THE RELATIONSHIP BETWEEN HELICOBACTER PYLORI INFECTION AND GLYCEMIC REGULATION IN TYPE 2 DIABETIC PATIENTS

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ABSTRACT

Objective: *We evaluated the relationship between Helicobacter pylori (HP) positivity and glycemic regulation in type 2 diabetic patients.*

Material and Method: *315 type 2 diabetic patients admitted to Dr. Lütfi Kirdar Kartal Training and Research Hospital Internal Medicine Polyclinics were evaluated retrospectively. Fasting plasma glucose, HbA1c levels and urea breath test (UBT) results were analyzed. The relationship between HbA1c levels and UBT positivity were investigated.*

Results: *Fasting plasma glucose was significantly higher in UBT positive patients (175.3±73.9 mg/dl) than in UBT negative patients (139.3±35.6 mg/dl) (p<0.05). HbA1c levels were also detected as significantly higher in UBT positive patients (8.0±2.1) than in the UBT negative ones (6.9±1.2) (p<0.05).*

Conclusion: *We showed in our study that HP infection rates detected with UBT in diabetic patients are significantly higher in patients with poor glycemic control than in the ones with tight glycemic control.*

Keywords: *Diabetes mellitus, Helicobacter pylori, HbA1c*
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TİP 2 DİYABETİK HASTALARDA HELİCOBACTER PYLORİ ENFEKSİYONU İLE GLİSEMİK REGÜLASYONARASINDAKİ İLİŞKİ

ÖZET

Amaç: Tip 2 diyabetik hastalarda glisemik regülasyon ile Helicobacter pylori pozitifliği arasındaki ilişkiyi değerlendirdik.

Materyal ve Metod: Dr. Lütfi Kırdar Kartal Eğitim ve Araştırma Hastanesi İç Hastalıkları Polikliniklerine başvuran 315 tip 2 diyabetik hasta retrospektif değerlendirildi. Açlık kan şekeri, HbA1c seviyeleri ve üre nefes testi (ÜNT) sonuçları analiz edildi. HbA1c seviyeleri ile ÜNT pozitifliği arasındaki ilişki araştırıldı.

Bulgular: ÜNT pozitif olan hastalarda açlık kan şekeri (175,3±73,9 mg/dl), ÜNT negatif olan hastalara (139,3±35,6 mg/dl) göre anlamlı şekilde yüksekti (p<0,05). HbA1c seviyeleri de ÜNT pozitif olan hastalarda (8,0±2,1), ÜNT negatif olan hastalara (6,9±1,2) göre anlamlı şekilde yüksek tespit edildi (p<0,05).

Sonuç: Çalışmamızda diyabetik hastalarda ÜNT ile saptanan HP enfeksiyonu oranlarının kötü glisemik kontrollü grupta sıkı glisemik kontrollü gruba göre anlamlı derecede yüksek olduğu gösterilmiştir.

Anahtar Kelimeler: Diabetes mellitus, Helicobacter pylori, HbA1c **Nobel Med 2014; 10(3): 32-35**

INTRODUCTION

Diabetes mellitus (DM) is a common, chronic and progressive disease. As the prevalence of type 2 DM increases, morbidity and mortality caused by microvascular and macrovascular complications also increase. Neuropathy that disrupts patient's quality of life may result in various clinical status changes as well as very serious complications like coronary artery disease, chronic kidney disease and retinopathy. Gastric autonomic neuropathy comes into prominence when the duration of disease lengthen. Dyspeptic symptoms are increased in diabetic patients and are attempted to be explained with diabetic gastroparesis, increased tendency to infections, especially the role of Helicobacter pylori (HP) infection in glycemic regulation has been a subject of curiosity. HP infection is a common infectious disease in the world and is detected in 95% of patients with duodenal ulcer and 70-80% in patients with gastric ulcer. HP rate is nearly 50% in patients with dyspeptic symptoms but no ulcer.[1]

Simon et al. first described an association between HP and DM in 1989.[2] The relationship between DM, HP infection and indigestion is a controversial topic. In some studies it is shown that indigestion and HP infection detected much more in diabetic patients.[3] On the other hand some studies have shown that there is no difference for HP positivity between diabetic and non-diabetic populations, even it was reported that HP positivity is less in diabetic patients.[4]

We aimed to investigate the effects of HP to glycemic regulation as a chronic infectious disease and the relationship between glycemic regulation and HP prevalence by comparing urea breath tests (UBT) and HbA1c levels.

MATERIAL and METHOD

This study includes 315 type 2 diabetic patients admitted to Dr. Lütfi Kırdar Kartal Training and Research Hospital Internal Medicine Polyclinics between June-December 2011. Patients with chronic kidney disease, chronic liver disease, decompensated heart failure, a history of malignant disease, a history of using proton pump inhibitors or antibiotics in the last one month were excluded. We recorded durations of DM, dyspeptic symptoms, fasting plasma glucose, HbA1c levels of all patients and did UBT to all patients for HP infection. Patients were divided into three groups based on their HbA1c levels;
Well controlled group: HbA1c<7 % (n:170)
Poor controlled group: HbA1c: 7-9 % (n:88)
Uncontrolled group: HbA1c: >9% (n:57)

Table 1: Comparison of DM durations, fasting plasma glucose, HbA1c levels and UBT positivity in diabetic patients

	Urea-Breath Test		p
	Positive Mean±SD/n-%	Negative Mean±SD/n-%	
DM duration	5.6±3.7	5.4±3.7	0.657
Fasting plasma glucose	175.3±73.9	139.3±35.6	< 0.001*
HbA1c	8.0±2.1	6.9±1.2	< 0.001*
HbA1c			
≤7	74-46.5%		< 0.001*
7</≤9	36-22.6%		
9<	49-30.8%		

*: Chi-square/Mann-Whitney U test, **DM:** Diabetes Mellitus, **UBT:** Urea breath tests

Table 2: Comparison of UBT and indigestion in DM patients

DM Patients / Dyspeptic symptoms	Urea-Breath Test		p
	Positive n (%)	Negative n (%)	
Positive	80 (50.3%)	28 (17.9%)	< 0.001*
Negative	79 (49.7%)	128 (82.1%)	

*: Chi-square test, **DM:** Diabetes Mellitus, **UBT:** Urea breath tests

Fasting plasma glucose, HbA1c levels, durations of DM and dyspeptic symptoms compared with UBT for three groups.

UBT: After 6-hour fasting 37 kBq 14C-Urea capsul was administered with water and patients blowed on a breathcard after 15-20 minutes. Breathcards were tested with Geiger Müller counter (HELIPROBE analyzer). Results were evaluated as mentioned kit prospectus;
Grade 0: No infection
Grade 1: Suspicious
Grade 2: Infected

Descriptive statistics of the data frequency, rate, mean, standard deviation values were used. Kolmogorov-Smirnov test was used to evaluate the distribution of the variables. Mann-Whitney U test and independent samples t-test were used to analyze quantitative datas. Chi-square test was used for the analysis of qualitative data. The Ethical Committee of Dr. Lütfi Kırdar Training and Research Hospital provided ethical approval for the study (Decision No=3, Date: 03/10/2012)

RESULTS

There was no significant difference in DM durations between UBT(-) and UBT(+) patients (p>0.05). Fasting plasma glucose was significantly higher in UBT(+) patients (175.3±73.9 mg/dl) than in UBT (-) patients (139.3±35.6 mg/dl) (p<0.05) (Table 1).→

Table 3: Comparison of DM duration and indigestion			
	Dyspeptic Symptoms		p
	Positive Mean±SD	Negative Mean±SD	
DM duration (years)	6.3±4.0	5.1±3.5	0.007*
*: Mann-Whitney U test			

HbA1c levels were detected significantly higher in UBT positive patients (8.0±2.1) than in UBT negative ones (6.9±1.2) (p<0.05) (Table 1).

Patients who had HbA1c <7% (well controlled group) had less indigestion and HP positivity than patients who had HbA1c between 7-9% and >9% (poor controlled and very poor controlled groups respectively) (p<0.05) (Table 1).

Dyspeptic symptoms in UBT(+) patients (50.3%) were significantly higher than in UBT(-) patients (17.9%) (p<0.05) (Table 2). The mean duration of DM for patients with dyspeptic symptoms (6.3±4.0) was significantly higher than the patients without dyspeptic symptoms (5.1±3.5) (p<0.05) (Table 3).

DISCUSSION

The number of diabetic patients is increasing in our country and all over the World. According to International Diabetes Federation (IDF), the number of diabetic patients is 246 million (6% of 20-79 year-old population) in 2007 and it is expected to be 380 million (7.3% of adults) in 2025.[5] Diet, oral hypoglycemic agents and insulin are used for DM treatment. However, glycemic control in diabetic patients still continues to be a very serious problem. In achieving to goal patients discordance and inadequate drug use play a critical role, beside these factors chronic infections are also very important.[6]

The relationship between DM and HP infection is controversial. In resulted studies and most of ongoing studies the prevalence of HP infection is higher in people with diabetes.[6] In contrast, some other studies have shown that there is no association between HP infection and DM. HP infection was not related to the duration of DM and not evenly dyspeptic symptoms.[7] Even some studies have shown that there was a decrease in HP infection in diabetic patients than in healthy people.[8]

Oldenburg et al. have compared a diabetic group (n:143) and non-diabetic group (n:159) according to HP and indigestion. HP prevalence was established significantly higher in obese, women, middle aged patients and patients had a high fasting plasma glucose, high HbA1c levels, long DM duration, dyspeptic symptoms, autonomic neuropathy in cardiovascular system and high blood pressure. Duration of diabetes and HbA1c levels were associated with the frequency of infection.[9,10] In our study, high fasting plasma glucose and HbA1c levels were in a positive correlation with the incidence of infection (p<0.05), however, there was no significant difference between the frequency and duration of diabetes, and HP (p>0.05).

Chen et al. have investigated the relationship between HP colonization-HP CagA gene positivity and HbA1c levels in 7417 patients, there was a positive correlation between body mass index and HbA1c levels with HP positivity.[11] This is the largest study on this issue and it is important that our study results are similar to this study results.

Fernandini et al. have compared HbA1c levels in 75 diabetic patients by dividing them into two groups; HP positive and HP negative. They showed that mean HbA1c was 7.5% in HP positive group, and 7% in HP negative group, moreover HP positive group had poor glycemic control.[12] They suggested that these findings might be the result of decreased gastric motility and peristaltism, chemical changes occurring gastric mucosa by non-enzymatic glicosylation.[13] This study is the closest one to our study purpose.

In our study DM durations were not different between UBT(-) and UBT(+) patients (p>0.05). Fasting plasma glucose was significantly higher in UBT positive patients (175.3±73.9 mg/dl) than in UBT negative patients (139.3±35.6 mg/dl) (p<0.05). Mean HbA1c level was detected significantly higher in UBT positive patients (8.0±2.1) than in UBT negative ones (6.9±1.2) (p<0.05) (Table 1).

On the other hand there are also some studies available showing similarity in HP prevalence between diabetic and non-diabetic ones. Kozak et al. showed in a 100 people study group that HP prevalence was similar in diabetic and non-diabetic groups.[8] Anastasios et al. showed that HP prevalence and indigestion frequency were similar in diabetic and non-diabetic patients.[7] Ko et al. and Stanciu et al. showed that there was no relationship between HP positivity and fasting plasma glucose, HbA1c, DM duration, dyspeptic symptoms and endoscopic findings.[14]

Zelenkova et al. showed that HP positivity was fewer in diabetic group (n;195) than in non-diabetic group (n:216).[15] Kojecky et al. found that HP positivity →

non-ulcer dyspepsia, gastric ulcer were fewer in diabetic group (n:91) than in non-diabetic group (n:98).[16] They established that there was fewer indigestion in diabetic patients than in non-diabetic ones. It is well-known knowledge that indigestion prevalence is higher in diabetic patients because of autonomic gastropathy. This study differs from others because it shows exactly opposite results. These two studies are interesting because they show lower HP prevalence in diabetic patients. These studies suggest that microangiopathy may prevent HP colonization and microvascular changes occurring gastric mucosa may prevent HP colonization and may create a negative environment for survival.

In recent years, there are several studies evaluating the relationship between HP positivity and dyspepsia reported different results. Our study suggests that there is a remarkable relationship between HP positivity, DM and dyspepsia and there is a need for larger studies.[14,15]

CONCLUSION

Our results suggest that HP infection has a critical role for diabetic patients' glycemic regulation. Glycemic control is worse in HP positive patients than in HP negative ones. HP eradication regimens may help glycemic regulation in diabetic patients who have dyspeptic symptoms and have a poor glycemic control. Larger and prospective studies including the results of post-eradication findings are needed.

* The authors declare that there are no conflicts of interest.

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