Original Article

Effect Of Triple Therapy And Probiotic-Assisted Treatment In Helicobacter Pylori Infection On Glycemic Control In Type 2 Diabetes Mellitus

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Abstract

Background
Helicobacter pylori promotes gastrointestinal tract inflammation, which affects glucose and lipid absorption, altering lipid utilization and energy harvesting and leading to type 2 diabetes and impaired blood glucose levels.

Methodology
Patients with type 2 diabetes and Helicobacter pylori infection were recruited from the endocrinology clinic for this research investigation. Fasting blood samples were obtained before and after 2 weeks of eradication therapy, glycated haemoglobin (HbA1c) and Fasting Blood Glucose levels were assessed.

Results
62 (19 male 30.6%, 43 female 69.4%) patients with the mean age of 37.2 ± 5.9 years were recruited. The mean HbA1C levels before successful treatment was 8.2 ± 3.6 before therapy and 7.4 ± 3.7 and difference was significant (p-0.01)

Conclusion
Our findings suggest that Helicobacter pylori treatment can help decrease mean glycated haemoglobin levels in type 2 diabetic patients. More research will be needed to assess the effects of Helicobacter pylori eradication in other age groups, as well as in relation to obesity and other diseases, and it may be advantageous for people at risk of diabetes to be tested for the presence of Helicobacter pylori infection.

Keywords Helicobacter pylori infection, Type 2 diabetes, HbA1C, FBS

Introduction:

Helicobacter pylori (HP), a gram-negative bacillus, is the most prevalent pathogenic bacteria around the world, infecting and continuously colonizing the stomach mucous lining (1). About half of the world's population is thought to be infected with HP, with the infection potentially reaching more than 70% in underdeveloped countries; the great majority of infected people are asymptomatic, with just a small number acquiring illness, commonly in adulthood (2). It has been estimated that roughly 4.4 billion individuals globally are afflicted with Helicobacter pylori (H. pylori) (3). A 2019 study that examined the association between diet habits and H. pylori infection discovered that people who take more vegetable and grain products have a lower chances of becoming infected with H. pylori (4). Furthermore, a cross-sectional Chinese investigation hypothesized a favorable relationship between a high carbohydrate and sweeteners diet and the incidence of H. pylori infection. A diet high in animal items and seafood, on the other hand, was linked to a lower incidence of H. pylori infection (5).

HP induces gastrointestinal inflammation, which might affect glucose and fat absorption. In type 2 diabetes, insulin resistance, glucose and lipid metabolism and energy utilization are aberrant (6). Infection with H. pylori is related with elevated chronic inflammatory indicators such as tumor necrosis factor-α and C-reactive protein, and hence a positive correlation between H. pylori infection and insulin resistance has been established in several investigations on non-diabetic individuals (7). As a result, it is possible that persistent H. pylori infection may predispose people to hyperglycemia (8). The link between H. pylori infection and hyperglycemia in type 2 diabetic patients remains unclear. Previous research has yielded inconsistent results regarding the relationship between HP infection and various clinical symptoms of diabetes (9-11).

We hypothesized that investigating diabetes mellitus indicators such as glycated haemoglobin levels (HbA1c) and fasting blood sugar (FBS) would help us better comprehend the etiologic significance of HP infection in type 2 diabetes patients. To take on this issue, this study was devised to assess the potential long-term consequences of HP infection on HbA1c and FBG levels in type 2 diabetic patients.

Methodology:

The present six-month randomized clinical trial took place at the National Medical Centre in Karachi, Pakistan. The study procedure was explained to all patients and informed written consent was given. 62 people with Type 2 diabetes and positive H. pylori for peptic ulcers were enrolled in the trial. The study included patients with type 2 diabetes who had dyspepsia and reflux symptoms, as well as a known HP infection. However, exclusion criteria included Type 1 diabetes, treatment interruption, past gastroscopy or gastrectomy, continuing antibiotic use, H2 receptor antagonists, omeprazole use, or sucralfate use within the last 12 weeks. Based on the medical regimes, the particiapants were split into two groups. Patients in Group A received Triple Therapy (TP) (Omeprazole 20 mg twice daily + Clarithromycin 500 mg twice daily + Amoxicillin 1 gm twice daily) for two weeks, while patients in group B received Combination Therapy Probiotic CTP (Lactobacillus reuteri 100 mg twice daily + Omeprazole 20 mg twice daily) for a period of two weeks.

For the purpose of measuring the titres of IgG anti-helicobacter pylori antibodies, one serum sample was taken from each diabetic participant in the study. IgG anti-HP antibodies detected by serology confirmed the diagnosis of HP infection. A commercial ELISA method was used to determine HP antibodies. Additionally, fasting blood sugar (FBS) and glycated haemoglobin levels (HbA1c) were assessed in blood samples before eradication therapy. Two weeks after eradication treatment, HbA1c and FBS were re-evaluated.

The SPSS version 20 was used to do all estimations. Standard deviation (SD) and the mean are used to express data. The Kolmogorov-Smirnov test was used to evaluate adjustment to normalcy. The paired-t test was used to compare the pre and post result of the intervention. The Independent Samples t Test was used to test the differences between the means of two groups.

A p-value of 0.05 was deemed statistically significant.

Results:

In this study, we assessed 62 people with a mean age of 37.2 ± 5.9 years (19 male 30.6%, 43 female 69.4%) (Table I). The mean HbA1C in both the groups was 8.2 ± 3.6 before therapy and 7.4 ± 3.7 after treatment, with a significant difference (p 0.01).

Table I: Demographics of the Study Population

Drug Treatment	Triple Therapy and Combination (Omeprazole + Probiotic) (Mean ± SD)
Mean age	**37.2 ± 5.9 years**
BMI	**27.8 ± 4.8**
Gender **Male** **Female**	 **19 (30.6%)** **43 (69.4%)**
Mean age , BMI presented as Mean ± SD Gender presented as number and percentage	

Table II mentioned the mean age, mean BMI, Fasting Blood Glucose (FBG) and HbA1C of the study population in both groups

Table II: Demographic and laboratory data in Group A and Group B

Drug Treatment	Group A Triple Therapy	Group B Combination (Omeprazole + Probiotic)	p-value
Mean age	**38.2 ± 5.6**	**36.1 ± 6.3**	**0.14**
BMI	**27.2 ± 4.01**	**28.5 ± 5.8**	**0.37**
Fasting blood Glucose	**92.1 ± 14.5**	**92.8 ± 15.3**	**0.85**
HbA1C	**8.1 ± 3.4**	**8.3 ± 3.8**	**0.76**
Mean age , BMI, Fasting Blood Glucose (FBG) and HbA1C presented as Mean ± SD p-value < 0.05 is considered significant			

Fasting blood glucose levels in both groups did not differ significantly. There was no significant difference in either group following therapy when the two groups were compared. Group B, on the other hand, had marginally better comparison results (**Table III**).

HbA1c values in Group B decreased significantly following treatment. When the two groups were compared, there was no significant difference in either group following therapy. Group B, on the other hand, reported better comparison outcomes (**Table III**).

Table III: The value of HbA1c and FBS before and after treatment in Group A and Group B

Drug Treatment	Triple Therapy	Combination (Omeprazole + Probiotic)	p-value
Fasting Blood Glucose (FBG)			
Before Treatment	**92.1 ± 14.5**	**92.8 ± 15.3**	**0.85**
After 2 weeks Treatment	**90.4 ± 15.3**	**89.3 ± 11.7**	**0.75**
p-value	**0.096**	**0.071**	
HbA1C			
Before Treatment	**8.1 ± 3.4**	**8.3 ± 3.8**	**0.76**
After 2 weeks Treatment	**7.2 ± 4.0**	**7.0 ± 3.6**	**0.82**
p-value	**0.047**	**0.011**	

Fasting Blood Glucose (FBG) and HbA1C presented as Mean ± SD
p-value < 0.05 is considered significant

Discussion:

Due to varying selection criteria for diabetic patients as well as varying criteria for the diagnosis of HP infection, the prevalence risk of HP infection among patients with diabetes is still unknown, despite the fact that DM patients have a higher risk of contracting many infections due to their weakened immune system (12). Additionally, there have been inconsistent data from earlier studies regarding the link between HP infection and type 2 diabetes (11, 13, 14). According to the findings of this study, 62 individuals with Type 2 diabetes and HP infection responded to treatment (19 male 30.6%, 43 female 69.4%) in two groups.

In the current study, HbA1c levels decreased in the triple therapy and combination groups, although there was no significant effect on Fasting blood glucose levels. According to some studies, HP infection is associated with HbA1c, and one potential mechanism for this relationship is the role of HP in the host metabolic homeostasis by disrupting ghrelin and leptin production, which affects blood glucose levels in individuals with diabetes (15-17).

Several investigations have indicated that diabetes people had a higher prevalence of H. pylori infection and a lower eradication rate (18, 19). Although the link between H. pylori infection and diabetes is still being contested, the study by Jung et al discovered that regular triple therapy with a probiotic may be a more effective therapy for diabetes than concomitant therapy (20).

Cohen et al. found that adults infected with HP had greater body mass index (BMI) levels, even if they were asymptomatic, and indicated that HP therapy could lead to weight loss and better diabetic control (21).

In a study, Xia et al found no link between HP immunoglobulin G seropositivity and type 2 diabetes mellitus (22) and an investigation by De Luis in 2001 on the effect of HP infection therapy on the emptying of the stomach and its influence on glycemic control in type 1 diabetes mellitus found that HbA1c did not change significantly after the therapy (23).

The small number of participants and lack of control subjects made it difficult to interpret our results, so a more extensive series of controlled studies are advised to confirm the results presented here.

Conclusion:

HP therapy can address metabolic problems in type 2 diabetics. More research will be needed to assess the impact of HP eradication in various ages, as well as in relation to obesity and other disorders. Patients at risk of diabetes may benefit from being tested for HP infection and evaluated for HP eradication. TP and CTP shown promising efficacies as first-line therapies for H. pylori infection. It may be possible to add probiotics to avoid adverse effects.

Conflict of Interest: Authors report that they have no conflict of interest. The authors alone are responsible for the content and writing of this article.

Ethical approval: ERC was provided in accordance with the declaration of Helsinki.

Informed consent: Informed consent was obtained

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