The Relationship between ABO Blood Group Distribution and the incidence of Upper Gastric and Duodenal Ulcer in Iraqi Patients

Manal K. Abdulridha*.

*Department of Clinical Pharmacy, College of Pharmacy, AL-Mustansiriya University, Baghdad, Iraq.

Abstract

The relationship between blood group antigens and peptic ulcer disease has been widely evaluated in the past, but only one study relating H pylori seroprevalence to ABO blood groups among Iraqi patients with peptic ulcer disease is available. We aimed to evaluate the frequency of peptic ulcer disease among different ABO blood groups in Iraqi patients, and we thought it was worthwhile to try to determine whether these components take some part in disease etiology. One hundred and six patients with peptic ulcer disease (PUD) (43 male and 63 female; mean age: 48 ± 18 years) who attended Baghdad teaching hospital and Al-Yarmouk teaching hospital endoscopy centers were enrolled, and 238 control Subjects. Finger blood samples were used for ABO/Rhesus (Rh) blood group antigen typing. The ABO blood group phenotype frequency in peptic ulcer patients was as follows: 18.9% for blood group A, 15.1% for blood group B, 57.5% for blood group O and 8.5% for blood group AB. Rh positivity was found in 100% of patients. Significant higher percentage of patients with both gastric and duodenal ulcer disease are those holding blood group O+ compared to other blood group phenotypes (57.5%) (p = 0.003). The present study showed higher incidence of duodenal ulcer (DU) in patients with blood group O+ compared to gastric ulcer (GU) patients (65.6% vs 54.1%), although no statistical difference between both diseases was found, (p > 0.05) in respect to other blood group phenotypes. Peptic ulcer disease is predominant in patients aged between 50-59 years represents with higher percentage (26.4%) compared to other age groups. Patients with blood group O+ phenotype presented with a highly significant percentage of Peptic ulcer disease, since those individuals may express a higher inflammatory response to H. pylori with higher levels of lymphocyte infiltration in the gastrointestinal mucosa, and a higher frequency of secretor status. In addition, they do not produce the substance on the surface of blood group O+ cells that may protect the lining of the duodenum. According to these results, probably ABO/Rh blood group (mainly blood group O+) has an important role in patients with peptic ulcer disease as additional risk. The functional significance of ABO blood group distribution might be associated with biological behavior of Peptic ulcer disease. The impact of blood group on Peptic ulcer disease may be a focus for further studies.

Keywords: ABO/Rh Blood group system - Upper gastrointestinal disorders – Age & Gender distribution

Corresponding author E-mail: mkar_3564@yahoo.com
Received:20/10/2012
Accepted:25/3/2013
The relationship between blood group and the incidence of peptic ulcer disease had been evaluated by several references whom provided a new clue to the etiology of the disease $^{1,2,3}$. It is well known that *Helicobacter pylori* (*H. pylori*) infection and aspirin/non steroidal anti-inflammatory drugs (NSAIDs) are the most important factors predisposing peptic ulcer disease in the community $^{(3)}$. In addition, the possible relationship between genetic factors and the natural history of peptic ulcer has been studied $^{(4)}$. A number of evidence is in favor of both hereditary (ABO blood group) and environmental factors playing a part in the development of bleeding duodenal ulcer $^{(5,6,7)}$.

Some reports postulated that overt bleeding from the gastric mucosa, whether aspirin-induced or not, may be related to ABO blood group and secretor status $^{(8,9)}$. The association of blood group O with bleeding from duodenal ulcer was also confirmed $^{(10)}$. Recently it was considered that the life expectancy of persons holding blood group O is less than that of other blood groups, and generally, blood group O holders are more prone to various diseases mainly duodenal ulcer $^{(11)}$. Similarly, gastric carcinoma was found to be associated with blood group A, but no explanation for this condition was found $^{(12)}$. In addition, type O people may be more vulnerable to the bacteria that can cause peptic ulcers, *Helicobacter pylori* $^{(13,14)}$. Many epidemiologic studies had found that non secretors of ABO blood group antigens and individuals of blood group O were overrepresented among patients with peptic ulcers $^{(15,16)}$. These studies encouraged many researchers to investigate the relation between ABO blood groups and their secretor status with peptic ulcer $^{(9,11)}$.

Data concerning the association of ABO blood groups among Iraqi patients with gastric compared to duodenal ulcer was presented in one study only. We aimed to evaluate this association and we thought it was worthwhile to try to determine whether these components take some part in disease etiology.

### Statistical analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) (student version 13, McGraw Hill Company 2006). Chi square test was used to detect statistically significant differences among variables. *P*-values <0.05 were considered significant.
Results

This study includes a total of 344 subjects 106 (30.8%) patients and 238 (69.2%) controls. The demographics and clinical characteristics is shown in table (1).

Table 1: Demographics and clinical characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total N (%)</th>
<th>Patients N (%)</th>
<th>Controls N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects</td>
<td>344 (100)</td>
<td>106 (30.80)</td>
<td>238 (69.20)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>146(42.40)</td>
<td>43 (40.6)</td>
<td>103(43.3)</td>
</tr>
<tr>
<td>Female</td>
<td>198(57.60)</td>
<td>63 (59.4)</td>
<td>135(56.7)</td>
</tr>
<tr>
<td>Age (Year)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>113(32.8)</td>
<td>14(13.2)</td>
<td>99 (41.6)</td>
</tr>
<tr>
<td>30 – 39</td>
<td>85(24.70)</td>
<td>19(17.9)</td>
<td>66 (27.7)</td>
</tr>
<tr>
<td>40 – 49</td>
<td>61(17.7)</td>
<td>22(20.8)</td>
<td>39 (16.4)</td>
</tr>
<tr>
<td>50 – 59</td>
<td>56(16.3)</td>
<td>28(26.4)</td>
<td>28 (11.7)</td>
</tr>
<tr>
<td>60 – 69</td>
<td>29(8.4)</td>
<td>23(21.7)</td>
<td>6 (2.6)</td>
</tr>
</tbody>
</table>

Table 2: Blood group distribution between patients and controls

<table>
<thead>
<tr>
<th>Blood group</th>
<th>Subjects N (%)</th>
<th>P*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients</td>
<td>Controls</td>
</tr>
<tr>
<td>A</td>
<td>20 (18.90)</td>
<td>71 (29.80)</td>
</tr>
<tr>
<td>B</td>
<td>16 (15.10)</td>
<td>49 (20.60)</td>
</tr>
<tr>
<td>AB</td>
<td>9 (8.50)</td>
<td>32 (13.40)</td>
</tr>
<tr>
<td>O</td>
<td>61 (57.50)*</td>
<td>86 (36.10)*</td>
</tr>
<tr>
<td>Total</td>
<td>106 (100)</td>
<td>238 (100)</td>
</tr>
</tbody>
</table>

*Pearson Chi-Square
The association between the ABO blood group and both gastric cancer and peptic ulcers has been studied previously \cite{18-19}. This study provide an estimation of the extent of such associations in Iraqi patients. In general adult population 22% of all of peptic ulcer (GU&DU) disease were idiopathic and almost 40% of duodenal were H.pylori infection. Obesity is a risk factor for gastric ulcer as for use of low-dose of aspirin \cite{20,21}. Previous studies demonstrated that blood group O is associated with duodenal ulcer disease, while gastric ulcer and gastric carcinoma are associated with blood group A \cite{21,22,23}.

Also it was concluded that gastric ulcer near the pylorus and those occurring with duodenal ulcer were associated with acid hypersecretion, these cases were marked in patients with blood group O, while gastric ulcer in body of the stomach occurring in patients in which their duodenum was normal, were characterized by acid hyposcretion and this marked in patients with blood group A, the cause that blood type A is most likely to have gastric cancer \cite{24}. Romshoo \textit{et al.} (1997) reported that, the majority of peptic ulcer patients (56%) had blood group O and it though a risk factor for peptic ulcer \cite{25}. In another study, Bayan \textit{et al.} (2009) finding contributes to the positive correlation between group O and upper gastrointestinal bleeding caused by gastroduodenal ulcers and erosive gastropathy and the blood group O which was found to have higher frequency in patient group than in controls ( \( p = 0.004 \)) \cite{26}. In prospective well-defined cohort study of Swedish and Danish blooddonors have confirmed that individuals with blood group O have a higher risk of peptic ulcers than those with other blood groups \cite{27}. Those findings have been confirmed by many other reports \cite{28,29}. Despite epidemiological evidence of increased peptic ulcer disease in ABO blood group O subjects, and the evidence that H. pylori adhesion to gastric epithelial cells is mediated by blood group epitopes, no significant association between blood groups and H. pylori serological status was detected ( \( p > 0.05 \)) \cite{30}. Jaff MS. (2011) showed a significant association between the O blood group and infection caused by \textit{H. pylori} (\( P = 0.01 \)), the prevalence of seropositivity to \textit{H. pylori} infection was (64.8%) in symptomatic patients in the Kurdistan region of Iraq \cite{31}. In the present study, patients with blood group O phenotype presented with a highly significant percentage of PUD compared to controls (57.5%) vs (36.1%) respectively \( p = 0.003 \).

Blood group O individuals express a higher inflammatory responses to \textit{H. pylori} with higher levels of lymphocyte infiltration in the gastrointestinal mucosa \cite{32}, a lower level of Von Willebrand’s factor \cite{33,34}, and a higher frequency of secretor status \cite{35}, in addition, they do not produce the substance on the surface of blood cells that may protect the lining of the duodenum \cite{36,37} all these together explain the possible cause of these individuals' increased susceptibility to peptic ulceration. Jaff MS, study support this epidemiological view of gastric susceptibility of O blood group to \textit{H. pylori} infection which is most probably due to high secretor status \cite{31}. This correlation was supported in many reports \cite{38,39}. Bayan \textit{et al.} (2009) showed higher frequency of DU among patients with blood group O with significantly higher H. pylori positivity (\( p=0.031 \)) compared to other ABO phenotype. Although no statistical difference was noticed in O blood group distribution between DU and GU endoscopic findings \cite{26}. The present study show higher incidence of DU in patients with blood group O compared to GU (65.6% vs 54.1%), although no
statistical difference between both diseases in blood group O in respect to other blood groups, \( p > 0.05 \). This is probably due to small number of patients enrolled in this study. Most studies stated that stomach ulcers are more likely to develop in older people. This is may be because arthritis be prevented by daily use of aspirin / (NSAIDs) \(^4\), in addition to age related relaxation of pylorus valve allowing backflow of bile to erode the stomach lining \(^{41}\). H. pylori Seropositivity increased with age, and was not related to gender\(^{30}\). This age – related ulcer development was correlated to ABO blood group phenotype in many studies \(^{42,43}\), including our study. Further studies screening the effect of age on incidence of peptic ulcer disease are warranted to exclude other confounders. According to results, probably ABO/Rh blood group (mainly blood group O+) has an important role in peptic ulcer disease as additional risk. We can conclude that the functional significance of ABO blood group distribution might be associated with biological behavior of PUD. The impact of therapeutic strategy with anti-secretory or H. pylori irradiation protocols on blood group in PUD may be a focus for further studies.

References


102
