Original paper

The Relationship between Helicobacter Pylori Seropositivity and Myocardial Infarction

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Abstract

Background: There is a controversial result about the association of *H.Pylori* infection and ischemic heart disease. The study was design to study the relation in our locality.
Aim of the study: To study the relationship between Helicobacter pylori infection and myocardial infarction.
Patients & methods: Patients that were included in this study, were patients with acute myocardial infarction (S-T segment elevation) that were admitted to coronary care unit of Baghdad Teaching hospital and Al-Hussein hospital in Karbala city between June, 2004 to August 2004, with less than 48 hours of onset of their symptoms.
Patients were evaluated regarding cardiovascular risk factors; smoking, hypertension, diabetes mellitus, body mass index (BMI), hypercholesterolemia, low high-density lipoprotein (HDL) and family history (10-15).
Control groups were included in the studies that were age and sex matched
Fifty patients diagnosed
with myocardial infarction that were admitted to the coronary care unit in Baghdad teaching hospital and Al-Hussein Hospital in Karballa city were tested for anti *H.Pylori* antibody using ELISA and compared with 51 control persons without coronary heart disease.
Results: 72 % of the patients 78.4% of the controls were seropositive for *H.Pylori* without significant difference.
Conclusion: No significant relation exists between seropositivity against *H.Pylori* and acute myocardial infarction.
Keywords: Helicopacter pylori, Myocardial infarction, seropositivity.

Introduction

In recent years, atherosclerosis has come to be recognized as an active inflammatory, rather than simply as passive process of lipid infiltration [(1)]. Inflammation occurs in response to vascular oxidation stress and injury through known and unknown stimuli. Inflammatory triggers undoubtedly include oxidized and glycosylated products (e.g. modified lipoprotein). Given their association with inflammation, infectious agents also are being explored as potential stimulants of vascular inflammation and promoter of atherosclerosis [(2)].The role of infection in human atherosclerosis remain elusive, the ability of infectious agent to induce several (if not all) of the inflammatory mechanisms active in atherosclerosis has been demonstrated experimentally. Several direct and indirect cellular and molecular mechanisms by which vascular and selected extra vascular infection may promote atherosclerosis are listed in table (1). In response to pathogens; pathogens induced products (e.g. reactive oxygen species, oxidized low density lipoprotein) or cross reacting, autologus molecules, local and systemic

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(circulating) inflammatory mediators are induced including chemokines, cytokines and adhesive molecules, inflammatory cells are recruited and proliferate (monocyte/ macrophages, T-cells and smooth muscles cells) and proinflammatory, prothrmbotic and matrix degrading molecules are expressed. Endothelial dysfunction ensues, lipid accumulations are promoted and plaque growth, and subsequently destabilization and thrombosis occurs .Potential athrogenic mechanisms have been studied for *Chlamydia pneumonia, cytomegalovirus* and *H.Pylori*. Animals models provide further experimental support for potential role of infection in atherosclerosis .Indeed association of Mark's disease; herpes virus and atherosclerosis in chickens was made more than half century ago, providing a first "proof-of-principle" for the infection theory of atherosclerosis[(2)] .

H.Pylori is a microaerophilic spiral shape gram-negative bacteria that colonize the gastric lumen of human and other primates [(3)]. Infection is community acquired in childhood and is usually chronic infection [(4)]. *H.Pylori* is distributed worldwide. The prevalence of *H.Pylori* in developing world is about 80%, it tends to be higher in those aged 60 years and more, while in developed countries is range between 40-60% in those aged 60 years and 20% in those aged 30 years and less [(5)]. In Iraq, its prevalence had ranged between 42.9% and 67 % depending on the method that were used. [(6)]

The organism is recognizing to be of major etiological factors in peptic ulcer disease and gastric cancer [(7)]. In one, study *H.Pylori* DNA was found in 20 of 38 carotid plaques and morphological and immunohistochemical evidence of *H.Pylori* infection in half of DNA positive plaques [(8)].

Many epidemiological studies have studied the role of *infection with H.Pylori* with *the* etiology of coronary artery disease. These studies have ranged from those showing a strong positive association to no significant association. [(3, 8, 10)]

The prevalence of infection and cardiovascular disease are variable from locality to another. This study is conducted to see if there is any relation between *H.Pylori* and coronary heart disease in our country.

Patients & Methods

Patients that were included in this study, were patients with acute myocardial infarction (S-T segment elevation) that were admitted to coronary care unit of Baghdad Teaching hospital and Al-Hussein hospital in Karbala city between June, 2004 to August 2004, with less than 48 hours of onset of their symptoms.

Patients were evaluated regarding cardiovascular risk factors; smoking, hypertension, diabetes mellitus, body mass index (BMI), hypercholesterolemia, low high-density lipoprotein (HDL) and family history (10-15).

Control groups were included in the studies that were age and sex matched. Exclusion criteria for control group include-

1- History of self-reported physician diagnosed atherosclerotic vascular related disease.
2- Upper gastrointestinal bleeding.
3- Peptic ulceration.
4- Acute infection, febrile illness within previous three weeks.
5- Malignancy.

Patients in this study were also negative for peptic ulceration, upper gastrointestinal bleeding or stroke [(9)].

Venous samples were tested for the H.Pylori infection. Serum IgG antibody against *H.Pylori* were measured using enzyme linked immunosorbant assay (ELISA) kits (Platelia® *H.Pylori*, Bio-Red, France) in Medical City Teaching Lab.

Values more than 1.1 represent positive tests; ≤0.9 are negative; 0.9-1.1 are intermediate result.

Statistical Analysis

All data were tabulated and arranged in numbers (№), percentage; mean ± standard deviation (SD). Difference between variable were measured using statistical package of social science (SPSS), using chi-square and T-test.

P<0.05 consider as level of significance.

Results

A total of 50 patients with acute myocardial infarction and 51 persons age and sex matched control were included in this study. The mean age group of the patients was 56.7 ± 9.3 years, whereas the mean age group of the controls was 54.8 ± 9. Table 1:- Shows the gender of patients and controls groups.

Table **2**, Shows seropositivity of *H.Pylori* among patients and controls groups. There was no significant difference between the two groups (72%, 78.4% seropositivity of H. pylori in patient & control group respectively)

Table **3** Shows the relation between seropositivity for *H.Pylori* and sex. There was no significant difference between the two groups (80.6% vs 84.8% positive for H. pylori in patients and control group).

Table 1. gender of patients and control groups

Gender	Patients No.& percentage	*Control No.& percentage*
Male	**36(72.0%)**	***33(64.7%)***
Female	**14(28.0%)**	***18(35.3%)***
Total	***50***	***51***

Table 2. Seropositivity of *H.Pylori* of studied groups

Anti *H.Pylori* IgG	Patient No.& percentage	*Control No.& percentage*
Positive	36 72%	*40* *78.4%*
Negative	14 28%	*11* *21.6%*
Total	*50*	*51*

P value =NS (not significant)

Table 3. Seropositivity of *H.Pylori* in the patients and controls according to the Gender.

Group		Anti *H.Pylori* IgG		***Total***
		Positive	Negative	
Patient	**Male**	29 80.6%	7 19.4%	*36*
	Female	7 50.0%	7 50.0%	*14*
	Total	36 72.0%	14 28.0%	*50*
Control	**Male**	28 84.8%	5 15.2%	*33*
	Female	12 66.7%	6 33.3%	*18*
	Total	*40* *78.4%*	*11* *21.6%*	*51*

P value =NS

Table **4** shows the relation between seropositivity for *H.Pylori* and family history of coronary heart disease. There was no significant difference between the two groups (11.2%, 21.4% relation of seropositivity of H. pylori infection and positive history of CAD)

Table 4. Seropositivity of *H.Pylori* and family History of coronary heart disease (CHD).

Family history of CHD	***Anti H.Pylori IgG***	
	Positive	***Negative***
Positive	4 11.2%	*3* *21.4%*
Negative	32 88.9%	*11* *78.6%*
Total	*36*	*14*

Table 5 shows the relation between seropositivity for H.Pylori and hypertension. There was no significant difference (27.8%, 42.9% the association of hypertension with anti H. pylori positive seropositivity & negative seropositivity respectively)

Table 5. Seropositivity of *H.Pylori* and hypertension groups

Hypertension	***Anti H.Pylori IgG***	
	Positive	***Negative***
Positive	**10** **27.8%**	***6*** ***42.9%***
Negative	**26** **72.2%**	***8*** ***57.1%***
Total	***36***	***14***

Table **6** shows the relation between seropositivity for *H.Pylori* and body mass

index (BMI) ≥30 kg/m². There was no significant difference between the two **groups (38.8% vs 35.7% seropositivity for H. pylori in patients with (BMI) ≥30)**

Table 6. Seropositivity of *H.Pylori* and body mass index (BMI) ≥30

BMI≥30	*Anti H.Pylori IgG*	
	Positive	*Negative*
Positive	14 38.8%	*5* *35.7%*
Negative	22 61.1%	*9* *64.3%*
Total	*36*	*14*

P value =NS

Table **7** shows the relation between seropositivity for *H.Pylori* and diabetes mellitus. There was no significant difference between the two groups **(38.9%, 50% positive for H. pylori)**

Table 7. Seropositivity of *H.Pylori* and diabetes mellitus

Diabetes mellitus	***Anti H.Pylori IgG***	
	Positive	***Negative***
Positive	**14** **38.9%**	***7*** ***50%***
Negative	**22** **61.1**	***7*** ***50%***
Total	***36***	***14***

P value =NS

Table **8** shows the relation between seropositivity for *H.Pylori* and smoking. There was no significant difference between the two groups **(38.9%, 42.8 for smokers, 61.1%, 57.1% for nonsmokers).**

Table 8. Seropositivity of *H.Pylori* and smoking.

Smoking	*Anti H.Pylori IgG*	
	Positive	*Negative*
Positive	14 38.9%	*6* *42.8%*
Negative	22 61.1%	*8* *57.1%*
Total	*36*	*14*

P value =NS

Table **9** shows the relation between seropositivity for *H.Pylori* and hypercholesterolemia. There was no significant difference between the two groups **(25.0%, 42.8% for positive hypercholesteremia vs 75%, 57.1% for negative hyperchesteremia respectively)**

Table 9. Seropositivity of *H.Pylori* and hypercholesterolemia

HYPERCHOL-ESTEROLEMIA	*ANTI H.PYLORI*	
	Positive	*Negative*
Positive	9 25.0%	*6* *42.8%*
Negative	27 75.0%	*8* *57.1%*
Total	*36*	*14*

P value =NS

Table **10** shows the relation between seropositivity for *H.Pylori* and low level of high-density lipoprotein (HDL). There was no significant difference between the two groups (19.4%, 21.4% for high LDL vs 80.6%, 78.6% for normal LDL respectively)

Table 10. Seropositivity of *H.Pylori* and low level of high-density lipoprotein (HDL).

LOW (HDL)	***ANTI H.PYLORI***	
	Positive	***Negative***
Positive	**7** **19.4%**	***3*** ***21.4%***
Negative	**29** **80.6%**	***11*** ***78.6%***
Total	***36***	***14***

P value =NS

Discussion

Since the appearance of the suggestion that a relation may co-exit between previous infections with *H.Pylori* and ischemic heart disease, many papers have addressed the subject; but with controversial results [10, 17, 18, 21, 22, 23].

A Meta analysis published in 1998 had found no relation between *H.Pylori* and ischemic heart disease [22] but; papers had continued to appear also with conflicting result. The subject was approached from different aspects. Some authors had suggested that the difference may be related to existence of different strains in different localities and a virulent strains that bearing cytotoxin associated gene A (cag A) may be more causally related to ischemic heart disease; but controversy

also remained, some studies found positive relation [3, 8, 9] while others found no relation [19, 20].

Age was suggested as another explanation for discordant findings; in one study positive relation was found between *H.Pylori* and ischemic heart disease at a young age group (30-49 years)[17], while another study had not confirmed that [20].

It seems that difference in the design of the study had gave different results and as was suggested by a group of authors that studies in which controls were recruited opportunistically (e.g. hospital inpatient without heart disease) reported strong association, studies that try to reduce the effect of selection bias by adjusting for potential confounders and by sampling controls from the same populations as their cases (population control) tend to report weaker association [24]. The currant study had failed to show any association between seropositivity against *H.Pylori* and acute myocardial infarction, a finding that can find support among many papers with negative result [10, 18, 21, 22]. The subject will continue attracting the attention of physician looking for possible treatable causes for ischemic heart disease. Different design of studies were approaching the subject from different aspects ends with controversy about the relation of *H.Pylori* and myocardial infarction.

Also, Elizalde shows that circulating platelet aggregates and activated platelets were also detected in H. Pylori infected patients (Elizalde et al., 2010). Also It seems that CHD is one of the extra gastrointestinal diseases and some studies showed its association with H. Pylori infection (Jin et al., 2007; Danesh et al., 1999). The role of inflammatory mechanism in the pathogenesis and progression of coronary artery disease has been increasingly conducted but still remains to be elucidated.

Epidemiological studies based on serological findings have suggested an association between chronic H. Pylori infection and atherosclerosis, although controversies exist. In Izadi et al.'s study on 105 patients under CABG, PCR test result was positive Helicobacter species for 31 (29.5%) specimens from coronary artery disease plaque.

Conclusion: There were no significant relation exists between seropositivity against *H.Pylori* and acute myocardial infarction

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