Association Between ABO Blood group, serum IL-6 and Helicobacter pylori Infection Among New Born and Young children

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Abstract

Helicobacter pylori (H. pylori) infection is the most common cause of chronic gastritis infections. In an attempt to search for the infantile H pylori and the potential role ABO blood group as possible risk factor of infection and the interleukin-6 (IL-6) in associated H. pylori infection, this study was performed among symptomatic children in Baghdad city from January 2019 to December 2019. The gold standard diagnosis of H. pylori infection was Rapid Test lateral flow immunochromatographic. A whole of 182 children were involved in the study. The general prevalence of H. pylori infection was 72%. There were variations in the infection rate according to age and sex of patients; these variations were significant. The higher infection with 4-6 age group (24%) and the lower in 8-10 age group (10%). Significantly infection with H. pylori was higher in the male (56.5%) than female (43.5%).

H. pylori infection was found to be positively attendant with group O blood (44.2%) while other blood group finds no correlations. The mean serum IL-6 level was 53.30 ng/l for patients, 51.93 pg/mL for healthy, with no significant differences, also no correlation in serum IL-6 levels with age, sex and ABO blood group of patients infected with H. pylori.

Keywords: Helicobacter pylori, serum IL-6, ELISA, ABO blood groups, immunochromatography, newborn

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Introduction

The discovery of Helicobacter pylori by Marshall and Warren (1) in 1983, it is a joint infection bacterial in humans, and the organism is the most current pathogen microbial gastric (2). It is currently evaluated that half of the world's human inhabitance is infected with the gastric pathogen H. pylori (3). This infection is mostly acquired through childhood especially in countries poor (4, 5). The prevalence of H. pylori differs among countries (6). 50% of children are infected through 10 years of age in developing countries (7). In 1994, H. pylori was considered to be the major risk factor of gastric cancer (8), specially with increasingly common resistant antibiotic strains and the lack of an effective vaccine (9). Arising evidence for the part of genetic parameter in vulnerability to H. pylori infection havelately emerge (10,11). As potential possibility parameter for H. pylori infection is group blood ABO (12).
Group ABO blood was initially revealed in 1901 via Karl Landsteiner (13). It is the maximum commonly utilized grouping blood method and encoded via a gene situated on nine chromosome (14,15). The antigens are too present in the secretory fluids like sweat, saliva and semen (16-19). Group O blood have protective nature of thromboembolism (20-21), pancreatic cancer (22-23), austere malaria (24), while is find to be prone for peptic disease ulcer and cholera (25).

IL-6 is a multifunctional cytokine produced through nonimmune and immune cells, and is an inflammatory mediator and regulator metabolic (26-27). High IL-6 mucosal levels are related with \textit{H. pylori} infection (28). 

Material and methods

This study consisted of 182 individuals, of which blood samples were collected over the period from January 2019 to December 2019 at Baghdad province.

Ethical permission to conduct the research was obtained from all patients included in this study. As well as normal blood sample was collected from 40 apparently healthy volunteers, from each patient a full medical history for diseases and preceding laboratory discovery was obtained.

Blood collection for \textit{H. pylori} detection and ELISA test

Novo Q \textit{H. pylori} Ab Rapid Test is a lateral flow, immune chromatographic screening test for determination of Ab to \textit{H. pylori} antigen in serum or plasma specimen, during the assay the serum or plasma (2 drops) is added to sample well the mixture moves laterally on the membrane chromatographically to the test region which percoated with \textit{H pylori} antigen gold conjugate, if \textit{H pylori} antibodies are present in the specimen, two colored band are formed on the test region. One colored band in the test region indicate the negative result, with 15-20 minutes the result would read.

After collection of blood, Serum or plasma anticoagulant was centrifuged at 3000 rpm at 4°C for 10 min and the supernatant was aliquot, stored at −80°C in deep freeze until analyzed. Blood level for IL-6 (Sunlong) quantitatively limited and done for samples collected accordingly. ELISA for IL-6 performed for patients and healthy blood samples by commercially available ELISA kits. The lower level of sensitivity for the IL-6 is 2 ng/l and . The assay was read in a micro plate reader and way was a solid phase sandwich ELISA.

Statistical Analysis:

The Statistical Analysis System (2012) program was utilized to discover the affect of several parameters in study factor. Least important variance –LSD test was utilized to important compare among means, test Chi-square was utilized to important compare among percentage (0.05 and 0.01 probability) in this study.
Results

Epidemiological study

Infection rate with *H. pylori in newborn and young children according to age*

Out of 182 cases included the infection rate with *H. pylori* was 131 (72%).

There were variations in the infection rate in different age groups of patients; these variations were significant (Table-1). The higher infection rate seems to be in 4-6 age group (24%) and the lower in 8-10 age group (10%).

Table-1: Infection rate with *H. pylori* according to age

<table>
<thead>
<tr>
<th>Results</th>
<th>Age (years)</th>
<th>≤2</th>
<th>&gt;2-4</th>
<th>&gt;4-6</th>
<th>&gt;6-8</th>
<th>&gt;8-10</th>
<th>&gt;10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients NO.(%)</td>
<td></td>
<td>21(16%)</td>
<td>27(20%)</td>
<td>32(24%)</td>
<td>22(16.8%)</td>
<td>13(10%)</td>
<td>14(11%)</td>
<td>131/182(72%)</td>
</tr>
</tbody>
</table>

P<0.05

Infection rate with *H. pylori* according to gender:-

Infection with *H. pylori* higher in the male significantly (56.5%) than female (43.5%), (Table-2).

Table-2: Infection rate with *H. pylori* according to gender

<table>
<thead>
<tr>
<th>Results</th>
<th>Gender</th>
<th>Male NO.(%)</th>
<th>Female NO.(%)</th>
<th>Total NO.(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients NO.(%)</td>
<td></td>
<td>74(56.5%)</td>
<td>57(43.5%)</td>
<td>131</td>
</tr>
</tbody>
</table>

P<0.05

Infection rate with *H. pylori* according to ABO blood group

The distribution of infection with *H. pylori* in relation to ABO blood group was statistically difference (P<0.05), the highest rate was 44.2% in O+ blood group followed by 22.5% and 21.7% in blood group B+ and A+ respectively, while the lowest rate was 11.7% in AB blood group (Table-3).
Table-3: Infection rate with H pylori according to ABO blood group

<table>
<thead>
<tr>
<th>Blood groups</th>
<th>A+</th>
<th>B+</th>
<th>O+</th>
<th>AB+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PatientsNo. (%)</td>
<td>28(21.7)</td>
<td>29(22.5)</td>
<td>57(44.2)</td>
<td>15(11.7)</td>
<td>129</td>
</tr>
<tr>
<td>A-</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Blood IL-6 level Assessment of IL-6

Forty eight blood samples of H. pylori infected patients and forty samples blood of apparently controls healthy (at the same range of age and sex with patients groups) were analyzed via sandwiches ELISA test for assessment of blood IL-6 levels. The mean (ng/L) of blood IL-6 level for patients was (53.30) and for healthy controls was (51.93), with non-statistically important variance (P > 0.1) as appear in (Table-4) below.

Table-4: Mean, SD, SE, and the mode of blood IL6 level in H pylori patients.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Infected</th>
<th>Non infected</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean(ng/L)</td>
<td>53.30</td>
<td>51.93</td>
<td>0.608</td>
</tr>
<tr>
<td>SD</td>
<td>30.65</td>
<td>28.36</td>
<td>-</td>
</tr>
<tr>
<td>SE</td>
<td>4.13</td>
<td>4.08</td>
<td>-</td>
</tr>
<tr>
<td>Median</td>
<td>53.00</td>
<td>45.40</td>
<td>-</td>
</tr>
<tr>
<td>Minimum</td>
<td>7.30</td>
<td>1.40</td>
<td>-</td>
</tr>
<tr>
<td>Maximum</td>
<td>120.00</td>
<td>120.00</td>
<td>-</td>
</tr>
</tbody>
</table>

NS: Non-Significant.

For the age and sex, the mean (ng/L) of blood IL-6 in patients appeared to be with non-important variance for both age and sex (p = 0.709, p = 0.221) at the same order as appear in (Table5 and 6).
Table- 5: Level of blood IL-6 in *H pylori* infected patients according to age

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>≤2</th>
<th>2-4</th>
<th>&gt;4-6</th>
<th>&gt;6-8</th>
<th>&gt;8-10</th>
<th>&gt;10</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood IL-6 conc. (ng/L)</td>
<td>54.95 ±14.29</td>
<td>60.38 ±13.24</td>
<td>45.25 ±5.10</td>
<td>41.32 ±6.61</td>
<td>63.16 ±8.70</td>
<td>56.48 ±9.64</td>
<td>0.709 NS</td>
</tr>
</tbody>
</table>

NS: Non-Significant

Table- 6: Level of blood IL-6 in *H pylori* infected patients according to gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood IL-6 conc. (ng/L)</td>
<td>47.52 ±4.85</td>
<td>59.29 ±6.57</td>
<td>0.221 NS</td>
</tr>
</tbody>
</table>

NS: Non-Significant

**Blood IL-6 mean level in patients in relation to ABO blood**

Statistical analysis of blood IL-6 mean level in patients in relation to ABO blood group is appear in (Table-7), with non-variances among groups, but a highly increase was in AB blood group (61.68ng/L) followed by O group (47.56 ±7.42ng/L) and A group (47.12 ±5.22ng/L) then B group (41.77 ±7.72ng/L).

Table-7: Level of blood IL-6 in *H pylori* infected patients according ABO blood group

<table>
<thead>
<tr>
<th>Blood groups</th>
<th>A</th>
<th>B</th>
<th>O</th>
<th>AB</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood IL-6 conc. (ng/L)</td>
<td>47.12 ±5.22</td>
<td>41.77 ±7.72</td>
<td>47.56 ±7.42</td>
<td>61.68 ±7.46</td>
<td>0.347 NS</td>
</tr>
</tbody>
</table>

NS: Non-Significant

**Discussion**

This study to detect the prevalence of *H. pylori* among children, great prevalence (72%) of *H. pylori* between children. This result is higher than (29) in Egypt and (30) in Saudi Arabia that reported *H. pylori* infection in 64.6%, 49.8% of children, and comparable to (31), 72.4% in Egypt. This difference of rates infection among studies is possibly due to variances in the socio-economic status, educational level, size sample and methods utilized for *H. pylori* detection.
In this study children > 4-6 years group had the maximum H. pylori rates infection (32 %), whereas those >8-10 years have the lowermost (13 %). As well studies of (32, 33) find that infection rise in early childhood due to poor sanitation, bad hygienic behaviors, bedroom sharing with an infected sibling, and in a study of Hasosah et al. (30), the prevalence of H. pylori was 57.7% between those > 10 years old. This could be explicated via raised outdoor coverage by faulty dietary practices like eating from street. In accordance by the study (34), gender wasn’t a risk parameter of infection childhood with H. pylori.

Group O blood to be related with a determine 44% of H. pylori infection than blood non-O group, that was greatly statistically important. Although, group A, B and AB blood was find to be attendant with determine 28% 29% and 15 % of H pylori infection.

Group blood antigens are receptors for poisons, bacteria and parasites they colonization facilitate or avoid host clearance mechanisms (35, 36).

This is reliable with research in Iraq and Iran (37, 38), the carbohydrate antigens contributed to vulnerability to diseases infectious (39). Specially, the H antigen of group O blood uttered in the gastric mucous membrane is appropriate to the add-on of Helicobacter pylori (40, 41).

In conditions normal, IL-6 is included in host protection mechanisms operative as a messenger among innate and adaptive methods by the inspiration of gamma interferon making in T-cells, through the campaign of secretion immunoglobulin in activated B-cells, and tooth-through activating polymorph nuclear cells (42, 43).

They were a want of variance in cytokine 6 levels among infected (53.30ng/L/ml) and non-infected (51.93ng/L) children, sex age and ABO blood groups also showed no significant difference. Thus H. pylori contagion in children in contrast to adults don’t cause vagaries in systemic cytokine secretion this agree with (44).

While (45) recorded important relationship among blood interleukin-6 and Helicobacter pylori antibody levels between H. pylori-positive adults (45).


A study suggests that the immaturity of innate immunity in children is not fully mature and that this is true for the gastrointestinal system and that the frequency of H. pylori infection is high in childhood and declining in later ages (47). It was observed that children had a higher rate of H. pylori infection than adults and that the infection had decreased in later ages (48).

**Conclusion**

The frequency of H. pylori was increased in childhood group and declined in later ages. The higher infection with 4-6 age group (24 %) and the lower in 8-10 age group (10%). Infection with H. pylori greater in the male group (56.5%) than female (43.5%). H. pylori infection was higher in the childhood O group of blood than other
groups, also no correlation in serum IL-6 levels with sex, age and ABO blood groups of patients infected *H. pylori*.

**References**


12. Rossez, Y. et al. (2012). Almost all human gastric mucin O-glycans harbor blood group A, B or H antigens and are potential binding sites for Helicobacter pylori. *Glycobiology.* 22(9), 1193–206


