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Helicobacter pylori Seroprevalence in Patients with Bronchiectasis

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ABSTRACT

Background: *This study assessed Helicobacter pylori (HP) seroprevalence in bronchiectatic patients and determined whether there is a potential association between bronchiectasis and H.pylori infection or not.*

Materials and Methods: *This study was conducted on forty consecutive patients (26 men, 14 women; mean age 48.90±16.67 years, range 21-86 years) with bronchiectasis diagnosed by clinical symptoms and high resolution CT-scan. Helicobacter pylori IgG serum levels were measured in serum by enzyme-linked immunosorbent assay. Forty healthy subjects (25 men, 15 women; mean age 55.50±11.91 years, range 16-77 years) were selected as controls with no history of cerebrovascular, ischemic heart or respiratory diseases. Control subjects were matched for age, gender and socioeconomic status.*

Results: *Significant differences were observed in the seroprevalence of H.pylori between the two groups, who had similar age, gender distribution and socioeconomic status (76.0% vs. 54.4 %, p=0.001). Similarly, H.pylori IgG levels were significantly higher in bronchiectatic patients than in control subjects attended the hospital with non-respiratory conditions (1.43± 0.55 and 1.07±0.44 U/ml, respectively; p<0.05).*

Conclusion: *The association between Hp infection and bronchiectasis was confirmed in this study. Additional studies with larger numbers of patients and randomized control studies should be undertaken to assess the relationship and impact of the H.pylori eradication on bronchiectasis.* ***(Tanaffos 2006; 5(3): 25-29)***

Key words: *Helicobacter pylori, Bronchiectasis, Seroprevalence*

INTRODUCTION

Helicobacter pylori (HP) is a gram-negative, oxidase positive, microaerophilic, flagellate, curved or spiral bacterium that colonizes the mucous layer of the human gastric epithelium (1,2).

It is the most popular pathogenic bacterium in the world. Approximately, half of the population has *H.pylori* infection worldwide, and the prevalence is thought to be 80 - 90% in developing countries and 30 - 50% in developed countries (3). The organism is now accepted as the etiological agent for type B gastritis and the majority of duodenal and gastric ulcers, and is linked to the development of gastric

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cancer (4, 5). Moreover, an association between *H.pylori* infection and several extra gastroduodenal pathologies, including cardiovascular, skin, rheumatic, and liver diseases has been established recently (6,7). *Helicobacter pylori* induces an inflammatory response, and chemokines in particular interleukin 8 (IL-8), which attracts and activates the polymorphs and macrophages. Furthermore, *H.pylori* increases the permeability of the mucosa (8). Bronchiectasis is an irreversible focal bronchial dilation usually resulting from direct bronchial wall destruction due to infection, inhalation of noxious chemicals or immunologic reactions. Bacterial endotoxins and proteases, proteases derived from circulating or pulmonary inflammatory cells, superoxide radicals, and cytokines like interleukin-1β, IL-8, and tumor necrosis factor-alpha (TNF-α) may mediate bronchial wall damage (9). Based on these facts coupled with recent findings of *H.pylori* in tracheobronchial aspirates in mechanically ventilated patients and in nasal or maxillary sinus specimens from patients with chronic sinusitis (10), it is hypothesized the *H.pylori* infection might have a pathogenic role in chronic inflammatory and infective airway disease including chronic bronchitis and bronchiectasis.

As far as we know, few studies have assessed this issue. Tsang et al. showed that *H.pylori* seropositivity in patients with bronchiectasis was significantly higher than that in the controls (76 % vs. 54.3 %, respectively, p=0.001). Further analysis in studied patients revealed an association between *H.pylori* IgG concentration and 24-hours sputum volume (*P*=0.03) (11). In contrast to this finding, Ilvan et al. and Angrill et al. found no differences in *H.pylori* seropositivity between bronchiectatic patients and the general population in different studies respectively (12,13). Moreover, no evidence of *H.pylori* was obtained in the bronchial samples of patients with bronchiectasis in this study (13). Because of the conflicting results that have been reported, we performed this study to investigate *H.pylori* seroprevalence in patients with bronchiectasis and control subjects and its potential association.

MATERIALS AND METHODS

Subjects

After approval by the local ethics committee, and obtaining written informed consent, 40 patients with bronchiectasis (26 men, 14 women) with a mean age of 48.90 years (ranging 21–86) were selected from the admitted patients with bronchiectatic exacerbations. Before starting any medications, the diagnosis of bronchiectasis was established by clinical symptoms and high resolution CT scan. None of them had active tuberculosis. All patients provided a 5 ml venous blood sample and the serum was sent to the same laboratory to be analyzed (Chizar Lab, Tehran). Venous blood was also collected from 40 normal healthy subjects (32 men, 8 women, mean age 55.50±11.91 years, range 16-77 years) selected randomly among the patient's family members. None of these control subjects had a history of cerebrovascular, ischemic heart or respiratory diseases. Control subjects were matched for age, gender, and socioeconomic status.

Measurements

Anti *H.pylori* IgG was measured in serum samples from patients and controls by enzyme-linked immunosorbent assay (Trinity kit, Biotech Co, USA) according to the manufacturer's instruction. The result for each serum sample was expressed as the ratio of the optical density value of the sample to the threshold value and was expressed in ELISA units. Serum samples with ELISA units of greater than 1.10 U/ml, between 0.90-1.10 and less than 0.90 were considered positive, borderline and negative, respectively. Borderline results were omitted from

further analysis. Previous studies had validated sensitivity and specificity of this test in adults against a gold standard of culture and histological assessment (86% sensitivity, 96% specificity) (14). Information on level of education, number of persons living in the same household, smoking history, gastrointestinal symptoms (epigastric pain, heartburn and bloating), history of cardiovascular disease and proven peptic ulcer, and other respiratory diseases were obtained via a questionnaire administered by the interviewer.

Table 1. Comparison of characteristics of the study patients and controls.

	Cases	Controls	Cases vs. Controls
	(n=40)	(n=40)	P-Value
Sex(M/F)	26/14	25/15	NS
Age(years)			
Mean	48.90	43.08	NS
SD	16.67	12.60	
H.pylori IgG level (U/ml)			
Mean	1.43	1.07	0.003
SD	0.55	0.44	
H.pylori IgG seropositivity (%)	75%	51.5%	0.65

NS= Not Significant
SD= Standard Deviation

Statistical analysis

All data were expressed as mean ± standard deviation. The analyses were preformed in via SPSS software. All reported p-values were two-tailed. The results of the tests would be expected to be significant at the 0.05 level by chance. Parameter differences between groups were evaluated using the student's *t*-test for continuous variables and a Chi-square test for proportions.

RESULTS

From March 2003 to December 2003, 40 consecutive patients with bronchiectasis were included in this study. Patients consisted of 26 men and 14 women with a mean age of 48.90 years (SD=16.67). The control group consisted of 25 men and 15 women with a mean age of 43.08 (SD=12.60). There were no significant differences between the two groups in terms of distribution of age, gender, socioeconomic status, educational level and number of persons living in the same household ($p<0.05$).

The etiologies of bronchiectasis were: 34 idiopathic, 2 post-tuberculosis, 2 inhalation of noxious chemicals, 1 cystic fibrosis, and 1 primary ciliar dyskinesia.

H.pylori IgG levels were significantly higher in bronchiectatic patients than in controls ($p<0.05$). The values in case and controls groups were 1.43± 0.55 and 1.07±0.44 U/ml, respectively. *H.pylori* seropositivity was also significantly higher in bronchiectatic patients than in controls. *H.pylori* seropositivity was present in 75% of the patients with bronchiectasis in comparison to 51.5% in healthy control subjects. There were no significant differences between patients and controls in terms of gastrointestinal symptoms (Table 2).

Table 2. Frequency of gastrointestinal symptoms in patients and normal controls

Symptoms	Patients(No.)	Controls(No.)	Cases vs. Controls
Epigastric pain	13	10	NS
Heartburn	5	9	NS
Bloating	16	8	NS

NS= Not Significant

DISCUSSION

Significant differences were observed in *H.pylori* seroprevalence between the two groups, who had similar age, gender distribution and socioeconomic

status. Similarly, *H.pylori* IgG levels were significantly higher in bronchiectatic patients than in control subjects with non-respiratory conditions.

Our results were in accordance with those of Tsang and associates (11), as we also found that *H.pylori* seropositivity in patients was significantly higher than that in controls (76.0 % *vs*. 54.4 %, p=0.001). The results of our study do not support the findings of Angrill et al. which reported no differences of *H.pylori* seropositivity between bronchiectatic patients and the general population (13).

To reduce the influence of confounding factors, we selected the controls so that they were similar to the cases in age, sex and socioeconomic status. Pulmonary tuberculosis is a common cause of bronchiectasis. Data in the literature on the relationship between *H.pylori* infection and pulmonary TB are controversial (15). However, patients with active tuberculosis were excluded from our study in order to omit the potential impact of tuberculosis on both bronchiectasis and *H.pylori*. We did not match patients and control subjects for smoking habits and it should be regarded as a potential limitation of the study.

The mechanisms by which *H.pylori* causes mucosal injury are not entirely clear, but several theories have been proposed. Urease produced by the organism catalyzes urea to ammonia, which erodes the mucous barrier, leading to epithelial damage. Cytotoxins produced by *H.pylori* have also been implicated in host epithelial damage. Lastly, cytokines produced in response to inflammation may play a role in mucosal damage and subsequent ulcerogenesis (16, 17). Similar pathogenetic mechanisms lead to mucosal and epithelial damage in bronchiectasis.

In conclusion, the possible association between *H.pylori* and bronchiectasis, if confirmed by additional studies with larger numbers of patients and randomized control studies, may have important clinical and therapeutic implications.

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