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Evaluation of serum ghrelin levels in patients with hyperplastic gastric polyps

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Background/aims: *Ghrelin is a 28 amino acid peptide and the main source of serum ghrelin is the stomach. The aim of this study was to evaluate serum ghrelin levels in patients with hyperplastic gastric polyp.* ***Materials and Methods:*** *Eighty patients (50 female, 30 male) were included in this study: 28 with hyperplastic gastric polyp, 20 with benign gastric ulcer and 32 with chronic active gastritis. Serum ghrelin levels were measured by radioimmunoassay method.* ***Results:*** *Serum ghrelin level was significantly lower in patients with hyperplastic gastric polyp (1139.86±279.23 pg/ml) than in those with benign gastric ulcer (1362.45±335.35 pg/ml) and chronic active gastritis (1362.91±269.67 pg/ml) (p=0.016 and p=0.003, respectively). The benign gastric ulcer and chronic active gastritis groups had similar serum values (p=0.996). Serum ghrelin level was not affected by Helicobacter pylori, with levels of 1298.70±309.01 pg/ml and 1252.12±303.04 pg/ml in 56 positive and 24 negative patients, respectively (p=0.536). In the patients with hyperplastic gastric polyp, Helicobacter pylori infection was found to have no effect on serum ghrelin level (p=0.855).* ***Conclusions:*** *Serum ghrelin levels of patients with hyperplastic gastric polyp were lower than in patients with benign gastric ulcer and chronic active gastritis. In patients with various benign stomach lesions, the presence of Helicobacter pylori does not seem to affect serum ghrelin levels.*

Key words: Ghrelin, hyperplastic gastric polyp, benign gastric ulcer, *Helicobacter pylori,* chronic active gastritis

Hiperplastik mide polipli hastalarda serum ghrelin düzeylerinin değerlendirilmesi

Amaç: *Ghrelin 28 amino asit peptiddir ve dolaşımdaki ghrelinin ana kaynağı midedir. Bu çalışmanın amacı hiperplastik mide polipli hastalardaki serum ghrelin seviyesini değerlendirmekti.* ***Gereç ve Yöntem:*** *Çalışmaya 80 (50 kadın/30 erkek) hasta dahil edildi. Hasta gruplarının dağılımı; 28 hiperplastik mide polipli hasta, 20 benign mide ülserli hasta ve 32 kronik nonatrofik gastritli hasta idi. Serum ghrelin seviyesi radyoimmun test yöntemi ile ölçüldü.* ***Bulgular:*** *Serum ghrelin düzeyi hiperplastik mide polipli hastalarda (1139.86±279.23 pg/ml), benign mide ülserli (1362.45±335.35 pg/ml) ve kronik aktif gastritli hastalara (1362.91±269.67 pg/ml) göre anlamlı düzeyde düşüktü (P=0.016 ve P=0.003). Benign mide ülserli ve kronik aktif gastritli grup arasında fark yoktu (P=0.996). Serum ghrelin seviyeleri Helikobakter pilori pozitif hastalarda (56 hasta) 1298.70±309.01 pg/ml ve Helikobakter pilori negatif hastalarda (24 hasta) 1252.12±303.04 pg/ml saptandı ve sonuç anlamlı değildi (P=0.536). Hiperplastik mide polipli hastalarda Helikobakter pilori varlığının serum ghrelin seviyesine etkili olmadığı saptandı (P=0.855).* ***Sonuç:*** *Hiperplastik mide polipli hastalardaki serum ghrelin seviyesi benign mide ülserli ve kronik nonatrofik gastritli hastaların serum ghrelin seviyesinden daha düşüktü. Çeşitli benign mide lezyonlarına sahip hastalarda Helikobakter pilori varlığının serum ghrelin düzeylerine etkisi görülmüyor.*

Anahtar kelimeler: Ghrelin, hiperplastik mide polibi, iyi huylu mide ülseri, *Helikobakter pilori,* kronik aktif gastrit

INTRODUCTION

Ghrelin, which is produced in many human tissues, has a high mRNA expression in the stomach (1). It is an important gastroprotective factor for the gastric mucosa. It is known that plasma ghrelin levels show a decrease after gastrectomy and gastric bypass operations (1,2). Ghrelin has impor-

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tant functions in appetite regulation, energy balance, gastric motility, and acid secretion. The main source of serum ghrelin is considered to be the stomach (1-4).

Hyperplastic gastric polyps (HGPs) are usually asymptomatic and determined incidentally during upper gastrointestinal endoscopy performed for various reasons. They are mostly seen as single small sessile polyps. HGPs can be found anywhere in the stomach, mostly the antrum. HGPs are mostly related with autoimmune and *Helicobacter pylori (H. pylori)*- induced chronic gastritis.

The relation between *H. pylori* infection and ghrelin levels in the circulation is a controversial issue. There are studies reporting lower ghrelin levels in *H. pylori*-positive patients compared to *H. pylori*-negative patients. Some studies also suggest no association between *H. pylori* infection and serum ghrelin levels.

The aim of this study was to compare serum ghrelin levels in patients with HGP to those with benign gastric ulcer or chronic active gastritis.

MATERIALS AND METHODS

Patients

Eighty patients were included in the study: 28 patients with HGP, 20 patients with benign gastric ulcer and 32 patients with chronic active gastritis.

Inclusion Criteria

Inclusion criteria of the study are mentioned below:

1. Age between 18-80 years
2. No history of gastrectomy or bypass surgery
3. Body mass index (BMI) <30 kg/m^2
4. Histologically confirmed benign gastric ulcer
5. Histologically confirmed HGP
6. Histologically confirmed chronic active gastritis in the group other than HGP and benign gastric ulcer groups
7. No antibiotics or proton pump inhibitor use during the last 15 days

Upper Gastrointestinal System Endoscopy

All upper gastrointestinal system endoscopy procedures were performed in the Ankara Ataturk Education and Training Hospital, Gastroenterology Clinic Endoscopy Unit.

Biopsies were taken from the body of a gastric polyp, if any was detected. Patients were included in the study provided the histological examination demonstrated a hyperplastic polyp. Polypectomy procedures were performed afterwards.

In order to compare with gastric polyp cases, sufficient numbers of sequential gastric ulcer and chronic active gastritis cases meeting the inclusion criteria were designated and included. The ulcer localization and size were recorded; biopsies from ulcer edges were conducted to confirm benign histology. If gastritis was suspected, antral biopsies were taken in order to confirm chronic active gastritis. From all patients, two single biopsies were taken from the prepyloric area of the antrum for *H. pylori*.

Serum Ghrelin Level Measurement

Blood samples for serum ghrelin measurement were obtained at 8:30 a.m. following a 12- hour fasting period. Serum samples were centrifuged immediately and preserved at -70°C. Serum ghrelin levels were measured by radioimmunoassay method (Ghrelin RIA kit, DIAsource ImmunoAssays S. A., Rue de l'Industrie, Belgium).

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL) (16.0 software package program). Data were analyzed by definitive statistics (mean ± SD, maximum, minimum, and percentage). Comparative data between groups were analyzed with independent sample t test and Fisher's exact chi-square test. P values less than 0.05 were considered statistically significant.

RESULTS

Eighty patients (50 female, 30 male) were included in the study. Twenty-eight (35%) had HGP, 20 (25%) had benign gastric ulcer, and 32 (40%) had chronic active gastritis. No differences were found between the groups in terms of age, gender and BMI. General characteristics of the patients are demonstrated in Table 1.

Forty-four hyperplastic polyps -most frequently in the antrum and corpus- were established in 28 patients. Nineteen patients had single polyps and nine had more than one. General characteristics of the polyps are demonstrated in Table 2. Nine of them were >1 cm. Characteristics of the polyps according to size and localization are shown in Table 3.

Table 1. General characteristics of the patients

	HGP	BGU	CAG
N	28	20	32
Age (year)	60.03±9.98	54.30±12.83	42.03±14.03
Gender (F/M)	19/9	10/10	21/11
BMI (kg/m^2)	28.64±3.81	27.10±2.61	26.71±4.97
H. pylori (Positive/negative)	15/13	18/2	23/9
Serum ghrelin (pg/ml)	1139.86±279.23	1362.45±335.35	1362.91±269.67

HGP: Hyperplastic gastric polyp. BGU: Benign gastric ulcer. CAG: Chronic active gastritis. BMI: Body mass index. *H. pylori: Helicobacter pylori.*

Serum ghrelin level in patients with HGP (1139.86±279.23 pg/ml) was lower than in chronic active gastritis (1362.91±269.67 pg/ml; p=0.003) and benign gastric ulcer (1362.45±335.35 pg/ml; p=0.016), respectively.

No difference was found between serum ghrelin levels of patients with chronic active gastritis and benign gastric ulcer (p=0.996). When all patients were examined in terms of *H. pylori* presence, no significant difference was demonstrated between ghrelin levels of 56 *H. pylori*- positive patients (1298.70±309.01 pg/ml) and 24 *H. pylori*-negative patients (1252.12±303.04 pg/ml) (p=0.536). Serum ghrelin levels of 30 females (1298.50±319.42 pg/ml) and 50 males (1301.77±286.89 pg/ml) were similar (p=0.702). When serum ghrelin levels of patients with HGP were examined for *H. pylori* presence, there was no statistical difference between 15 *H. pylori*-positive patients (1149.07±293.50 pg/ml) and 13 *H. pylori*-negative patients (1129.23±273.31 pg/ml) (p=0.855).

DISCUSSION

In this study, we compared serum ghrelin levels of patients with HGP to those of patients with benign gastric ulcer and chronic active gastritis. Levels were significantly lower in patients with HGP compared to those with benign gastric ulcer and chronic active gastritis (p=0.016 and p=0.003, respectively).

Suzuki et al. (5) showed that plasma ghrelin levels were significantly higher in patients with gastric ulcer compared to those with chronic gastritis and were significantly higher in patients with gastric ulcer than in those with non-ulcer chronic gastritis in *H. pylori*-positive patients.

In a study researching different gastrointestinal diseases (chronic gastritis, benign gastric polyps, gastric ulcer, reflux esophagitis, duodenal ulcer, acute gastritis, and gastric cancer), plasma ghrelin levels of patients with chronic gastritis and gastric ulcer were found to be the lowest (6). Plasma ghrelin levels of patients with benign gastric polyp were not different from the normal population. In that study, the types of the benign gastric polyps were not mentioned. To the best of our knowledge, no other study on ghrelin levels in a HGP population has been published.

It is known that total plasma ghrelin level shows a decrease in patients with *H. pylori*-related atrophic gastritis depending on the degree of atrophy. This finding can be explained by the loss of cells that produce ghrelin due to inflammatory

Table 2. General characteristics of polyps

Polyp characteristics	Patient number (%)
Localization	
Antrum	13 (46.4)
Corpus	9 (32.2)
Fundus	2 (7.1)
Cardia	4 (14.3)
Number of polyps	
1	19 (67.9)
2	6 (21.4)
4	2 (7.1)
5	1 (3.6)
Diameter	
0-5 mm	7 (25)
5-10 mm	16 (57.1)
>10 mm	5 (17.9)

Table 3. Characteristics of polyps according to size and localization

Polyp Localization	Polyp size		
	0-5 mm	6-10 mm	>10 mm
Antrum (n=21, 47.8%)	7	14	-
Corpus (n=17, 38.6%)	5	5	7
Fundus (n=2, 4.5%)	-	2	-
Cardia (n=4, 9.1%)	1	1	2

and/or atrophic changes (7). Campana et al. (8) showed that plasma active ghrelin levels of patients with chronic atrophic gastritis were higher than in healthy individuals. This observation suggests that in chronic active gastritis, active ghrelin level might be elevated to compensate for the decreased total ghrelin level.

Recently, the results of a meta-analysis showed that circulating ghrelin levels were significantly higher in *H. pylori*-negative people than in those infected with *H. pylori* (9).

Serum ghrelin levels of patients infected with H. pylori are lower than in noninfected patients, independent from age, sex and BMI (10-12). This is due to the decrease of ghrelin-positive cells and ghrelin mRNA expression in the gastric mucosa of *H. pylori*-infected patients (13). However, there are also some studies suggesting no association between *H. pylori* presence and plasma ghrelin concentration (14). In our study, we found that presence of *H. pylori* did not seem to affect serum ghrelin levels in any of the patient groups, including the patients with HGP. In our study, the presence of *H. pylori* was demonstrated by histopathological examination of two single biopsies taken from the antrum. Establishing *H. pylori* infection only by the histopathological examination seems to be a limitation of this study.

In conclusion, serum ghrelin levels were found to be lower in the patients with HGP compared to patients with benign gastric ulcer and chronic active gastritis. Presence of *H. pylori* infection did not seem to affect serum ghrelin levels in benign gastric pathological conditions.

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