Is helicobacter pylori infection a risk factor for coronary heart disease?

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Abstract

BACKGROUND: There is still controversy about association of Helicobacter pylori (H. pylori) infection with coronary heart disease (CHD). This study designed to evaluate this association in a sample of Iranians Population.

METHODS: Medical and drug history as well as fasting blood samples of 112 consecutive patients who were candidate for coronary angiography were taken on catheterization day. Fasting blood samples were used to measure C-reactive protein (CRP), anti H. pylori immunoglobulin G (anti H. pylori IgG) and interlukine-6 (IL6). According to angiography reports, participants were divided into patients with (n = 62) or without CHD (n = 43). To compare the association between H. pylori infection with CHD, multivariate logistic regression tests were used by adjusting sex and age, age and sex plus history of diabetes mellitus (DM), Dyslipidemia (DLP), and/or hypertension (HTN), CRP status and IL-6 level.

RESULTS: Sixty two patients with CHD and 43 participants without CHD were enrolled in the present study. The mean ages of patients with and without CHD were 62.4 ± 9.5 and 59.0 ± 10.5 years respectively. Multivariate logistic regression analysis after adjusting for history of DM and/or DLP and/or HTN plus CRP status and IL-6 level showed significant association of H. pylori infection with CHD (OR 3.18, 95%CI 1.08-9.40).

CONCLUSION: H. pylori infection is one of the probable risk factors for CHD independent of history of DM, DLP, HTN, CRP status and IL-6 level.

Keywords: Helicobacter Pylori, Coronary Heart Disease, Angiography.

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Introduction

Researchers have focused on coronary atherosclerosis as a major cause of death[1] and have found that atherosclerosis process is multi-factorial and have introduced traditional cardiovascular risk factors such as diabetes mellitus (DM), hypertension (HTN), smoking, and obesity as the underlying causes,[2] but substantial proportions of patients with coronary heart disease (CHD) do not have these traditional risks.[3] Hence, the other factors which may affect this chronic process were evaluated and chronic inflammation was one of the novel CHD risk factors Chlamydia pneumonia with CHD was mentioned and which have been introduced.[4,5] Recently, the associations of some kinds of infections like inflammation was introduced as one of the probable cause for this association.[6]

Helicobacter pylori (H. pylori) infection is the most common infection worldwide, especially in developing countries.[7] Several studies have shown that this bacterium involved in pathogenesis of some extra gastrointestinal disorders like Reynaud phenomena and migraine.[8,9] Knowing the inflammation as a cardiovascular risk factor in the one hand and H. Pylori involvement in extra digestive disorders on the other hand made researchers to evaluate H. pylori role in atherosclerosis processes.

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Table 1. Basic characteristics of the study population

	CHD Positive N = 62	CHD Negative N = 43	P
Age (mean ± SD)	62.4 ± 9.5	59.05 ± 10.5	0.12
Sex (female)	20 (32.3%)	17 (39.5%)	0.40
Diabetes Mellitus	22 (35.5%)	4 (9.3%)	0.00
Dyslipidemia	31 (50.0%)	13 (30.2%)	0.02
Hypertension	26 (41.9%)	14 (32.6%)	0.16
CRP (positive)	10 (16.1%)	5(11.6%)	0.20
IL-6 ≥14	10 (16.1%)	3(7%)	0.16
H. pylori positive	30 (48.38%)	16 (37.20%)	0.06

CRP: C-reactive protein, IL-6: interlukine-6, H. pylori: Helicobacter pylori

Some studies have shown the association of H. pylori infection with CHD[10,11] while others could not documented its role in atherosclerosis processes.[12,13] According to theses controversial findings, the objectives of the present study were to examine the possible association of the H. pylori infection with CHD in a sample of Iranian population.

Materials and Methods

Study Population: This cross-sectional study was performed in Isfahan Chamran Heart Hospital from September 2010 to April 2011. One hundred and twelve consecutive patients who were candidate for coronary angiography and signed an informed consent were selected. Before catheterization, all subjected completed a semi structured questionnaire regarding their past medical and drug history. Accordingly, patients with infectious disease within 2 weeks prior to the catheterization, heart failure, hepatic dysfunction, autoimmune disease, thyroid dysfunction and/or adrenal dysfunction as well as patients who consumed any kinds of glucocorticoids were excluded. This Study was approved by the Ethical Committee of Najafabad Branch, Islamic Azad University.

Biochemical Measurements: On the morning of catheterization participants' fasting blood sample were taken to measure C-reactive protein (CRP), anti H. pylori immunoglobulin G (anti H. pylori IgG) and interlukine-6 (IL6). Eliza method was used to measure the level of IL-6 and anti H. pylori IgG. Qualitative measurement via latex immunoassay method was used for detecting CRP status. IL-6 ≥ 4.1 considered as high Level.

Coronary Angiography: Coronary angiography was carried out by left-heart catheterization and arteriography using Judkins method,[14] then two cardiologists separately reviewed the angiography films and if they were agreed on the stenosis ≥ 75% of any of coronary arteries, the patient was considered as CHD-positive. According to angiography reports, patients were divided into two groups, patients with (n = 62) or without CHD (n = 43).

Data analyses: Statistical analyses were carried out using SPSS software (version 16.0, Chicago, IL, USA). Unpaired student t-tests were used for comparing continuous variable. Chi-square test for discrete variables was used. To compare the association of H. pylori infection with CHD, logistic regression tests were used by adjusting sex and age, sex and age plus history of DM, dyslipidemia (DLP), and/or HTN, in two separate steps, and finally third step of adjusting was done by adjusting sex and age plus history of DM, DLP and/or HTN, plus IL-6 level and CRP status.

Results

In present study 112 patients who were candidate for coronary angiography were enrolled but 105 of the participants met the criteria of the study. Patients with ≥ 75% coronary stenosis were considered as CHD positive group (n = 62), and 43 participants with < 75% coronary stenosis considered as CHD negative group. Anti H. pylori IgG was positive in 30 subjects with CHD and 16 participants without CHD (P = 0.06). Basic characteristics of two study groups were presented in table 1. Patients with history of diabetes mellitus and dyslipidemia were significantly higher in CHD group (P < 0.001 and P = 0.02, respectively), but the CRP status and IL-6 level were not significantly different between the two groups.

The association of H. pylori infection with CHD was presented in table 2. Multivariate logistic regression analysis after adjusting for other factors showed its significant association with CHD (OR 3.18, 95%CI 1.08-9.40).

Table 2. The association of H. pylori infection with Coronary heart disease

	P	OR (95% CI)
Unadjusted model	0.13	1.82 (0.82-4.00)
Adjusted model 1*	0.37	1.45 (0.63-3.35)
Adjusted model 2†	0.06	2.55 (0.92-7.04)
Adjusted model 3**	0.036	3.18 (1.08-9.40)

* Adjusted for age and sex; † Adjusted for age and sex plus history of DM and/or HTN and/or DLP; ** Adjusted for age and sex plus history of DM and/or HTN and/or DLP plus CRP status and IL-6 level

Discussion

Present findings showed patients with H. pylori

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infection are about 3 times more at risk of CHD independent to history of DM, DLP, HTN, CRP status and IL-6 level. Our findings were in accordance with few studies which evaluated the H. pylori association with CHD and acute myocardial infarction, but the chance which was suggested for this infection role in present study was higher compared to other studies.[10,15,16]

In the new decade, many study evaluated the role of H. pylori infection in extra-digestive disorders and the results was surprising. For examples, one study showed that H. pylori infection decrease the blood pressure value in patients who suffer from hypertension.[17] In addition, a few studies have demonstrated the association of some kinds of DLP and H. pylori infection.[18,19] In a case control study, relationship of H. pylori infection with insulin resistance was suggested.[20] On the other hand, it was documented that this gram negative bacterium induces the higher levels of some inflammatory biomarkers like CRP and IL-6.[21,22]

Accordingly, H. pylori association with some cardiovascular risk factors has been suggested and also it was shown that this bacterium induces some inflammatory cytokines. In the present study, the role of these risk factors and cytokines were adjusted, therefore, the remained higher chance may be due this adjusting and reveal the independent role of H. pylori infection in atherosclerosis process.

One study in a Korean population by Lee et al.[12] suggested that H. pylori infection is not an independent risk factor for CHD. In their study, method of data adjusting were different from our study and prothrombin time, activated partial thrombin time, CRP, and fibrinogen were used for adjusting. Also, an upper gastrointestinal endoscopy for diagnosis of H. pylori infection was used, so these differences in methods of two studies probably justifies these different findings.

Mechanisms which were suggested as responsible for the possible association of H. pylori infection and CHD are as follows:[17,20,23] Firstly, damaging influence of H. pylori and its products like cytokines, cytotoxins on coronary endothelium; secondly, activation of immune mechanisms by this bacteria which react with the nuclei of monocytes in atherosclerotic vessel wall and cytoplasm of fibroblast-like cell in atherosclerosis plaques; thirdly, H. pylori induces releasing of nitric oxide by vascular endothelium interferes with fibrinogen level which cause the reduction of the normal capacity of muscular relaxation and lead to vasoconstriction and adverse hemodynamic balance; finally, this infection elevates thromboxane which is measured as TXB that results in platelets activation.

Adjusting data for history of DM, DLR, HTN, CRP status and IL-6 level should be considered as a strength of this study while, cross-sectional design of study and absence of the other not measured confounders in adjusting data should be regarded as its limitations. Further studies are needed to evaluate the causal relationship between H. pylori infection eradication and CHD. It would be very important because screening and treatment of this infection by specific antibiotics could be easily done, if we hypothesize H. pylori infection eradication as an adjunctive measure for decreasing CHD.

In conclusion, since atherosclerosis process is multi factorial, H. pylori infection probably is one of the risk factors independent of DM, DLP, HTN, CRP status and IL-6 level.

Conflict of Interests

Authors have no conflict of interests.

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