Helicobacter pylori Infection and Inflammation: Implications for Pathophysiology of Diabetes Mellitus and Coronary Heart Disease

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ABSTRACT Asian Indians living in the Indian subcontinent or abroad experience high rate of coronary heart disease (CHD) and type 2 diabetes mellitus (T2DM). Asian Indians are also known to suffer from various infections, particularly during their childhood. One such chronic infection is with Helicobacter pylori (H. pylori). Since H. pylori with its specific virulence factor cytotoxin-associated gene A (cagA) has been suggested to be associated with CHD, a role of this H. pylori infection was investigated in the pathogenesis of CHD in Asian Indians living in Bangladesh. H. pylori (CagA) infected subjects with CHD (HP+ve cases, n=21), and without CHD (HP+ve controls, n=20), and non-infected without CHD (HP-ve normal controls, n=21) were included in this study. Thromboxane (TXB), an index of platelet activation, was found to be significantly higher in the HP+ve cases (p=0.05), but not in the HP+ve controls (p=0.88) when compared with HP-ve controls. Analyses of lipid profiles revealed that while triglycerides, total cholesterol and LDL did not show any significant changes, HDL was significantly lower in both the HP+ve cases (p=0.0003) and controls (p=0.005). The mean fasting glucose level in the HP+ve cases was markedly increased (p>0.0001), while it was intermediate in the HP+ve controls, and lowest in the HP-ve controls. HOMA-IR values, a measure of insulin resistance, did not reflect any substantial differences between the HP+ve and HP–ve controls, but they were highly significantly different between the HP+ve cases and HP–ve controls. HOMA-B, indicating insulin secretory dysfunction (ISD), was significantly higher in both the HP+ve groups when compared with the normal controls. The data indicate that H. pylori infection is associated with impaired insulin secretion, and that a component of insulin resistance that occurs independent of H. pylori can then lead to a worsening of glucose tolerance and the development of CHD. This is the first demonstration to our knowledge that H. pylori (CagA) infection is associated with insulin secretory dysfunction in human subjects. Since many Asian Indians contract various other chronic and acute infections, it is important to investigate the role of H. pylori and other infectious agents in the pathogenesis of T2DM and CHD.