (77%) test seropositive for anti-B19 IgG antibodies. According to gender, 66.7% (10 of 15) males and 33.3% (5 of 15) females were positive for anti-B19 IgM antibodies, while 80% (40 of 50) males and 20% (10 of 50) female tested positive for anti-B19 IgG. The frequency of IgG antibodies was75, 87.5, 72.2, 71.4 and 50 % in males and100, 75, 100, 66.7and 100% in females of age groups 1 –20, 20–30, 30–40, 40-50 and 50 – 60 yrs, respectively. The anti-B19 IgM antibody positivity were 25, 18.8, 16.7, 14.3 and 25% in males and 50, 25, 50, 33.3 and 100% in female in the age group shown in table (3).

Table(3) frequency of anti-B19 Abs in thalassemia major patients according to age and gender

Age group in years		Sex		Positive % anti-B19 IgG			Positive % anti-B19 IgM		
	Total	Male	female	Male	female	Total	Male	female	Total
1-20	10	8	2	6(75)	2(100)	8	2(25)	1(50)	3
20-30	20	16	4	14(87.5)	3(75)	17	3(18.8)	1(25)	4
30-40	20	18	2	13(72.2)	2(100)	15	3(16.7)	1(50)	4
40-50	10	7	3	5(71.4)	2(66.7)	7	1(14.3)	1(33.3)	2
50-60	5	4	1	2(50)	1(100)	3	1(25)	1(100)	2
Total	65	53	12	40	10	50	10	5	15

Discussion

Parvo virus B19 infection is distributed in humans throughout the world. Epidemiological studies of several countries show that the frequency of HPVB19 infection vary among many country and populations and increases with age [14]. Unfortunately, we do not have data on the exact prevalence of HPVB19 infection in our country.

In this study, a higher prevalence of HPVB19 specific IgM indicative of recent infection (11.5%) was found in thalassemic group compared to control (zero) with significant statistical difference (P value 0.02). The prevalence of HPVB19 specific IgG (38.5 %) in thalassemic group compared to control group(4%) with significant statistical difference (P value 0.003), and this is similar to results obtained by Adnan ,2013 [15].from Babylon, of 60 thalassemic major patient (Anti-B19 IgG is 38.4% and IgM 13%). Siritant korn *et al* ; [16] in Thailand , of 60 thalassemic major patient (Anti-B19 IgG is 38% and IgM 4%) . In Kishore *et al* . in serological study on 90 indian patient with thalassemia reported much higher rate of Anti-HPVB19 IgM and IgG (41.1% and 81% respectively) [17] .The difference perhaps associated to geographical difference in prevalence of HPVB19 infection [14] .

Conclusion

In this study, acute B19 infections were detect in patients with beta thalassemia major. showing of such high-risk groups can significantly reduce the incidence and prevalence of B19 infection; thus, screening is required for epidemiologic surveillance and disease-prevention measures.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: None

References

1- Heeqaard E, and Brown K, Human Parvovirus B19 . *Clin Microbiol Rev*.(2002) 15:485-505.

2- Brown KE,The expanding range of parvovirus which infect human. *Rev Med Virol.* (2010);20:231-44.

3- Plummer FA, Hammand GW, Forword K, Sekla L *etal*., .Anerythema infectiosum –Like illness caused by HPV infection *N Engl J Med* (2015).313:74-79.

4- Parvovirus B19 (erythema infectiosum, Fifth disease).In :Redbook 2006:Report of the committee on infectious disease .27th ed: Washington , D.C: American Academy Of Pediatrics, .,(2013).:484-7.

5- Kishore J,Kapoor A, Erythrovirus B19 in human. *India J Med Ree*; (2009)112:149-64.

6. Zanella A, Rossi F, Cesana C, Foresti A, Nador F, Binda AS, *et al*., Transfusion-transmitted human parvovirus B19 infection in a thalassemic patient. Transfusion. ; .(2015). 35:769–72.

7. Langar H, Triki H, Gouider E, Bahri O, Djebbi A, Sadraoui A, *et al* Blood-transmitted viral infections among haemophiliacs in Tunisia. Transfus Clin Biol. .,(2005).;12:301–5.

8. Brown KE ,The expanding range of parvoviruses which infect humans Rev Med Virol. ; (2010). 20:231–44.

9- Blümel J, Schmidt I, Effenberger W, Seitz H, Willkommen H, Brackmann HH, *et al* Parvovirus B19 transmission by heat-treated clotting factor concentrates. Transfusion. .,(2016)42:1473–81.

10- chneider B, Becker M, Brackmann HH, Eis-Hübinger AM, Contamination of coagulation factor concentrates with human parvovirus B19 genotype 1 and 2. Thromb Haemost. .(2014).;92:838–45.

11. Kishore J. Kapoor A, Erythrovirus B19 infections in humans. Indian J Med Res. .(2010). 112:149–64

12- Kurtzman GJ, Guscan P, Caras M, CohenB , Youg NS, B19 Parvovirus in circulatory cell of acutely infected patient. Blood . .(2010) 71:1448-1454.

13- Takahashi T, Ozawa K, Takahashi K, Asano S, Takaka F, Susptibilty of human hemopiotic cell to B19 PV in vitro increase with differentiation. Blood(2009). 75:603-610.

14- Cohen BJ, Buckley MM. The prevalence of antibodies to human parvovirus B19 in England and Wales. *J Med Microbiol* 1988;25:151-3.

15- Adnan H T, Seroprevalence of Human Parvovirus B19 Infection among Thalassemic Children in Babylon Center of Hereditary Blood Disorders. *Medical Journal of Babylon*-.(2013)Vol. 10- No. 2 -491-496.

16- Siritantikom S, Siritanaratkul N, Theamboonler A, KantakmalakaulW, et al .The prevalence and persistence of human parvovirus B19 infection in thalassemic patient . Asian Pac J Allergy Immunol .2007;25:169-74.

17- Kishore. J, Sirvastava M, and Choudhury N:Serological study on parvovirus B19 infection in multitransfused thalassemia major patient and its transmission through donor units. Asian J Sci.2011 Jun-Dec:140-143.