

# THE EVALUATION OF VARIETY IN TASTE OF LIDOCAINE SPRAY USED FOR TOPICAL ANESTHESIA IN PATIENTS UNDERGOING GASTROSCOPY

## GASTROSKOPİ UYGULANAN HASTALARDA TOPİKAL ANESTEZİK OLARAK KULLANILAN LİDOKAİN SPRAY TAT DEĞİŞİKLİKLERİNİN DEĞERLENDİRİLMESİ

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### ABSTRACT

**Purpose:** There is considerable variation in the distribution of the four basic taste buds from individual to individual. Differences in taste perception have been reported in the existence of some gastrointestinal diseases. We have also observed that patients perceive very different tastes after lidocaine spray use. We aimed to determine variations in the taste of lidocaine spray used for topical anesthesia before gastroscopy and to investigate the relationship between these differences and endoscopic findings and *Helicobacter pylori* (Hp) infection. **Methods:** 107 patients (48 males, 59 females, mean age  $46.8 \pm 16.8$  years) undergoing routine upper gastrointestinal endoscopy for different reasons were studied. After applying 4 doses (40 mg) of lidocaine spray to the oro-pharynx, the patients were questioned about the taste in the first minute. Afterwards the relationship between the taste perceived and the diseases found in endoscopy was evaluated. **Results:** The majority of patients (56%) perceived the taste of lidocaine spray as bitter, while 40.2% and 3.7% of them perceived it as fruity/sweet and tasteless, respectively. For the purposes of further analysis, patients stating that the taste was bitter were classified as tasters (56%), and those stating that it was non-bitter (i.e. sweet, fruity or tasteless) were classified as non-tasters (44%). No significant difference was found between the groups in terms of the endoscopic findings (such as esophagitis, gastritis, peptic ulcer) and Hp positivity. Additionally, Hp positivity and taste perception did not differ between the two groups, which were older than 46 years and younger than 46 years. **Conclusion:** The patients did not have uniform perceptions of the taste of lidocaine. This variability may depend on individual perceptions and the substances in the spray; it was not related to the endoscopic findings, Hp infection or age.

**Key Words:** Lidocaine, Topical Anesthesia, Endoscopy.

### INTRODUCTION

There is considerable variation in the distribution of the four basic taste buds in various species and, within a given species, from individual to individual. In humans, there is an interesting variation in the ability to taste

### ÖZET

**Amaç:** Dört temel duyası kişiden kişiye değişiklik gösterir. Kimi gastrointestinal sistem hastalarında da tat duyasında farklılıklar olabilir. Biz Lidocain kullanımı sonrasında da hastaların tadları farklı algıladıklarını gözlemledik. Bu çalışmada amacımız, gastroskopi öncesi topikal anestezi olarak kullanılan lidokain spreyin meydana getirdiği farklılıklar ve bu farklılıkların endoskopik bulgular ve *Helicobacter Pylori* (Hp) enfeksiyonları ile arasındaki ilişkiyi saptamaktır. **Metod:** Değişik nedenlerle gastrointestinal endoskopi uygulanan 107 hasta (48 erkek, 59 kadın, ortalama yaş  $46.8 \pm 16.8$  yıl) çalışmaya alındı. Orofarinkse 4 doz (40 mg) lidokain spray uygulandıktan sonra birinci dakikada hastalar tat değişiklikleri yönünden sorgulandılar. Daha sonra endoskopi sonucu konulan tam ile tad değişiklikleri arasındaki ilişki incelendi. **Bulgular:** Hastaların çoğu (%56) spray sonrası acımsı bir tat, %40.2'si tatlı/meyvemsi tad algıladıkları, %3.7'sinde tad değişikliği olmadığı belirtilmiştir. Daha sonraki aşamada, acımsı tat belirten hastalar tat duyarlı (%56), acımsı tat belirtmeyen hastalar (örn. Tatlı, meyvemsi ya da tat yok) tat duyasız olarak sınıflandırıldılar (%44). Endoskopik bulgular (özofajit, gastrit, peptik ülser gibi) ve Hp pozitifliği yönünden gruplar arasında belirgin bir farklılık bulunmadı. Ayrıca, Hp pozitifliği ve tad algısı yönünden her iki grup arasında 46 yaş üzeri ve altında olanlar yönünden de farklılık izlenmedi. **Sonuç:** Hastaların Lidokain sonrası tad duyarlarında tekdüze bir algılama izlenmemiştir. Bu değişkenlik bireysel algılama ve spreyin içeriğine bağlıdır ve endoskopik bulgular, Hp enfeksiyonu ya da yaş ile ilgili değildir.

**Anahtar Kelimeler:** Lidokain, Topikal Anestezi, Endoskopi.

phenylthiourea, also known as phenylthiocarbamide. The inability to taste phenylthiocarbamide is inherited as an autosomal recessive trait (1). Knowledge of this trait is of considerable value in studies of human genetics (2,3). The taste of phenylthiocarbamide has been

reported to be associated with peptic ulceration (4,5). In another study, different taste perceptions in the use of lidocaine spray have been reported (6). Lidocaine spray, a topical anesthetic, is widely used as a pharyngeal anesthetic to facilitate upper gastrointestinal endoscopy. We have also observed that patients perceive very different tastes after lidocaine use. This study aimed to determine perception variations in the taste of lidocaine spray and to investigate the relationship between these differences and some diseases such as gastritis, duodenitis, esophagitis, peptic ulcer and *Helicobacter pylori* infection.

### MATERIALS AND METHODS

One hundred seven patients (48 males, 59 females, range 20-89 years, mean age  $46.8 \pm 16.8$  years) undergoing gastroscopy for dyspeptic complaints were included in the study. Patients who had undergone gastric surgery, had diseases interfering with the sense of taste such as upper respiratory tract infection and oral disease and had received eradication treatment for *Helicobacter pylori* infection were excluded. Lidocaine spray (Xylocaine pump spray 10%; Astra Södertälje, Sweden), the only commercial preparation in Turkey, was used for oropharyngeal anesthesia. One milliliter of Xylocaine spray consists of 100 mg of lidocaine, 241 mg of ethanol (95%), 300 mg of polyethylene glycol, 10 mg of banana aroma, 0.5 mg of menthol, 1.5 mg of saccharin, and an adequate amount of distilled water (7). The adjusted pump valve of the Xylocaine spray gives 10 mg of lidocaine in every puff. Four puffs (40 mg) were used for each patient.

All the patients included in the study group gave their informed consent. The same physician applied the spray and questioned all the patients. They were asked how the taste was (bitter, sweet,

fruity, tasteless) in the first minute following the spray application and their answers were written down. *Helicobacter pylori* status was determined by rapid urease test and/or histopathologically.

The chi-squared test was used for statistical analyses. Calculated p values less than 0.05 were considered significant.

### RESULTS

Gastritis in 43 patients, gastroduodenitis in 40 patients, esophagitis+gastroduodenitis in 12 patients, peptic ulcer (6 duodenal, 5 gastric) in 11 patients, and gastric cancer in 1 patient were defined in the gastroscopy procedure. *Helicobacter pylori* positivity rates in these diagnoses were 58% (25/43), 77.5% (31/40), 50% (6/12), 100% (11/11), and 100% (1/1), respectively (Table 1). The rate of Hp positivity was 69.2% (74/107) overall.

The majority of the patients perceived the taste of the spray as bitter (60/107, 56%). Forty-three patients (40.2%) stated it was fruity/sweet and 4 (3.7%) tasteless. The patients perceiving a fruity/sweet defined the taste as follows: 11 as banana, 17 as peppermint, 1 as raspberry, 1 as pineapple, and 1 as strawberry.

For the purpose of further analysis, patients who perceived the taste as bitter were classified as tasters (60/107, 56%), and those who perceived the taste as non-bitter (i.e. sweet, fruity or tasteless) were classified as non-tasters (47/107, 44%). Table 1 shows the demographic features, endoscopic results and Hp infectivity of the patients. There were no significant differences between the tasters and non-tasters in terms of age, gender, endoscopic findings and Hp positivity ( $p > 0.05$ ).

Table 2 shows the comparison of endoscopic findings in association with Hp positivity. As

Table- 1: Comparison of demographic features, Hp status and endoscopic findings in the tasters and non-tasters of topical lidocaine.

	Tasters (n=60)	Non-tasters (n=47)
Mean age	49.02 ± 16.83	42.87 ± 16.36
Sex (Male:Female)	27:33	21:26
Hp prevalence	41 (68.3%)	33 (70.2%)
Endoscopical findings		
Gastritis	24 (40%)	19 (40.4%)
Gastroduodenitis	23 (38.3%)	17 (36.2%)
Esophagitis+Gastroduodenitis	5 (8.3%)	7 (15%)
Peptic ulcer	7 (12%)	4 (8.5%)
Gastric carcinoma	1 (2%)	-

Table- 2: Comparison of endoscopic findings in the tasters and non-tasters in terms of Helicobacter pylori positivity.

Endoscopical findings	Patients with Helicobacter pylori	
	Tasters	Non-tasters
Gastritis	13	12
Gastroduodenitis	17	14
Esophagitis+Gastroduodenitis	3	3
Peptic ulcer	7	4
Gastric carcinoma	1	-

shown in this table, Hp positivity was defined in 13 of the 24 patients with gastritis (54.2%), in 17 of the 23 with gastroduodenitis (74%), in 3 of the 5 with esophagitis+gastroduodenitis (60%), in all of the 7 with peptic ulcers (100%), and in 1 with gastric carcinoma (100%) in the taster group. In the non-taster group, Hp infection was found in 12 of the 19 patients with gastritis (63.2%), in 14 of the 17 with gastroduodenitis (82.4%), in 3 of the 7 with esophagitis+gastroduodenitis (43%), and in all of the 4 patients with peptic ulcer (100%).

As a result, there was no statistically significant difference between the tasters and non-tasters in terms of Hp positivity on the basis of the endoscopic findings ( $p > 0.05$ ).

When we divide the patients into two groups according to their ages, we found no difference between those 46 years old or younger (n: 55) and those older than 46 years (n: 52) in terms of taste perception or Hp positivity.

## DISCUSSION

The ability of humans to discriminate differences in the intensity of tastes, like discrimination in olfaction, is relatively crude. A 30% change in the concentration of the substance being tasted is necessary before an intensity difference can be detected. The taste of phenylthiocarbamide has previously been associated with peptic ulceration (4,5). Inability to taste phenylthiocarbamide is inherited as an autosomal recessive trait. In dilute solution, phenylthiocarbamide tastes sour to about 70% of Caucasian populations but is tasteless to the other 30%. Testing for this trait is of considerable value in studies of human genetics (1).

Threshold concentrations of substances differ and taste buds respond to different perceptions of taste, i.e. sour, salty, bitter or sweet. For instance,

while the threshold concentration of sucrose perceived as sweet is 10,000 mmol/L, this amount is 23 mmol/L for saccharin. (1). The reason for the preference of saccharin as an artificial sweetener is the low level of its threshold concentration.

Lidocaine spray is a medicine used topically to obtain oro-pharyngeal anesthesia. Particularly used before upper gastrointestinal endoscopy, it is quite fruitful in increasing the tolerance of patients (8,9). It is unclear whether the variation in taste of lidocaine spray is determined genetically. In a study by Asante et al., which included 69 patients, the rates of subjects considering the taste of lidocaine as bitter were 54% (37/69), fruity/sweet 35% (24/69), and tasteless 9% (6/69) (6). These rates are similar to ours. Additionally, there was no statistically significant difference between tasters and non-tasters with respect to endoscopical findings and Hp positivity either in our study.

When we consider that the medicine contains banana aroma, the perception of a banana taste in 11 patients compared to one of peppermint taste in 17 patients is another clue indicating that the taste of the medicine is differently perceived. The perception of a peppermint taste in the majority of patients may be due to the menthol in Xylocaine. On the other hand, the perception of a sweet taste may be due to saccharin in the mixture.

In conclusion, the patients did not have a uniformly perception of the taste of lidocaine spray. This variability that may depend on individual perceptions, and the substances in the spray were not related to the endoscopical findings, Hp infection or age.

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