Association of Helicobacter Pylori Infection in patients suffering from Type 2 Diabetes Mellitus

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ABSTRACT

Background: Helicobacter pylori (H. pylori) infection has been associated with hyperglycemia and raised levels of inflammatory cytokines triggered in patients suffering from type 2 diabetes mellitus.

Aim: To compare the frequency of H. pylori infection in diabetic and non-diabetic patients.

Study Design: Case control.

Place and Duration: Department of Pathology/Microbiology and Medicine outdoor department, Life Hospital, Lahore from June 2017 to March 2018.

Methods: This hospital-based case control study was conducted on 180 subjects and were divided into two groups i.e. type 2 diabetics and non-diabetics. All diabetic patients of >18 years of age, both gender and the known cases with history of indigestion, heart burn, pain or discomfort in the stomach or abdominal fullness for more than a month were screened for H.pylori infection. The collected data of both groups was evaluated and separated for analysis.

Results: H. pylori infection was positive in75% of diabetic patients and only 25% in non-diabetic group with a highly significant p-value (0.000). In H. pylori infection positive diabetic group, majority of the patients were reported to be males with maximum age range of 41-50 years in both diabetic (30) and non-diabetic (10) patients.

Conclusion: This study overall concludes that diabetic patients are at greater risk of H. Pylori infection. Hence, infection by this pathogen must be suspected in patients suffering from type 2 diabetes mellitus.

Keywords: Diabetes mellitus, Helicobacter pylori, Helicobacterpylori serology

INTRODUCTION

Helicobacter pylori (H. pylori) infection is gaining strong foothold in the developing countries. It is also a public health problem worldwide. The rate of active H. pylori infection in one of a study conducted in Pakistan is 49.5%. It is notorious for causing gastritis, peptic and duodenal ulcers. This Gram negative rod has a unique virulence factor called cag A protein which modifies the signal transduction and gene expression in host epithelial cells. The production of ammonia by its urease enzyme along with inflammatory response further leads to mucosal damage.

H. pylori is also responsible for certain extragastric disorders including cardiovascular diseases and metabolic syndrome. The activating point of infection has been low grade systemic inflammation in all of these extragastric disorders. Similarly, it has been suggested in certain studies that inflammation has a key role in the pathogenesis of type 2 diabetes mellitus. The insulin action is blocked by various inflammatory markers such as C-reactive protein and Interleukin-6 by phosphorylation of serine residues on insulin receptor substrate. The growing evidence suggests that H. pylori is responsible for the regulation of two hormones leptin and ghrelin, involved in energy homeostasis. The action of these two hormones affects obesity, insulin sensitivity, and glucose homeostasis.

Diabetes mellitus is one of the important causes of dyspepsia. There is an increase occurrence of H. pylori infection in diabetes mellitus patients. Two significant causes of dyspepsia in diabetics include delayed gastric emptying and antral dysmotility. The blood glucose concentration has been mainly thought to be related with H. pylori infection. Hyperglycemia may trigger H. pylori infection or there may be reactivation of previous dormant infection producing symptoms related to dyspepsia in diabetes. The prevalence of H. pylori in diabetes mellitus is 61% in Pakistan. There are various studies which show positive relevance between H. pylori infection and type 2 diabetes mellitus.

Only few studies from Pakistan reported association of H. pylori infection and type 2 diabetes mellitus. The present study was focused on observing the frequency of H. pylori infection in patients with type 2 diabetes mellitus. The aim of the study was to help the clinicians to properly identify the cause of dyspeptic symptoms in type 2 diabetic patients.

PATIENTS AND METHODS

This case control study was conducted at Medicine out door department and Pathology/Microbiology department of Life care hospital, Lahore, A project of Life Care Foundation TRUST from June 2017 to March 2018. All ethical considerations and obligations were duly addressed and the study was conducted after approval from ethical committee. Informed consent was also taken from the patients.

Non-probability convenient sampling was done. Patients aged ≥18 years who were known diabetics & with active symptoms of dyspepsia, epigastric discomfort or bloating for one month or more were included in the study. Patients with type 1 diabetes, on steroids or immunosuppressants, recently taking antibiotics, proton pump inhibitors, H2 receptor blockers, or on antacids in last
4 weeks and with past and present evidence of active
gastrointestinal bleeding, jaundice or after gastric surgery
were excluded from the study both for diabetic patients
and non-diabetic patients group.

Cost-effective H. pylori antibody commercial kit (Bio
Check, USA) for antibodies detection in blood was
performed on all these samples sent to laboratory. The
antibodies detected are either IgG, IgM or IgA to H. pylori if
present in this specimen will bind to the H. pylori
conjugates. This immunochromatographic (ICT) test was
interpreted according to instructions of the manufacturer.
When both control and test lines were visible, the ICT test
was regarded positive. When only control line was visible,
the test was regarded negative. When control line was
absent, the test was regarded to be invalid. The test was
interpreted within 15 minutes. H. pylori positive patients
were divided into two groups - A and B. Group A was
allocated to known diabetic patients and group B to non-
diabetic patients (control group). The collected data of both
groups (A and B) were then evaluated, separated and
saved for analysis.

The data were evaluated in statistical program SPSS
version 21. Frequency and percentages were calculated
wherever applicable. The Chi-Square test was applied
among the categorical variables. P-value<0.05 was
considered as statistically significant.

RESULTS

Out of total 180 patients, there were 107 patients positive
for H. pylori infection. Out of 107 patients, 80 patients
were found to be diabetic and 27 patients were found to be non-
diabetic as shown in table 1. Overall, p-value is 0.000
which is highly significant statistically.

From eighty patients studied, 62.5% of diabetic males
were found to be H. pylori positive as compared to diabetic
females (37.5%) given in table 2.

Figure 1 depicts the H. pylori infection in diabetics
and non-diabetics in relation to various age groups. H. pylori
infection was found highest in both diabetics (37.5%) and
non-diabetics (37%) with age group of 41-50 years. The
mean age in diabetic group is 49±11 years.

<table>
<thead>
<tr>
<th>H. pylori serology status</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive (n=107)</td>
<td>80 (75%)</td>
<td>27 (25%)</td>
</tr>
<tr>
<td>Negative (n=73)</td>
<td>25 (34%)</td>
<td>48 (66%)</td>
</tr>
<tr>
<td>P value=0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Gender distribution in H. pylori positive infected diabetic
and non-diabetic patients (n=107)

<table>
<thead>
<tr>
<th>H. pylori positivitygender</th>
<th>Group (n=80)</th>
<th>A (n=27)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>50 (62.5%)</td>
<td>23 (85%)</td>
</tr>
<tr>
<td>Females</td>
<td>30 (37.5%)</td>
<td>04 (15%)</td>
</tr>
</tbody>
</table>

DISCUSSION

Helicobacter pylori is associated with a number of
gastrointestinal & extra gastrointestinal diseases that has
dramatically altered the diagnostic approach in various
fields of medicine. In the literature, most of the studies
show link between H. pylori infection with type 2
diabetes. Whereas, few other studies failed to reveal any
association. In our study, we found that H. pylori infection
was more common in diabetic patients (75%) as compared to
non-diabetic patients group (25%). Highly significant p-value
implies that there is an association of H. pylori infection
with diabetic group. These results corresponds to a study
conducted in Pakistan at Liaquat University Hospital,
Jamshoro in 2010, where H. pylori infected 73% patients
were diabetic and 51.4% were non-diabetic. However, in
this study H. pylori antigen was detected in stool. Another
study conducted in Africa revealed 88.2% diabetics and
67.7% non-diabetics with anti-H. pyloriantibodies positive
status. Analogous results were also found in studies
conducted by Kimiaki et al and Marollo et al. On the
contrary, few authors reported contradictory results.
Deficiency of cellular and humoral responses pose risk for
chronic infections in diabetic patients. Gastroparesis causes
delayed gastric emptying, hence bacterial overgrowth can
increase the chance for H. pylori infection. Leukocyte
functional abnormality and hyperglycemia are also predisposing factors for infections and facilitate secondary *H. pylori* colonization.

In the present study, most of male diabetic patients were found to be *H. pylori* infection positive. This may be due to more males visiting to our hospital as compared to females. Unlike results were reported by a study conducted in India with male predominance of 75% in diabetics and 42.8% in non-diabetic patients suffering from *H. pylori* infection. On the other hand, another study showed more prevalence of *H. pylori* in females which states that gender distribution for this infection is still controversial.

In our study, both diabetic and non-diabetic patients infected with *H. pylori* reported in age group between 41-50 years. A study published by Zafar et al. reported maximum patients in the same age group as that of our study but only for *H. pylori* infected diabetic patients. The mean age in our study was 49±11 years. However, a study by Sargyn et al. showed that the mean age of diabetic patients with *H. pylori* infection was 56±2 years.

There are different methods for detection of *H. pylori* infection, namely biopsy of the mucosa, the rapid urease test, serum *H. pylori* antibodies and *H. pylori* stool antigen test. Different studies have used either one or any two of these methods for studying *H. pylori* infection. However, in the present study, *H. pylori* infection was investigated by immunochromatographic method because of low economic cost and rapid turnaround time. Similarly, for stool antigen detection, patient might have to wait which may be less convenient for the patient as compared to blood test. Biopsy and rapid biopsy urease test both requires endoscopic procedure which is not available in our hospital.

**CONCLUSION**

This study indicates there is a significant relationship of *H. pylori* infection in patients who are suffering from type 2 diabetes mellitus when compared to non-diabetic population. Therefore, type 2 diabetic patients suffering from active dyspeptic symptoms should undergo further confirmatory tests for diagnosis of *H. pylori* infection.

**Conflict of interest:** No conflict of interest.

**REFERENCES**