



Study on relationship between acute gastrointestinal disease and *Helicobacter pylori* infections

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ABSTRACT

Objective: To assess the relation between acute gastrointestinal disease and *Helicobacter pylori* (*H. pylori*) infections. **Methods:** Over the 18-month period, a total of 323 patients referred to three hospitals in Babol (north of Iran) were enrolled in this cross-sectional study. *H. pylori* status (rapid urease test), endoscopic findings in the patients, personal habits (smoking or alcohol intake) and administration of drugs, such as non-steroidal anti-inflammatory drugs (NSAIDs) were analyzed using standard *Chi*-square test and multinomial logistic regression analysis. **Results:** Results showed that acute gastric ulcer patients had a significant association with alcohol ($P=0.001$, $OR=6.183$), opium ($P=0.022$, $OR=2.823$), smoking ($P=0.016$, $OR=2.579$) and NSAIDs ($P=0.046$, $OR=2.071$). However, patients with acute duodenal ulcer have a significant association with opium ($P=0.023$, $OR=2.326$) and alcohol ($P=0.003$, $OR=3.888$). As well as, gastric cancer had significant association with alcohol ($P<0.05$, $OR=6.937$), smoking ($P=0.012$, $OR=2.738$), family history ($P=0.005$, $OR=4.380$) and gender ($P<0.05$, $OR=5.103$). **Conclusions:** Current investigation shows that *H. pylori* infection, alcoholism, male gender, age and family history have an additive impact on the incidence of gastric cancer. In addition, alcoholism, opium usage, NSAIDs and family history have more impact on the incidence of acute gastric ulcer and acute duodenal ulcer in patients.

1. Introduction

Helicobacter pylori (*H. pylori*) is a microaerophilic, spiral-shaped, and motile bacterium that responsible for gastric diseases, such as duodenal ulcer (DU) and chronic gastritis[1]. There is increasing document to recommend that *H. pylori* also plays a predominant

role in the development of gastric cancer (GC). The frequency of *H. pylori* infection in developed countries is significantly lower, with 20% to 50% of the population infected[2,3]. The increase of these illnesses in the presence of *H. pylori* infection depends on a variety of characteristics, including host and environmental factors[4]. Everhart *et al*[5] reported that lower income, increasing age, smoking and educational status were the main risk factors

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associated with acute peptic ulcer disease (PUD). Rosenstock *et al*[6] showed that *H. pylori* infections and tobacco smoking were the main risk factors for PUD in Danish population. It was reported that aging and smoking is associated with PUD in the Norway[7]. However, Aldoori *et al*[8] reported that there were no relation between smoking and duodenal ulcer. Based on the Meta-analyzes about the relationship between seropositivity to *H. pylori* and GC, the odds ratio (OR) for infected patients is approximately 1.92[3]. The aim of this study was to investigate the relation between *H. pylori* infection and acute gastrointestinal disease in the patients admitted to the three hospitals in Babol, north of Iran.

2. Materials and methods

2.1. Ethical statement

The study was approved by Ethical committee of The Babol University of Medical sciences, Babol, Iran (consent ref no. MuBabol.Rec.1394171). In all patients undergoing endoscopy, written informed consents were obtained and permitted by the Ethics Committee of Babol University of Medical Sciences (muBabol), Babol, northern Iran. The protocol was clarified to subjects before admission. Identifying information of all samples was kept undisclosed. Sample donors received a standard letter comprising information about the project and were invited to a general health check.

2.2. Study population

In this cross-sectional study, from February 2015 to August 2016, a total of 323 non-duplicative biopsy specimens were obtained by gastroenterologists from each untreated patient underwent upper gastro-duodenal endoscopy referred to the three hospitals in Babol, north of Iran. Out of these patients, 174 (53.87%) and 149 (46.13%) were male and female, respectively. The mean age of the patients studied was (51±15) years, with a range from 15 to 89 years. All patients were living in the Mazandaran, a province in the north of Iran. In all registered patients, two biopsies were obtained during endoscopy from the corpus and antrum of the stomach. A gastroenterologist done an upper gastrointestinal endoscopy using Olympus GIF-150 for all enrolled patients and collected biopsy samples from the antrum and corpus of the stomach. Of 323 enrolled patients, 140 (43.3%), 47 (14.6%), 85 (26.3%) and 51 (15.8%) individual have gastritis, GU, DU and GC, respectively.

2.3. Inclusion criteria

An important inclusion criteria of the study that were participating

patients had not taken any antimicrobials, including, bismuth, proton-pump inhibitor, H2 receptor blockers, warfarin, fluoxetine or steroid for 2 wk prior before doing endoscopy.

2.4. Exclusion criteria

Patients with the history of active gastrointestinal bleeding, chemotherapy, acute cholecystitis, pancreatitis, hematologic disorders, hepatitis, cirrhosis and bile duct surgery were excluded from the study.

2.5. Data collection

Data on age, sex, main complaint, and type and duration of nonsteroidal anti-inflammatory drugs (NSAIDs) use were collected using questionnaires. All biopsies samples from each region were sent for rapid urease test (RUT). The RUT was done using Chem Enzym Co. kit and read within 2 h for all cases. Findings were collected including data from the RUT, endoscopic and clinical outcomes in patients (gastritis, GU, DU, and GC), personal habits such as tobacco smoking, alcohol and opium consumption, obesity, taking medications such as aspirin, warfarin, or NSAIDs and also a family history of stomach cancer.

2.6. Statistical analysis

All statistical analyses were done with Statistic Package of the Social Science software (version 22.0 SPSS, Chicago, Illinois, USA). Results were analyzed using the *Chi*-square test and then variables that were statistically significant entered into the multinomial logistic regression model. A *P* value < 0.05 was considered statistically significant.

3. Results

Out of all collected samples, 175 (54.2%) were positive in RUT. Diagnosis of *H. pylori* infection in patients showed that 60 (44.0%) cases with gastritis, 24 (51.1%) with GU, 46 (54.0%) with DU, and 43 (84.0%) with GC.

Prevalence of *H. pylori* infection was significantly higher in GC patients than those in GU, DU and gastric patients. Male patients had significantly higher incidence of GC and PUD than female patients. Instead of, female participant patients in the study had significantly higher incidence of gastritis than male.

Prevalence of infection and other risk factors in the gastritis, GC, DU, GU were shown in Table 1. Risk factors including *H. pylori* infection, smoking, alcohol and opium intake, NSAIDs

consumption and family history of the stomach cancer were performed using multinomial logistic regression test (Table 2). We have found that GU had significantly associated with alcohol ($P=0.001$, $OR=6.183$), opium ($P=0.022$, $OR=2.823$), smoking ($P=0.016$, $OR=2.579$) and NSAIDs ($P=0.046$, $OR=2.071$). On the other hand, DU had significantly associated with opium ($P=0.023$, $OR=2.326$) and alcohol ($P=0.003$, $OR=3.888$). Moreover, GC had significantly associated with alcohol ($P<0.05$, $OR=6.937$), smoking ($P=0.012$, $OR=2.738$), family history ($P=0.005$, $OR=4.380$) and gender ($P<0.05$, $OR=5.103$).

Table 1

Relationship between risk factors and various gastrointestinal diseases

Parameters	Acute gastrointestinal diseases [n(%)]				P value
	G	GU	DU	GC	
Gender	57 (32.0)	26 (14.0)	52 (29.0)	39 (22.0)	<0.05
<i>H. pylori</i> (+)	62 (35.0)	24 (13.0)	46 (26.0)	43 (24.0)	<0.05
Family history	33 (29.0)	21 (18.0)	31 (27.0)	26 (23.0)	0.001
Smoking	35 (30.0)	19 (16.0)	40 (35.1)	20 (17.0)	0.006
Opium	24 (25.0)	19 (20.0)	33 (35.0)	17 (18.0)	0.001
Alcohol	9 (12.0)	15 (20.0)	24 (33.0)	24 (33.0)	<0.05
NSAID	42 (41.0)	20 (19.0)	27 (26.0)	13 (12.0)	<0.05

G: gastritis. Gender refers to male. Risk factors including *H. pylori* infection, family history of the stomach cancer, smoking, alcohol and opium intake, as well as NSAIDs consumption were performed.

4. Discussion

The study showed a significant association between infection with *H. pylori* as determined by a RUT positive test, and the risk of GC[9]. Following infection with *H. pylori*, several factors such as alcohol intake, smoking, opium addict, NSAIDs consumption, sex, age and family history have an important role in the development of disease outcomes[10,11]. Previous studies have shown that the impact of these factors varied among different populations[6,12]. In 1994, *H. pylori* as a first-degree carcinogen for GC was introduced by the International Agency for Research on cancer[13]. A strong evidence suggests that the risk of stomach cancer increases in populations with high rates of *H. pylori* infection[14]. Schlemper et al[15] showed that the ratio of ulcers that are infected with *H.*

pylori is higher in countries where the organism is more common. *H. pylori* had more effects on ulcer disease in the Japanese patients than in the Dutch population[15]. The risk of GC in smokers is approximately two times more than non-smokers[16]. According to the Parasher et al[17], smokers are more likely to develop ulcers. These findings are in contradiction with the present study. In contrast with our study, the European prospective studies showed that approximately 18% of GC are related to smoking[14,18]. In similar study conducted by González et al[18], there is a strong relationship between smoking and the development of GC.

NSAIDs consumption was associated with a significantly lower risk of gastric non-cardia adenocarcinoma but did not have a significant association with gastric cardia cancer[19]. In our study, there was no significant association between GC and NSAIDs intake. In contrary to the present study, Rosenstock et al[6] showed that alcohol intake might reduce the incidence of peptic ulcers. Brenner et al[20] reported that the rate of *H. pylori* infection may reduce using alcohol consumption. In contrast with the current data, we found that alcohol intake was a risk factor that had significant association with GU, DU and GC[20]. Shakeri et al[21] opium consumption was associated with an increased risk of GC with OR [95% confidence interval (CI)] of 3.1 (1.9-5.1). Instead, in this study a significant association was found between opium abuse with GU ($P=0.022$, $OR=2.823$), and DU ($P=0.023$, $OR=2.326$). In agreement with the Choi et al[22], genetic and/or family history is as an important factor in GC. According to the data of this study, the incidence of GC is gradually raised with increasing age, and between age and GC was observed a significant association. In this study, patients with average age 65.1 years are prone to cancer, so increasing age is a risk factor for cancer. In a study conducted in the United States between 2005 and 2009, about 1% of GC patients were between the ages of 20 and 34, while 29% were 75 to 84 years[23]. In line with Brown et al[24], there is a significant association between male and GC. Differences observed in this study and other studies can be attributed to differences in diet, type of food (raw food), geographical distances, level of hygiene, family health and parental education, gender, genetics, and year of

Table 2

Relationship between risk factors and GU, DU and GC.

Parameters	GU			DU			GC		
	OR	95% CI (lower-upper)	P value	OR	95% CI (lower-upper)	P value	OR	95% CI (lower-upper)	P value
Gender	0.787	0.259-2.387	0.672	0.991	0.410-2.397	0.984	4.380	1.547-12.407	0.005
<i>H. pylori</i>	1.027	0.487-2.166	0.945	1.402	0.762-2.579	0.277	5.103	2.076-12.547	<0.050
Family history	2.579	1.194-5.567	0.016	1.674	0.870-3.221	0.123	2.738	1.244-6.023	0.012
Smoking	1.177	0.410-3.379	0.761	1.633	0.697-3.827	0.259	0.494	0.190-1.287	0.149
Opium	2.823	1.165-6.845	0.022	2.326	1.125-4.808	0.023	1.362	0.557-3.327	0.498
Alcohol	6.183	2.149-17.789	0.001	3.888	1.566-9.653	0.003	6.937	2.511-19.162	<0.050
NSAID	2.071	0.980-4.375	0.046	1.437	0.757-2.726	0.267	1.228	0.527-2.859	0.634

Gender refers to male. Risk factors including *H. pylori* infection, family history of the stomach cancer, smoking, alcohol and opium intake, as well as NSAIDs consumption were performed.

study.

In conclusion, data analysis in this study showed that the *H. pylori* infection, alcohol uptake, male gender, age and family history act as risk factors that had an additive impact on the incidence of GC, also the risk factors of alcohol and opium intake for DU. Alcohol and opium uptake, NSAIDs consumption and family history have an important role for GU in our study.

Conflict of interest statement

The authors declare that there is no conflict of interest.

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Authors contributions

Conceived and designed the experiments (supervisor): Dr. Ramazan Rajabnia. Performed the experiments: Maryam Salehi. Clinical advisor: Dr. Javad Shokri Shirvani, Analyzed the data: Dr. Elaheh Ferdosi-Shahandashti and Dr. Farzin Sadeghi. Statistical analysis and Sample size calculation: Dr. Soraya Khafri and Wrote the paper: Dr. Elaheh Ferdosi-Shahandashti.

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