SHORT REPORT

Presence of pre-diabetes in Helicobacter pylori positive versus Helicobacter pylori negative patients having dyspepsia

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Abstract

Pre-diabetes is a state of intermediate hyperglycaemia. Helicobacter (H) pylori infection is an established risk factor for pre-diabetes. This comparative cross-sectional study was done in Mayo Hospital Lahore from November 2015 to August 2016 in which 270 patients underwent upper gastrointestinal endoscopy with antral biopsy. An oral glucose tolerance test was done half to one hour after endoscopy. Patients were diagnosed having pre-diabetes according to American Diabetic Association criteria. Cases were divided into Group A and B based on the presence or absence of histopathological evidence of H. pylori respectively. Comparison was done to see the occurrence of pre-diabetes in H. pylori positive versus helicobacter negative dyspeptic patients. Results showed that 79 (58.52%) in Group-A and 62 (45.93%) in Group-B had pre-diabetes while remaining 56 (41.48%) in Group-A and 73 (54.07%) in Group-B had no findings of this morbidity, p value was calculated as 0.03 showing a significant difference. It was concluded that H. pylori infection is significantly associated with pre-diabetes.

Keywords: Dyspepsia, Helicobacter pylori, Pre-diabetes, Association.

Introduction

Dyspepsia is a worldwide problem that affects 40% of adults, accounts for 8.3% of visits to primary care physicians. Approximately 10% of all patients presenting for endoscopy for gastrointestinal symptoms have dyspepsia.[1] Infection with Helicobacter (H) pylori is also a universal problem, more in developing countries. Helicobacter pylori, a gram-negative, spiral, flagellate bacillus which normally is a resident of gastric epithelium, can cause inflammatory cell infiltration in gastric mucosa that produces cytokines, which are not only responsible for local effects but can damage remote tissues causing extra digestive diseases like ischaemic heart disease, autoimmune thyroid disease, anaemia, idiopathic thrombocytopenic purpura, neurologic diseases and reactivation of TB.[2] Pre-diabetes is a disorder in which concentration of blood glucose is more elevated than normal levels but it is not high enough for a diagnosis of diabetes mellitus. Pre-diabetes occurs in patients having insulin resistance. Pre-diabetes ultimately converts in to type 2 diabetes mellitus. Pre-diabetes along with insulin resistance is an important etiology of metabolic syndrome.[3]

Studies have shown that H pylori affect glucose homeostasis and insulin sensitivity in a negative way. Symptoms and quality of life may be improved with Helicobacter pylori eradication.[4] International Diabetes Federation (IDF) reported that in 2015 Pakistan had 7.0 million people of age group 20-79 years suffering from diabetes. By 2040, this number is expected to cross 14.4 million. In 2015, 7.9 million people had impaired glucose tolerance and this number is expected to cross 15.1 million in 2040. Moreover, 84,364 deaths were recorded due to diabetes in same year.[5]

There have been few studies conducted recently which proposed that H pylori infection plays a role in pathogenesis of diabetes mellitus.[6] Local as well as international data is scanty regarding association of Helicobacter pylori and pre-diabetes. Present study was aimed to find an association between the occurrence of pre-diabetes in H. pylori positive and negative dyspeptic patients.

Methods and Results

This comparative cross-sectional study was done in West Medical Ward, Mayo Hospital, Lahore. Using non-probability purposive sampling and 270 patients (135 patients in each group) were selected.

Patients with age more than or equal to 35 years, of either gender, with history of dyspepsia, bloating or epigastric discomfort for more than three months were included in the study. Patients with history of nonsteroidal anti-inflammatory drugs (NSAIDs) and/or alcohol intake, patients already on steroid or immunosuppressive or H. pylori eradication therapy, patients with diagnosed malignancy in previous medical records, patients with diagnosed chronic renal disease in previous medical records and patients having gallstones, were excluded.

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Table-1: Characteristics of the groups with their Numbers (n= 270).

Group A H. pylori positive	Group B H. pylori negative
135	135

Table-2: Comparison of occurrence of pre-diabetes in h. pylori positive versus negative dyspeptic cases (n=270).

Pre-diabetes	Group-A (n=135)		Group-B (n=135)	
	No. of patients	%	No. of patients	%
Yes	79	58.52	62	45.93
No	56	41.48	73	54.07
Total	135	100	135	100

P-value= 0.03.

After informed consent, patients underwent upper GI endoscopy and antral biopsy was obtained and sample was submitted to King Edward Medical University (KEMU) pathology department in labelled containers. An Oral Glucose Tolerance Test was done on the individuals approximately half to 1 hour after endoscopy. Patients were diagnosed having pre-diabetes according to American Diabetic Association (ADA) criteria 2013, fasting blood sugar level between 100-125 mg/dl and / or a blood sugar level between 140-199 mg/dl 2 hours after a 75-gram glucose tolerance test.[14] Cases were classified into Group A and B based on presence or absence of histopathological evidence of H. pylori respectively. All H. pylori positive patients were put on eradication therapy.

Data access and scrutiny was carried out by using SPSS 20. Quantitative data was presented by using Mean±SD. Qualitative data like occurrence of H. Pylori and pre-diabetes diagnosis were presented by using frequency table and percentages. Relationship among pre-diabetes and H. Pylori was evaluated by applying Chi-Square/Fisher exact test. A p-value of less than or equal to 0.05 was accepted as significant.

We stratified the data for age, gender and body mass index (BMI) to control the effect modifiers. Patients were divided according to age. It revealed that 35 (25.93%) cases of Group A and 38 (28.15%) cases in Group B were amongst 35-50 years while 100 (74.07%) in Group A and 97 (71.85%) in Group B were among 51-70 years of age. The mean and standard deviation was presented as 56.31±8.14 and 56.60±8.73 years in Group-A and B respectively. Gender division indicated that number of males in Group A and Group B were 76 (56.30%) and 71 (52.59%) whilst number of females in Group A and Group B were 59 (43.70%) and 64 (47.41%) respectively.

Evaluation of occurrence of pre-diabetes in dyspeptic patients with positive H. pylori versus negative H. pylori was done. It was inferred that 79 (58.52%) in Group A and 62 (45.93%) in Group B had pre-diabetes mellitus. Odds Ratio was 1.66, the value of Confidence Interval taken as 95% range from 1.026 to 2.688 and p value was 0.03 concluding statistically significant difference between the two groups (Table-2).

Discussion

This study was planned to verify the results of few studies conducted recently which suggested that Helicobacter pylori illness had a significant part in pathogenesis of resistance of insulin, pre-diabetes and diabetes mellitus.[6] Previously research has shown the association of H. Pylori and DM but no study had shown the relationship of H. Pylori with pre-diabetes. We aimed to find the association between the occurrence of pre-diabetes in H. pylori positive and negative dyspeptic patients which may help us in early detection of pre-diabetes in patient suffering from H. pylori infection. In our study, comparison of occurrence of pre-diabetes in patients with positive H. pylori against patients of dyspepsia with negative H. pylori was done. It showed that 79 (58.52%) in Group-A and 62 (45.93%) in Group-B had pre-diabetes mellitus while remaining 56 (41.48%) in Group A and 73 (54.07%) in Group B showed no consequences of this morbidity, p value was calculated as 0.03 showing a significant difference.

Previous literature leads to the hypothesis that cause of rising epidemics of pre-diabetes, diabetic related hazards and overweight is found to be due to H. pylori illness. Relationship of pre-diabetes occurrence with insulin resistance and H. pylori illness had been described.[7] Han X et al did a cross-sectional study in which more than thirty thousand middle and old-age patients participated. It was concluded that H.pylori infection had strong relationship with elevated risk of type 2 diabetes. Patients having H.pylori infection had lesser concentration of high-density lipoprotein (HDL) and raised blood pressure, total cholesterol level, glycated haemoglobin (HbA1c) and fasting blood sugar.[8]

On the opposite side, other reviews had shown no relationship among diabetes and H. pylori illness. A research done by Stanciu et al showed that H pylori infection had no significant relation with diabetes itself nor its duration or severity of dyspeptic symptoms in diabetic patients.[9] In one more research carried out in Nigeria, Oluyemi et al concluded that there was no indicative association of the H. pylori infection with diabetes mellitus.[10] The results of our study are contrary

to these findings. H. Pylori infection is strongly concomitant with pre-diabetes in our population. We can further study the effect of H. Pylori eradication on Insulin resistance and to see whether we can delay the conversion of pre-diabetes to Diabetes mellitus.

Therefore, in accordance with our findings and above-mentioned results, we are of the view that Helicobacter pylori positive dyspeptic patients have a significant association with pre-diabetes as compared to Helicobacter pylori negative dyspeptic patients. Early detection of pre-diabetes and its regular follow up can help us in not only early diagnosis but also minimizing the detrimental effect of full blown diabetes mellitus.

Although there are few limitations of the study. This study is limited with its study design which is cross-sectional. Further analytical studies like prospective Cohort should be planned in order further endorse the association between H. pylori infection and presence of pre-diabetes. Moreover, family history of Type 2 diabetes amongst groups was not included which is of paramount importance as there is a strong association between development of pre-diabetes and positive family history of type 2 Diabetes. It could be intriguing to further extend the study and the effect of eradication therapy can be studied in terms of any difference in improvement in pre-diabetes after eradication of H. pylori. Further studies are warranted to answer these limitations.

Conflict of Interest: Authors show no conflict of interest.

Funding: No funding was required in this study.

Ethical Approval: From Institutional Review Committee (IRB), King Edward Medical University, Lahore.

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