A Study of Prevalence of Helicobacter Pylori Infection in Diabetic and Nondiabetic Patients with Dyspeptic Symptoms

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ABSTRACT *Background: Infection with Helicobacter pylori is common worldwide and a significant cause of upper gastrointestinal disease. Recent reports suggested that Helicobacter pylori might have high prevalence among patients with diabetes. Aim: To determine the prevalence of Helicobacter pylori infection in diabetic and non-diabetic patients and to compare the prevalence of Helicobacter pylori infection in both groups. Materials and Methods: This hospital based case control study was conducted on 184 adult patients with dyspeptic symptoms for more than one month who were referred to the surgical endoscopic ward in ACS Medical College and Hospital. Fasting blood sugar was checked in all these patients and according to American Diabetes Association criteria they were divided into two groups Group I Diabetics and Group II Non Diabetics. Each group consists of 92 patients. All these diabetic and nondiabetic patients were then screened for Helicobacter pylori infection by doing the Imunocard test (SD Bioline). Results: Among the diabetic group Helicobacter pylori was positive in 61/92 (66.30%), whereas in the nondiabetic group Helicobacter pylori was positive in 21/92 (22.82%). Age-wise distribution of Helicobacter pylori positive patients showed prevalence rate progressively increased with age in both diabetic and nondiabetic groups with a high prevalence rate in 40 to 49 age group in both diabetic (31.15%) and nondiabetic (33.33%) groups. Thereafter prevalence rate decreased gradually in older age in both groups. Males were predominantly affected as compared to females in both diabetic and nondiabetic groups. Conclusion: Diabetic patients are more prone and at risk to acquire Helicobacter pylori infection. So every diabetic patients with dyspeptic symptoms should be screened for Helicobacter pylori.*

INTRODUCTION: Helicobacter pylori is the most common bacterial infection in human beings[1]. Helicobacter pylori colonises the gastric antrum and negatively affects the protective mucosa coating of the stomach and duodenum and allows gastric acid to get through to the sensitive lining beneath. Both, acid and the bacteria irritate the gastric lining and cause a sore or ulcer. The organism is also able to survive in stomach acid and stomach pH, as it itself secretes enzymes that neutralize the acid.

Helicobacter pylori is a major risk factor for gastric and duodenal ulcers, atrophic gastritis, mucosa associated lymphoid tissue lymphoma and intestinal metaplasia[2]. Many studies have evaluated the prevalence of Helicobacter pylori infection in diabetic patients . Several hypothesis were presented for the higher prevalence of Helicobacter pylori infection in diabetic patients such as immune system impairment in patients with diabetes mellitus, the reduction of both gastrointestinal motility and acid secretion and higher secretion of pro-inflammatory cytokines related to the Helicobacter pylori gastric infection itself [3].

Diabetes mellitus is one of the important cause of dyspepsia. Delayed gastric emptying and antral dysmotility are important causes of dyspepsia in diabetic patients. Beside Diabetes mellitus, Helicobacter pylori is also a well established cause of dyspepsia. The role of Helicobacter pylori infection in diabetic dyspepsia is mainly related to blood glucose concentration. Hyperglycemia may induce the infection by Helicobacter pylori or the silent infection may get reactivated and produce symptoms of dyspepsia in diabetes[4].

Furthermore, it is shown that there is an association between diabetic complications especially microvascular complications and Helicobacter pylori infection[5]. If the relationship between the two is established then effective preventive measures have to be implemented for this life threatening infection. Since there are only a few studies in our country on the association of Helicobacter pylori and diabetes mellitus, we conducted this study at a tertiary care teaching hospital, Chennai.

MATERIALS AND METHODS: This hospital based cross sectional study was done in the department of surgery at ACS Medical College and Hospital, Chennai from January 2016 to July 2016 which included 184 patients.. Adult patients ≥ 30 years of age with symptoms of dyspepsia, bloating or epigastric discomfort for more than one month, referred to surgical endoscopic ward were studied. Patients with complaints of weight loss, anemia or hematemesis were excluded and patients who were on eradication therapy for Helicobacter pylori in the previous 6 months were also excluded.An informed consent was taken from all the patients.

The patients were checked for fasting blood sugar with atleast 8 hours fasting period. Patients with fasting blood sugar higher than 126mg/dl in two separated samples were considered diabetic according to the American Diabetes Association criteria[6]. After investigating for diabetes the patients were divided into two groups Group I (Diabetics) and Group II (Non Diabetics). Each group consists of 92 patients. Blood sample was collected from all these patients and tested for Helicobacter pylori by using the rapid card test "One step antibodies to Helicobacter pylori (SD Bioline)". This is an immuno chromatographic test for the qualitative detection of antibodies of all isotypes (IgG, IgM and IgA) specific to Helicobacter pylori in human serum, plasma or whole blood.

RESULTS: 92 patients in each group were studied. In diabetic group Helicobacter pylori was positive in 61(66.30%) patients whereas in nondiabetic group it was positive in 21(22.82%) patients (Table 1).

TABLE 1
Prevalence of Helicobacter pylori in cases of diabetes and non diabetes.

H pylori status	Group I Diabetics (n = 92)	Group II Non Diabetics (n = 92)	P value 0.000
Positive	61 (66.30%)	21 (22.82%)	
Negative	31 (33.70%)	71 (77.18%)	

Age-wise distribution showed the prevalence rate of Helicobacter pylori progressively increased with age in both groups (Diabetic and Non diabetic) with the peak prevalence in Diabetic group (31.15%) and Non diabetic group (33.33%) was in the 40 to 49 age group and thereafter the prevalence rate decreased gradually in both the groups (Table 2).

TABLE 2
Age distribution of cases of Helicobacter pylori infection.

Age groupin Years	Group I Diabetics H pylori Positive % (n = 61)	Group II NonDiabetics H pylori Positive % (n = 21)
30 - 39	15 (24.59%)	6 (28.58%)
40 - 49	19 (31.15%)	7 (33.33%)
50 - 59	9 (14.75%)	6 (28.58%)
60 - 69	9 (14.75%)	1 (04.76%)
70 - 79	5 (08.20%)	1 (04.76%)
80 - 89	2 (03.28%)	0 (00.00%)
90 - 99	2 (03.28%)	0 (00.00%)

High prevalence of Helicobacter pylori was observed in males as compared to females in both groups (Diabetic and Nondiabetic), as in diabetic group among the Helicobacter pylori positive patients 40 (65.57%) were males and 21(34.43%) were females whereas in nondiabetic group 12 (57.14%) were males and 9 (42.86%) were females(Table 3).

TABLE 3
Sex distribution of cases of Helicobacter pylori infection

Sex	Group I Diabetics H pylori Positive % (n = 61)	Group II NonDiabetics H pylori Positive % (n = 21)
Male	40 (65.57%)	12 (57.14%)
Female	21 (34.43%)	9 (42.86%)

DISCUSSION: Helicobacter pylori is the main etiologic agent of chronic gastritis and peptic ulcer and is also related to gastric cancer[7]. Many reports on Helicobacter pylori have indicated that the seroprevalence of Helicobacter pylori is high in Diabetes Mellitus patients [8,9]. Diabetic patients are more vulnerable to the harmful effects of Helicobacter pylori due to their impaired immune status. Our study showed higher prevalence of Helicobacter pylori infection in diabetic patients as compared with non- diabetics.

In our study, the prevalence of Helicobacter pylori infection among diabetic patients with dyspepsia was 66.30% whereas in non-diabetic patients with dyspepsia it was 22.82%.This is in accordance with Talebi- Taher et al study in which the prevalence among diabetic and non-diabetic patients were 60% and 26.66% respectively[10]. Morrollo et al study also reported a higher prevalence of Helicobacter pylori among diabetics than in controls[11]. In Bajaj S et al study the prevalence of Helicobacter pylori was 77.5% in diabetics and 58.3% in non-diabetics and in Zafar KS et al study the prevalence was 64.1% in diabetics compared to 40% in non-diabetics[12,13]. Few other studies also reported higher prevalence of Helicobacter pylori infection in diabetic population[14,15, 16].

There are some studies that showed no association between diabetes mellitus and Helicobacter pylori infection. In Gasbarrini et al study the prevalence of Helicobacter pylori infection remains same in diabetics 37% and non-diabetics 34%[17]. In Xia HH et al study the seroprevalnce of Helicobacter pylori infection was 33% among diabetics and 32% among non-diabetics[18]. In candelli M et al study the prevalence was 28.1% among diabetics and 29.25% among nondiabetics and in Anastasios R et al study it was 37.3% among diabetics and 35.2% among non-diabetics[19, 20].

The variability of prevalence rates may be due to the epidemiological distribution of Helicobacter pylori and the higher prevalence of Helicobacter pylori among diabetics may be explained by the fact that a link between Helicobacter pylori, insulin and fasting serum glucose levels has recently been demonstrated[21]. These results could be explained by considering the evidence that some strains of Helicobacter pylori are considered more virulent; in particular, Cag A positive strains. They are presumed to have a higher pathogenic effect on gastric mucosa and are related to duodenal ulcer and gastric cancer. More specifically, Cag A positive strains are associated with the increased production of cytokines such as tumor necrosis factor, interleukin 1, interleukin 6, interleukin 8 that might alter the control of glycemia in diabetes mellitus patients. Thus, this correlation study is an important step in assessing the risk of the diabetes mellitus patients with the complications of the Helicobacter pylori infection.

In some studies, the reason, why diabetics are more prone to Helicobacter pylori infection has been explained. It is reported that the prevalence of Helicobacter pylori in diabetic patients has a significant association with autonomic neuropathy[22]. It is likely that autonomic neuropathy in diabetic patients will delay gastric emptying, which causes an imbalance between the absorption of carbohydrates and insulin secretion that will result in tighter control of blood sugar. On the other side, a decrease in gastric acid secretion in diabetic patients may facilitate bacterial colonization of the gastrointestinal tract.

Agewise distribution in our study showed that the prevalence rate progressively increased with age reaching its peak in 40 to 49 age group in both diabetics 31.15% and nondiabetics 33.33% and thereafter decreased gradually in older age group in both groups. Hence there was no difference between distribution of Helicobacter pylori in various age groups among diabetics and nondiabetics.This is in accordance with Zafar KS et al study in which the mean age in diabetic group was 48.9 ± 9.86 years and of nondiabetic group was 47.9 ± 9.16 years[13]. In Devrajani BK et al study the high prevalence of Helicobacter pylori was found in above 50 years age group both in diabetics and non diabetics[5]. It remains unclear whether fall in prevalence rate after the age of 50 is due to the spontaneous cure.

In our study male preponderance is seen in Helicobacter pylori infection in both diabetic 65.57% and nondiabetic group 57.14% as compared to females in diabetic 34.43% and nondiabetic group 42.86%. This is in accordance with Bajaj S et al in which the prevalence of Helicobacter pylori was 65% males vs 35% females in diabetic group and 63.3% males vs 36.7% females in nondiabetic group[12]. On the other hand, in another study the prevalence of Helicobacter pylori infection in females were predominant as compared to males[23].

Findings of our study infers that diabetic patients are more at risk for Helicobacter pylori infection (p = 0.000) (statistically significant) and implementation of preventive measures aimed at decreasing the prevalence of Helicobacter pylori have health benefits on diabetic patients.

CONCLUSION: In our study the prevalence of Helicobacter pylori infection in diabetes mellitus patients with dyspepsia was higher than non diabetic patients with dyspepsia. Hence every diabetic patient with dyspeptic symptoms should be screened for Helicobacter pylori. Effective and appropriate measures should be taken against control of diabetes mellitus and eradication of Helicobacter pylori infection.

REFERENCES:

1. Vafaeimanesh J, Parham M, Bagherzadeh M. Helicobacter pylori infection prevalence: Is it different in diabetics and nondiabetics? *IndJournofEndocrinology and Metabolism*2015; 19(3): 364- 368.

2. Tamura T, Morita E, Kawal S, Sasakabe T, Sugimoto Y, Fukuda N, Suma S, Nakagawa H, Okada R, Hishida A, Naito M, Hamajima N, Wakai K. No association between Helicobacter pylori infection and diabetes mellitus among a general Japanese population: a cross- sectional study. *Springer Plus* 2015; 4(1): 602.

3. Bener A, Micallef R, Afifi M, Derbala M, Al-Mulla HM, Usmani MA. Association between type 2 diabetes mellitus and Helicobacter pylori infection. *Turk J Gastroenterol* 2007; 18(4): 225- 229.

4. Devrajini BK, Ali-Shah SZ, SoomroAA, Devrajani T. Type 2 diabetes mellitus: A risk factor for Helicobacter pylori infection: A hospital based case-control study. *Int J Diabetes DevCtries* 2010; 30(1): 22-26.

5. Vafaeimanesh J, Bagherzadeh M, Damanpak V, Parham M. Association of Helicobacter pylori IgG antibody with microvascular complications in type II diabetic patients. *Annu Rev Res Biol* 2015; 5: 299-306.

6. Report of the Expert Committee on the Diagnosis and Treatment of Diabetes Mellitus. *Diabetes Care.* 1997; 20(7) : 1183 – 1197.

7. Brown LM. Helicobacter pylori: Epidemiology and routes of transmission. *Epidemiol Rev.* 2000; 22: 283-297.

8. Prasad S, Mathan M. Prevalence of Helicobacter pylori. *J Gastroenterol-Hepatol.* 1994; 120: 977 - 981.

9. Gill HH, Majumdar P. Age-related prevalence of Helicobacter pylori antibodies in Indian subjects. *Indian J Gastroenterol.* 1994; 13 : 92 – 94.

10. Talebi-Taher M, Mashayekhi M, Hashemi MH, Bahrani V. Helicobacter pylori in diabetic and non-diabetic patients with dyspepsia. *Acta Med Iran.* 2012; 50: 315 – 318.

11. Marrollo M, Latella G, Melideo D, Storelli E, Iannarelli R, Stornelli P, Valenti M, Caprilli R. Increased prevalence of Helicobacter pylori in patients with diabetes mellitus. *Dig Liver Dis.* 2001; 33(1) : 21 - 29.

12. Bajaj S, Rekwal L, Misra S, Misra V, Yadav RK, Srivastava A. Association of Helicobacter pylori infection with type 2 diabetes. *Indian J EndocrMetab.* 2014; 18 : 694 - 699.

13. Zafar KS, Ram V, Kumar M. A study of Helicobacter pylori infection in diabetes mellitus. *Int J Res Med Sci.* 2016; 4(9): 4166 - 4171.

14. Quadri R, Rossi C, Catalfamo E, Masoero G, Lombardo L, Rovera L et al. Helicobacter pylori infection in type 2 diabetic patients. *NutrMetabCardiovasc Dis.* 2000; 10 : 263 - 266.

15. Gulcelik NE, Kaya E, Demirbas B, Culha C, Koc G, Ozkaya M et al. Helicobacter pylori prevalence in diabetic patients and its relationship with dyspepsia and autonomic neuropathy.*J Endocrinol Invest.* 2005; 28 : 214 - 217.

16. Quatrini M, Boarino V, Ghidoni A, Baldassarri AR, Bianchi PA, Bardella MT. Helicobacter pylori prevalence in patients with diabetes and its relationship to dyspeptic symptoms. *J ClinGastroenterol.* 2001; 32 : 215 - 217.

17. Gasbarrini A, Ojetti V, Pitocco D, De Luca A, Franceschi F, Candelli M, Sanz Torre E, Pola P, Ghirlanda G, Gasbarrini G. Helicobacter pylori infection in patients affected by insulin-dependent diabetes mellitus. *Eur JGastroenterolHepatol.* 1998; 10(6): 469 - 472.

18. Xia HH, Talley NJ, Kam EP, Young LJ, Hammer J, Horowitz M. Helicobacter pylori infection is not associated with diabetes mellitus nor with upper gastrointestinal symptoms in diabetes mellitus. *Am JGastroenterol.* 2001; 96(4) : 1039 - 1046.

19. Candelli M, Rigante D, Marietti G, Nista EC, Crea F, Bartolozzi F et al. Helicobacter pylori, gastrointestinal symptoms and metabolic control in young type I diabetes mellitus patients. *Pediatrics.* 2003;111:800–803.

20. Anastasios R, Goristas C, Papamihail C, Trigidou R, Garzonis P, Ferti A. Helicobacter pylori infection in diabetic patients: Prevalence and endoscopic findings. *Eur J Intern Med.* 2002; 13 : 376.

21. Peach HG, Barnett NE. Helicobacter pylori infection and fasting plasma glucose concentration. *J ClinPathol.* 2001; 54: 466 -469.

22. Gentile S, Turco S, Oliviero B, Torella R. The role of autonomic neuropathy as a risk factor of Helicobacter pylori infection in dyspeptic patients with type 2 diabetes mellitus. *Diabetes Res ClinPract.* 1998; 42 : 41 - 48.

23. Kanbay M, Gur G, Arslan H, Yilmaz U, Boyacioglu S. The Relationship of ABO Blood Group, Age, Gender, Smoking and Helicobacter pylori Infection. *Dig Dis Sci* 2005; 50 : 1214 - 1217.