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

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Abstract

Background:- Parvovirus B19, a member of the genus Erythrovirus virus of the Parvoviridae family, causes several clinical diseases including infectious erythematous, 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-B19 IgG and 8(26.7%) anti-B19 IgM.

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 Paraviridae. 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 Ertbrovirus genus of the Parvovirade family.

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. 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.

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.  

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.  

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. 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.  

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. 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.  

HPV B19 had a strong predominance of the hematopoietic stem cell. 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.

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).

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 out 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 out 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

<table>
<thead>
<tr>
<th>Patients group</th>
<th>No of sample</th>
<th>Ab HPVB19 IgM</th>
<th>Ab HPVB19 IgG</th>
</tr>
</thead>
<tbody>
<tr>
<td>thalassemic group (130)</td>
<td>130(72.2%)</td>
<td>15(11.5%)</td>
<td>50(38.5)</td>
</tr>
<tr>
<td>Control groups (50)</td>
<td>50(27.8)</td>
<td>(0) (0)</td>
<td>2(4%)</td>
</tr>
<tr>
<td>Total</td>
<td>180(100)</td>
<td>15</td>
<td>52</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>0.02</td>
<td>0.003</td>
</tr>
</tbody>
</table>

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 month 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 month 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

<table>
<thead>
<tr>
<th>Number of transfusion</th>
<th>Positive % Anti-B19 IgG</th>
<th>Positive % Anti-B19 IgM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once every two monthly</td>
<td>0 (0)</td>
<td>1(6.7%)</td>
</tr>
<tr>
<td>Once a month</td>
<td>30(60%)</td>
<td>8(53.3%)</td>
</tr>
<tr>
<td>Two times per month</td>
<td>15(30%)</td>
<td>5(33.3%)</td>
</tr>
<tr>
<td>Three times per month</td>
<td>5(10%)</td>
<td>1(6.7%)</td>
</tr>
</tbody>
</table>

Total 65 thalasemia 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 was 75, 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

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>53</td>
<td>12</td>
<td>40</td>
<td>10</td>
<td>50</td>
<td>10</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

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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. 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 from Babylon, of 60 thalassemic major patient (Anti-B19 IgG is 38.4% and IgM 13%). Siritantikom et al; 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) . The difference perhaps associated to geographical difference in prevalence of HPVB19 infection.

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