Risk of Cardio Vascular Disease in Subjects with Helicobacter pylori Infection

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Abstract— An attempt was made to detect the presence of IgA, IgG and IgM antibodies to *H.pylori* by ELISA techniques in 180 subjects (90 men and 90 women) selected at random from a coastal village of Kerala. IgM antibodies against H. pylori were not detected in any of the samples indicating that non of the patients was having any recent infection. More than 30% of the subjects were positive either to IgA or IgG antibody to *H.pylori* of which more than 11% were positive for both IgA and IgG antibodies. There is a slight female predominance especially in the case of IgA antibodies. H. pylori patients with CVD and without CVD from the above group and equal number of healthy age and sex matched controls were evaluated for lipid profile. High sensitive CRP were statistically higher in H.pylori subjects than the controls. The lipid profiles of H.pylori patients with and without CVD were statically different from that of the controls. It was concluded that H.pylori contribute to the pathogenesis and progression of CVD and hence the treatment for H.pylori should be initiated in all patients who are positive to H.pylori so that the progression to CVD can be prevented

Index Terms— H. Pylori – Helicobacter pylori; CVD- Cardiovascular disease; AST- Aspartate amino transferase, hsCRP- High sensitive C-reactive protein. HDL-C- High Density Lipoprotein Cholesterol; LDL-C- Low density lipoprotein cholesterol.

1 INTRODUCTION

The principal cause of death in the world is cardiovascular diseases (CVD) the majority of which are coronary heart disease or cerebro-vascular disease with a pathogenic mechanism of atherothrombosis (1). It is estimated that 80% of all CVD mortality now occurs in developing countries(2). H.pylori is harbored in the pyloric region (antrum) of the human stomach and persists life-long, thus creating a state of chronic inflammation, especially a low-grade one. It is a gram-negative bacterium which is capable of invoking systemic host inflammatory responses including elevations in acute phase proteins, fibrinogen and C-reactive protein (CRP) and pro-inflammatory cytokines which are known to be associated with an increased risk of cardiovascular events (3). The patho-physiology, especially the extend of somatic DNA damages, if any, in subjects infected with H. pylori is not well understood. The possibility that an undetected chronic infection may be behind these changes in inflammatory markers, and has led to the spotlight falling on microorganisms, which is known to be commonly detectable in asymptomatic individuals. Seroepidemiologic studies have demonstrated that atherosclerosis is associated with several infectious pathogens, including cytomegalovirus(4) H. pylori(5) and C. pneumonia(6). Epidemiological studies have suggested an association between atherosclerosis and chronic Helicobacter pylori (H. pylori) infection. The association of H. pylori to atherosclerosis, particularly to CVD, is based on serological findings (7). The present study was undertaken to estimate the prevalence of H.pylori infection in a costal village of Kerala and to assess the immunological and biochemical alteration associated with infection which pre disposes an individual to cardiovascular diseases.

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2. Materials and Methods

One hundred and eighty healthy adult subjects in the age group of 21- 60 years from a coastal village of Kerala was selected at random for this study. There were equal number of men and women. None of them had any acute or chronic illness and were not suffering from auto immune diseases. Blood samples were collected from all the subjects after getting their informed consent, serum separated and transported to the laboratory in ice bags. IgA, IgG and IgM antibodies to *H.pylori* were detected by Enzyme Linked Immunosorbent Assay (ELISA). The blood glucose , total cholesterol, serum triglyceride (TG), high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c) and hs CRP were measured. The reagents were purchased from M/S Siemens Healthcare Diagnostic Inc, Newark, DE19714, USA and the analysis were carried out in fully automated analyzer, Dade Behring Dimension X pand Plus. Quality control is done with BIO-RAD Lypocheck Assayed Chemistry Control Level 1 and 2 of Bio-Rad Laboratories, Irvine CA UNITED STATES

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3 Results

The prevalence of H. pylori IgG, IgA and IgM are given in table 1. The lipid profile of all the test and control subjects are given in table 2. In this study we could not detect IgM anti bodies to *H.pylori* in any of the subjects but IgG and/or IgA antibodies were detected in more than 30% of subjects which is much lower than any of the previous reports from developing countries.

Dyslipedimia was observed among H.pylori infected subjects with or with out CVD. Lipid profile estimation showed a statistically significant difference between the study subjects with H.pylori infection and the control subjects. H.pylori infect-

ed subjects with or without CVD showed an elevated level of total cholesterol, LDL cholesterol and Triglyceride. The elevation in these parameters was slightly higher in the test subject with CVD than without CVD. H.pylori infected subjects with CVD showed a significant decrease in HDL cholesterol than that of the controls but the decrease in HDL cholesterol in H.pylori patient without CVD was lower but the difference was not significant. High sensitive CRP were statistically higher in H.pylori subjects than the controls. This study indicate that H.pylori infection can cause dislipidemia and elevation in hs CRP which may predispose an individual to CVD.

4 Discussion

Ellis, (1997) reported that the Infection by *H. pylori* induces an elevation of cholesterol and triglyceride levels with a decrease in HDL cholesterol.HDL cholesterol where reported to be lower in those patients. This may be a contributing factor for CVD. The present study is well in agreement with the previous study as we observed a statistically significant increase in Total cholesterol, triglyceride and LDL cholesterol levels in H.pylori infected subjects. Moreover the level of HDL cholesterol was significantly reduced among subjects with H.pylori infected CVD subjects.

Infection induced inflammation has recently been implicated strongly in atherogenesis (Libby et al. 1997). One such infection is caused by Helicobacter pylori (H. pylori), which is contracted by more than 85% of the populations in the Indian subcontinent during their childhood (Sarker et al. 1997). Some markers of inflammation are associated with a greater risk of coronary cardiopathy or a worse prognosis (Patel et al. 1995). Birnie et al. (1998) detected an elevated hs-CRP which was found to be associated with a worse prognosis in patients with unstable angina or recent myocardial infarction

H. pylori, is one of the most important microorganisms associated with illness that were previously considered to have a non-infectious etiology. Infection by *H. pylori* induces an elevation of cholesterol and triglyceride levels with a decrease in HDL cholesterol contributing to the development of dyslipidemia, a known cardiovascular risk factor (13), the present finding is well in aggremint with the previous study With respect to the association of this bacterium with coronary cardiopathy, the existing scientific evidence suggests that infection by *H. pylori* contributes to the genesis, progression, and severity of cardiovascular disease, although it is unlikely that it triggers cardiovascular disease on its own. Ultimately, it is the balance between the factors that favour cardiovascular disease and the host´s protective factors.

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Table 1 Prevalence of IgG and IgA anti bodies to *H.pylori*

Subjects	IgG Ab	IgA Ab	IgG or IgA Ab	IgG & IgM Ab
Men (n=90)	21	13	25	6
Women (n=90)	26	14	31	14
Total (n=180)	47 (26.11%)	27 (15.0%)	56 (31.11%)	20 (11.11%)

Table 2
Comparison of the Lipid Profile of the test and control subjects.

		N	Mean	Std. Deviation	F	P
CHOLESTEROL (mg/dL)	H Pylori positive with CAD	50	236.8	52.9	42.653	.000
	H Pylori positive without CAD	50	235.4	57.5		
	Control	50	160.2	25.5		
	Total	150	210.8	59.3		
TRIGLYCERIDE (mg/dL)	H Pylori positive with CAD	50	130.0	61.6	3.037	.051
	H Pylori positive without CAD	50	127.1	66.0		
	Control	50	105.2	30.3		
	Total	150	120.8	55.7		
HDL-C (mg/dL)	H Pylori positive with CAD	50	56.7	13.8	4.064	.019
	H Pylori positive without CAD	50	54.3	13.8		
	Control	50	48.5	14.4		
	Total	150	53.2	15.0		
LDL-C (mg/dL)	H Pylori positive with CAD	50	152.5	44.9	76.573	.000
	H Pylori positive without CAD	50	157.3	32.7		
	Control	50	84.0	14.5		
	Total	150	131.3	47.0		