Clinical and Experimental Health Sciences

Original Article / *Özgün Araştırma*

Retrospective Examination of the Results of Gastroscopy in Bandirma State Hospital in Terms of Helicobacter Pylori *and* Sydney *Classification*

Bandırma Devlet Hastanesi'ndeki Gastroskopi Sonuçlarının *Helicobacter Pylori* ve Sydney Sınıflaması Açısından Retrospektif İncelenmesi

Tamer Akay

Department of General Surgery, Bandirma State Hospital, Balıkesir, Turkey

Cite this article as: Akay T. Retrospective Examination of the Results of Gastroscopy in Bandirma State Hospital in Terms of *Helicobacter Pylori* and Sydney Classification. Clin Exp Health Sci 2018; 8: 19-24.

Abstract

Objective: The aim of this study is to examine the frequency of *Helicobacter pylori (H. pylori*) in Bandirma State Hospital and its relation with parameters in the Sydney classification.

Methods: Endoscopy reports of 1029 patients undergoing diagnostic endoscopy at Bandirma State Hospital Endoscopy Unit between January 2016 and February 2017 were retrospectively reviewed using Sydney classification.

Results: Nearly 60.6% of the patients in the study were female. Female patients (41.7%) had a lower rate of *H. pylori* than male patients (54.1%). The average age does not vary according to sex, and the average age of all patients was 48.2 years. Inflammation (99.8%) in 1027 patients and neutrophil activation (50%) in 515 patients, intestinal metaplasia (18.7%) in 192 patients, glandular atrophy (4.7%) in 48 patients, and lymphoid follicle (25.1%) in 258 patients were detected. In 479 patients, *H. pylori* was positive (46.6%).

Conclusion: In our study, the prevalence of *H. pylori* was 46.6%, below the average of the literature and similar to the results in developed countries. When the association of *H. pylori* with the variables of the Sydney classification is examined, as the intensity of inflammation, neutrophil activation, intestinal metaplasia, and lymphoid follicle grade increased, *H. pylori* positivity increased, but the relationship between glandular atrophy level and *H. pylori* was not significant.

Keywords: *Helicobacter pylori*, gastroscopy, prevalence

Öz

Amaç: Bu çalışmanın amacı Bandirma Devlet Hastanesi'ndeki Helicobacter pylorinin (*H.pylori*) sıklığını ve Sydney sınıflamasındaki parametrelerle ilişkisini incelemektir.

Yöntemler: Çalışmada Ocak 2016 ve Şubat 2017 tarihleri arasında Bandirma Devlet Hastanesi Endoskopi ünitesinde tanı amaçlı endoskopi yapılan 1029 hastanın endoskopi raporları Sydney sınıflaması açısından retrospektif olarak incelendi.

Bulgular: Çalışmadaki hastaların %60,6'sı kadın, kadın hastalarda (%41,7) H.pylori oranı, erkek hastalara (%54,1) göre daha düşük düzeydedir. Yaş ortalaması cinsiyete göre değişiklik göstermemekle birlikte, bütün hastaların yaş ortalaması 48,2'dir. 1027 Hastada enflamasyon (%99,8), 515 hastada nötrofil aktivasyonu (%50), 192 hastada intestinal metaplazi (%18,7), 48 hastada glandüler atrofi (%4,7) ve 258 hastada lenfoid folikül (%25,1) saptandı. 479 Hastada H.pylori pozitif (%46,6) saptandı.

Sonuç: Bizim çalışmamızda H.pylori prevalansı %46,6 saptanmış olup literatür ortalamasının altındadır ve gelişmiş ülkelerdeki sonuçlarla benzerlik göstermektedir. H.pylorinin Sydney sınıflamasındaki değişkenlerle olan ilişkisi incelendiğinde; inflamasyonun şiddeti, nötrofil aktivasyonu, intestinal metaplazi ve lenfoid folikül derecesi arttıkça H.pylori pozitifliğinin arttığı görülmekte ancak glandüler atrofi düzeyi ile H.pylori arasındaki ilişki anlamlı düzeyde saptanmadı.

Anahtar kelimeler: *Helicobacter pylori*, prevalans, gastroskopi

INTRODUCTION

Although *Helicobacter pylori (H. pylori)* has been seen in human stomach secretions since the beginning of the 19th century, the relationship between chronic active gastritis and peptic ulcer and adenocarcinoma has been understood in 1983. In 1893, Bizzozero observed a spiral microorganism in the dog stomach, and in 1906, Krienitz isolated a similar bacterium from the stomach of a patient with stomach cancer. However, until 1982, science accepted the stomach as sterile due to the acidic environment. *H. pylori* first attracted attention in 1983, when Warren and Marshall showed that colonies of *Campylobacter*-like spiral microorganisms in human stomach in Australia (1, 2).

Helicobacter pylori is a Gram-negative microorganism, short-stranded, and S-shaped (sometimes in cocode form), catalase-, oxidase-, and urease-positive, 0.5-0.9´3 µm in size. The bacteria is genetically highly polymorphic and has been shown to be infected humans with different *H. pylori* strains (3). The site where the bacterium is primarily located may be the stomach, and it may be placed everywhere the gastric epithelial cell is present (4). Normally, the gastric mucosa is well-protected against bacterial infections, and the intense acidic environment plays an important role in this. *H. pylori* is a bacteria susceptible to acid stomach. Since

Sorumlu Yazar/Correspondence Author: Tamer Akay **E-posta/E-mail:** op.dr.tamerakay@gmail.com

Geliş Tarihi/Received: 14.05.2017 **Kabul Tarihi/Accepted:** 08.06.2017 **Çevrimiçi Yayın Tarihi/Available Online Date:** 30.11.2017 **DOI:** 10.5152/clinexphealthsci.2017.497

the acidity is higher in the corpus and fundus regions, it is more easily located in the antrum region where the acidity is low. In addition, *H. pylori* is able to adapt to acidic environment of stomach due to its virulence factors and its urease activity is important for that. The urease enzyme breaks down the urea and transforms it into ammonia and carbon dioxide. Ammonia turns into ammonium in acidic environment, and ammonium plays an important role in maintaining the vitality of the bacteria in the mucus layer. *H. pylori*, an extracellular bacterium, is not invasive and cannot go under epithelial tissue (5).

H. pylori is an important influence on gastritis, peptic ulcer, nonulcer dyspepsia, mucosa-associated lymphoma (MALT lymphoma), and gastric adenocancer etiology (6). Borch et al. (7) investigated the presence of *H. pylori* in 501 patients and found gastritis in half of them. *H. pylori* positivity was reported in 87% of these patients with gastritis. Strauss et al. reported *H. pylori* positivity greater than 90% in duodenal ulcer and greater than 70% in gastric ulcer (8). In the study conducted by Köksal et al. (9), approximately 30% of patients with non-ulcer dyspepsia were found to have improved symptoms with *H. pylori* eradication. Uemura et al. (10) found that gastric cancer develops in 36 of 1246 patients (2.9%) with *H. pylori* infection and that gastric cancer does not develop during follow-up period in patients without *H. pylori* infection. In 1994, the World Health Organization, the International Agency for Research on Cancer, reached the conclusion that *H.pylori* is causally linked to gastric carcinogenesis and is a definite carcinogen in humans (11). Recent studies have also shown that *H. pylori* infection is associated with diseases other than gastrointestinal system such as persistent iron deficiency anemia, idiopathic thrombocytopenic purpura, stroke, Parkinson's disease, Alzheimer's disease, and ischemic heart disease (12).

H. pylori has been shown to be present in some primates, but the main reservoir is human. The route of transmission of this bacterium has not been established. It is thought to be infected by mouth. High prevalence in crowded living conditions such as nursing homes with bad hygienic conditions and rehabilitation centers shows that it is transmitted by fecal-oral route. The isolation from dental plates suggests that the demonstration of genetic material by the polymerase chain reaction (PCR) in saliva can also be transmitted by oral route (5, 13). *H. pylori* infections are quite common in the world. Infection rates are increasing with age. In developing countries, infections are more than 75% positive among individuals under 20 years of age. Infection rates in children aged 0-8 years are around 10% per year. Infection is rapidly gained in childhood, and most of the population is infected before adolescence period. In developed countries, the situation is reversed, and infection rates are low in children and adolescents, high in adults (50% over 60 years), and this height is a form of "carriage" that reflects the age-old infections acquired in childhood. This can be attributed to the well-being of healthy living conditions (3, 14).

Tests developed for *H. pylori* can be classified as invasive and noninvasive. Noninvasive tests include stool antigen test, saliva antibody test, urine antibody test, urea breath test, and serologically immunoglobulin G and M assay. Invasive tests include examination of endoscopic biopsy specimens with histopathology, culture, and rapid urease tests and PCR test (15). Sensitivity and specificity for invasive tests are over 90% (16). The most reliable method for diagnosis is pathology-histology and biopsy culture of endoscopic biopsy material. Hematoxylin-eosin and Giemsa are pathologically preferred because they are sensitive, easy, and accessible (17).

The changes that *H. pylori* causes in the gastric mucosa are described and classified in detail in the Sydney classification (18). The Sydney classification includes neutrophil activity, chronic inflammation, intestinal metaplasia, lymphoid follicles, glandular atrophy, and *H. pylori* activity (19).

* Polymorphic basal leukocyte (PNL) activity: Neutrophil infiltration is graded as less than 1/3 of the surface epithelium and gastric pits is mild (+), between 1/3 and 2/3 is moderate (++), and more than 2/3 is severe (+++).

**H. pylori* activity: *H. pylori* activity was assessed in areas without intestinal metaplasia. In the evaluation of *H. pylori* activity, it was found that there was no *H. pylori* (0), less organisms (+) in small groups than 1/3 of mucous surface, 1 to 3 (++) in small groups, and 2/3 of mucosal surface (+++) in large and large groups.

*Chronic inflammation: It was evaluated as mild (+), moderate (++), and severe (+++), taking into consideration the density of lymphocytes and plasma cells in the lamina propria when determining chronic inflammation.

*Intestinal metaplasia (IM): The presence of goblet cells in the gastric mucosa has been evaluated as IM. IMs are divided into complete and incomplete. IM is classified as mild, moderate, and severe. Mild (+) is less than 1/3 of the tissue, moderate (++) is between 1/3 and 2/3, and severe (+++) is more than 2/3.

*Lymphoid follicles: Lymphoid aggregates with lamina propria in biopsy specimens and with or without germinal centers have been evaluated as lymphoid follicle formation.

*Glandular atrophy: Glandular atrophy is classified as mild, moderate, and severe. The loss of glandular mucosa covering 1/3 of the mucosa is rated as mild (+), 1/3 and 2/3 is moderate (++), and more than 2/3 is severe (+++) (19).

The aim of this study is to retrospectively evaluate the significance of endoscopy results in the last year in our hospital in terms of *H. pylori* and Sydney classification.

METHODS

Our study included 1029 patients who underwent diagnostic endoscopy at the Bandirma State Hospital Endoscopy unit between January 2016 and February 2017. There was no appeal to the ethics committee because it was a retrospective research. The cases consisted of patients from various clinics in our hospital and patients referred to upper gastrointestinal endoscopy requests from hospitals in the surrounding provinces and districts. Written consent was obtained from all patients. Patients were examined by the anesthesiologist by performing general blood tests, all abdominal ultrasonography before the endoscopy procedure. They were hungry at 12 o'clock before the operation. Before gastroduodenoscopy, a 10% lidocaine spray (IMS Limited, So. El Monte, USA) was used

for oropharyngeal region anesthesia to remove the tingling reflex. Nevertheless, the uncompensated patient was treated with i.v. midazolam (2-5 mg) (CURAMED Pharma, Karlsruhe, Germany) and/or propofol (1 mg/kg) i.v. (Fresenius Kabi, Hafnerstrasse, Austria). No endoscopy was performed that would not be able to overcome the procedure due to cardiopulmonary or other reasons. Patients for control and treatment were not included in the study. Patients who could not be assessed until the second part of the duodenum were excluded from the study. Two biopsy specimens were obtained from the antrum region. Standard Fujinon and Pentax panendoscopes were used for gastroduodenoscopy. Endoscopic reports of patients and pathological reports of antrum biopsies were retrospectively reviewed. Age, sex, absence, or presence of *H. pylori* and histopathological parameters of gastritis were evaluated. The biopsy specimens taken from the stomach antrum were fixed in 10% formaldehyde, and after passing through the routine follow-up procedures, 4- to 6-µm sections were made from the prepared paraffin blocks, and the sections were stained with hematoxylin–eosin and evaluated for histomorphology and *H. pylori* presence. It was determined that the presence of spiral bacteria was observed by staining with Giemsa method.

Statistical Analyses

The IBM SPSS Statistics 22 statistical package program (IBM SPSS Statistics for Windows, Version21.0. Armonk, NY, USA) was used in the study. Independent-sample t test was used to compare the mean of the groups, and Chi-square independence test was used to analyze the relationships between the nominal and ordinal variables. The results were interpreted at 95% confidence level. $p>0.05$ values were not different between diagnostic groups, and $p<0.05$ values were evaluated as difference between diagnostic groups.

RESULTS

Of the 1029 patients included in the study, 624 were women (60.6%) and the average age of all patients was 48.2 years.

The rate of *H. pylori* infection in female patients is 41.7%, which is lower than that of male patients and this difference is statistically significant (Table 1).

Intestinal inflammation (99.8%) in 1027 patients, neutrophil activation in 515 patients (50%), IM in 192 patients (18.7%), glandular atrophy in 48 patients (4.7%), and lymphoid folliculitis in 258 patients (25.1%) and *H. pylori*–positive (46.6%) in 479 patients (Table 2).

When the association of *H. pylori* with histopathological variables is examined; *H. pylori* positivity was detected in 46.6% of the 1027 patients with inflammation, 74.4% of the 515 patients with neutrophil activity, 37.5% of the 48 patients with glandular atrophy, 58.3% of the 151 patients with intestinal metaplasia, and the 79.1% of 258 patients with lymphoid follicle (Table 2).

When the relation of *H. pylori* to all gastric histopathological variables in Sydney classification was examined, *H. pylori* positivity was increased with severity of inflammation increased ($p<0.05$) and it was statistically significant. Similarly, as neutrophil activation progresses from mild to moderate, *H. pylori* positivity seems to increase and it was statistically significant ($p<0.05$). Glandular atrophy level and *H. pylori* positivity were not statistically significant ($p>0.05$). When *H. pylori* positivity was assessed with IM and lymphoid follicle frequency, it was found to be statistically significant ($p<0.05$) (Table 2).

Table 1. Sex and *H. pylori* relationship

		***H. pylori*- (550)**	***H. pylori*+ (479)**	**Total (1.029)**	
Sex	Female	364 (58.3%)	260 (41.7%)	624 (100%)	
	Male	186 (45.9%)	219 (54.1%)	405 (100%)	
	Total	550	479	1.029	p<0.05

H. pylori: Helicobacter pylori

Table 2. Relation of histopathologic variables in sydney classification with *H. pylori*

		***H. pylori*- (550)**	***H. pylori*+ (479)**	**Total (1.029)**	
Inflammation	No	2 (100%)	0 (0%)	2	
	(+)	337 (82.4%)	72 (17.6%)	409	
	(++)	182 (37.7%)	301 (62.3%)	483	
	(+++)	29 (21.5%)	106 (78.5%)	135	
	Yes	548 (53.4%)	479 (46.6%)	1027	
	Total	550 (53.4%)	479 (46.6%)	1029	p<0.05
Neutrophil activity	No	418 (81.3%)	96 (18.7%)	514	
	(+)	103 (32.6%)	213 (67.4%)	316	
	(++)	21 (13.5%)	135 (86.5%)	156	
	(+++)	8 (18.6%)	35 (81.4%)	43	
	Yes	132 (53.4%)	383 (46.6%)	515	
	Total	550 (53.4%)	479 (46.6%)	1029	p<0.05
Glandular atrophy	No	520 (53%)	461 (47%)	981	
	(+)	28 (63.6%)	16 (36.4%)	44	
	(++)	2 (50%)	2 (50%)	4	
	Yes	30 (53.4%)	18 (46.6%)	48	
	Total	550 (53.4%)	479 (%46.6)	1029	p=0.38
Intestinal metaplasia	No	462 (55.2%)	375 (%44.8)	837	
	(+)	63 (42%)	87 (58%)	150	
	(++)	25 (61%)	16 (39%)	41	
	(+++)	0 (0%)	1 (100%)	1	
	Yes	88 (53.4%)	104 (46.6%)	192	
	Total	550 (53.4%)	479 (46.6%)	1029	p<0.05
Lymphoid follicle	No	496 (64.3%)	275 (35.7%)	771	
	Yes	54 (20.9%)	204 (79.1%)	258	
	Total	54 (20.9%)	204 (79.1%)	1029	p<0.05

H. pylori: Helicobacter pylori

Table 3. Relation to histopathological parameters in *H.pylori* (+) patients

	(+)	(-)	Total
Inflammation	479 (100%)	0 (0%)	479
Activity	383 (80%)	96 (20%)	479
Glandular atrophy	18 (3.8%)	461 (96.2%)	479
Intestinal metaplasia	104 (21.7%)	375 (78.3%)	479
Lymphoid follicle	204 (42.6%)	275 (57.4%)	479

In 479 *H. pylori*-positive patients, 100% were found to have inflammation, 80% had neutrophil activation, 3.8% had glandular atrophy, 21.7% had IM, and 42.6% had lymphoid follicles (Table 3).

DISCUSSION

For performing gastroduodenoscopy is given, it is firstly questioned by the patients beforehand When the indication whether the use of intravenous sedative and analgesic agents has been used. When told not to do so, the procedure is largely rejected or postponed because of the fact that it will be difficult for patients. In this study, 10% lidocaine spray was used for oropharyngeal region anesthesia according to the patient's gastroduodenoscopy tolerance. Nevertheless, the uncompensated patient was treated with i.v. midazolam (2-5 mg) (CURAMED Pharma, Karlsruhe, Germany) and/or propofol (1 mg/kg) i.v. (Fresenius Kabi, Hafnerstrasse, Austria). Many studies in the literature have reported that gastroduodenoscopies without sedation are well-tolerated (20-25). However, there are reports that gastroduodenoscopy with a proper dose of midazolam and propofol is safer (26-28).

Every patient was routinely biopsied from the antrum. In randomized controlled trials, *H. pylori* eradication has been shown to reduce health expenditure in high-risk areas for stomach cancer (29-31). In a study conducted by Güneri et al. (32) with 2069 gastroscopy patients, *H.pylori* positivity was found in 58% patients with normal mucosa images, which is statistically significant. In this study, which we performed on patients with normal mucosa images in the light of all these data, it is considered that taking a biopsy specimen for the diagnosis of *H. pylori* in every gastroscopy patient that we have detected is suitable for cost and preventive medicine in the long-term.

Turkey has a similar appearance to the developing countries in terms of *H. pylori* frequency. However, even though individual studies show this, the frequency of *H. pylori* in Turkey is not fully known. The results of epidemiological studies for *H. pylori* in our country are changing. The prevalence of *H. pylori* in the study performed by İbiş et al. (33) is 71.2%, and the studies performed by Özdil et al. (34) and Uyanıkoğlu et al. (35) show similar prevalence. Özardalı et al. (36) found *H. pylori* positivity of 89.8% in the studies they performed in Şanlıurfa province. *H. pylori* positivity was 73.7% in the study conducted by Mete et al. (19) in the Tekirdağ region. The prevalence of *H. pylori* in our study was 46.6%, below the average of the literature and similar to the results in developed countries.

Similarly, in studies conducted by Özdil et al. (34) and also by Uyanıkoğlu et al. (35), there was no significant difference between sex and age groups in terms of *H. pylori* prevalence. Demirtaş et al. (37) found that *H. pylori* positivity rate was higher in females but not statistically significant in terms of *H. pylori* positivity between both sex and age groups. *H. pylori* positivity was found to be statistically significantly higher in females in Çıkman et al.'s (38) studies in Van region. In our study, *H. pylori* ratio (41.7%) was lower in female patients than in male patients (54.1%), and this difference was statistically significant ($p<0.05$). There was no statistically significant difference between the averages according to sex.

It is stated that IM is closely related to *H. pylori* infection, and it is a precancerous lesion if it is accompanied by chronic *H. pylori* infection, which plays a facilitating role in the morphogenesis of IM (39-41). In *H. pylori*-positive gastritis patients, IM has a high prevalence. The prevalence of IM varies in different countries or in different ethnic groups in the same country. Generally, these prevalent differences are in line with the incidence of gastric cancer in these communities (40). Craanen et al. found that the incidence of IM was 10% in the age group of 50 years and 32% in the age group of 50 years and older. It has been reported that IM has increased with age in this study (42). Similarly, in a thesis conducted by Akpolat et al. (43) in our country, 14% of under-50 years old and 44% of over 50 years of age were detected as IM. In Balaban et al.'s (44) study, 10% of cases under 50 years of age and 12.7% of cases of 50 years of age and above were found to have IM and it was found to be significantly more than 50 years old. The frequency of IM was found to be 26.6% in the study conducted by Konakçı et al. (45). In our study, the prevalence of intestinal metaplasia in *H. pylori* positive gastritis patients was 21.7%, similar to the literature.

When the relationship between *H. pylori* and glandular atrophy was examined, the incidence of atrophy in the antrum and corpus were found to be 21.7% and 21.9% (33), respectively, in a study conducted by İbiş et al. (33). In the study conducted by Mete et al. (19) 82% of atrophy patients had *H. pylori* positivity, whereas 18.2% of *H. pylori*-positive patients had atrophy. Glandular atrophy was found in 33% of all patients in the study conducted by Konakçı et al. (45). In our study, *H. pylori* positivity was found in 37.5% of glandular atrophy patients and atrophy was found in 3.8% of *H. pylori*-positive patients and these results are similar to the literature.

When the relationship between *H. pylori* and lymphoid follicle frequency was examined, various results were found in the world. In the study performed by Stolte et al. (47), the frequency of lymphoid follicles in *H. pylori*-positive patients was found to be 54% and 85% in Zaitonun et al.'s (48) study and 27% in the study conducted by Wyatt et al. (49). When the results in our country were examined, the frequency of lymphoid follicles in *H. pylori*-positive patients was found to be 46.3% in Mete et al.'s (19) study. In the study performed by Çelebi et al. (50), the frequency of lymphoid follicles in *H. pylori*-positive patients was 66.2%. In our study, the frequency of lymphoid follicles in *H. pylori*–positive patients was found to be 42.6%, which is similar to the literature.

CONCLUSION

H. pylori positivity rate and the changes that *H. pylori* causes in the gastric mucosa in Bandirma and its surroundings is similar to the literature in developing countries such as Turkey. This result should be supported by more extensive studies even if it suggests that it is caused by dietary habits and *H. pylori* antigenic structure in Bandirma and surrounding regions.

Ethics Committee Approval: There was no appeal to the ethics committee because it is a retrospective research.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the author.

Financial Disclosure: The author declared that this study has receives no financial support.

Etik Komite Onayı: Retrospektif bir araştırma olduğu için etik komite onayı alınmadı.

Hasta Onamı: Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

Hakem Değerlendirmesi: Dış Bağımsız.

Çıkar Çatışması: Yazar çıkar çatışması bildirmemiştir.

Finansal Destek: Yazar bu çalışma için finansal destek almadığını beyan etmiştir.

REFERENCES

1. Marshall BJ. Helicobacter pylori. Am J Gastroenterol 1994; 89: 116-9.
2. Altındiş M, Özdemir M. Helicobacter pylori ve tanısı. The Medical Journal of Kocatepe 2003; 2: 1-12.
3. Brooks GF, Carroll KC, Butel JS, Morse SA, Meitzner TA. Jawetz Melnick and Adelberg's Medical Microbiology. Connecticut: Appeleton and Lange; 1998.p.543-65.
4. Makola D, Peura DA, Crowe SE. Helicobacter pylori infection and related gastrointestinal diseases. J Clin Gastroenterol 2007; 41: 548-58. 5. Dunn BE, Cohen H, Blaser MJ. Helicobacter pylori. Clin Microbiol Rev 1997; 10: 720-41.
6. Forman D, Coeleman M, De Backer G, Elder J, Moller H. An international association between Helicobacter pylori infection and gastric cancer. Lancet 1993; 341: 1359-63. [CrossRef]
7. Borch K, Jonnson KA, Petersson F, Redeen S, Mardh S, Franzen LE. Prevalence of gastroduodenitis and helicobacter pylori infection in a general population sample: relations to symptomatology and life-style. Dig Dis Sci 2000; 45: 1322-9. [CrossRef]
8. Strauss RM, Wang TC, Kelsey PB, Compton CC, Ferraro MJ, Perez-Perez G, et al. Association of helicobacter pylori infection with dyspeptic symptoms in patients undergoing gastroduodenoscopy. Am J Med 1990; 89: 464-9. [CrossRef]
9. Köksal AŞ, Parlak E, Oğuz D, Çiçek B, Şahin B. The short term effect of Helicobacter pylori eradication on symptoms in patients with non-ulcer dyspepsia. Akademik Gastroenterol 2006; 5: 36-40.
10. Uemura N, Okamoto S, Yamamoto S, Matsumura N, Yamaguchi S, Yamakido M, et al. Helicobacter pylori infection and the development of gastric cancer. N Engl J Med 2001; 345: 784-9. [CrossRef]
11. (No authors listed). Schistosomes, liver flukes and Helicobacter Pylori. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. IARC Monogr Eval Carcinog Risks Hum 1994 June 7 -14; Lyon, France. 1994; 61: 1-241.
12. Georgopoulos SD, Papastergiou V, Karatapanis S. Current options for the treatment of Helicobacter pylori. Expert Opin Pharmacother 2013; 14: 211-23. [CrossRef]
13. Özkan TB. Çocuklarda Helicobacter pylori enfeksiyonunda seroloji, tanı ve tedavi. Uludağ Üni Tıp Fak Derg 2007; 33: 81-5.
14. Graham DY. Therapy of Helicobacter pylori: Current status and issues. Gastroenterology 2000; 118: 2-8. [CrossRef]
15. Malfertheiner P, Megraud F, O'Morain C, Bazzoli F, El-Omar E, Graham D, et al. Current concepts in the management of Helicobacter pylori infection: the Maastricht III Concensus Report. Gut 2007; 56: 772-81. [CrossRef]
16. Graham DY, Sung JY. Helicobacter pylori. Sleisenger and Fordtran's Gastrointestinal and Liver Disease. In: Feldman M, Friedman LS, Brandt LJ, eds. Pathophysiology, Diagnosis, Management. 7th edn. Philadelphia: WB Saunders Co 2006;1049-66.
17. Winn WC, Allen SD, Janda WM, Koneman EW, Procop G, Schreckenberger P, et al. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6th ed. Philadelphia: Lippincott-Raven Publishers; 2006.p.403-8.
18. Dixon MF, Genta R, Yardley JH, Correa P. Classification and grading of gastritis. The updated Sydney System. International Workshop on the Histopathology of Gastritis, Houston 1994. Am J Surg Pathol 1996; 20: 1161-81. [CrossRef]
19. Mete R, Oran M, Güneş H, Yıldırım O, Topçu B, Öznur M, et al. Tekirdağ bölgesinde Helicobacter pylori prevalansı ve patolojik parametrelerin çok yönlü analizi; literatür ile güncelleme. Genel Tıp Derg 2014; 24: 1-6. [CrossRef]
20. Froehlich F, Schwizer W, Thorens J, Köhler M, Gonvers JJ, Fried M. Conscious sedation for gastroscopy: patient tolerance and cardiorespiratory parameters. Gastroenterology 1995; 108: 697-704. [CrossRef]
21. al-Atrakchi HA. Upper gastrointestinal endoscopy without sedation: a prospective study of 2000 examinations. Gastrointest Endosc 1989; 35: 79-81. [CrossRef]
22. De Gregorio BT, Poorman JC, Katon RM. Peroral ultrathin endoscopy in adult patients. Gastrointest Endosc 1997; 45: 303-6. [CrossRef]
23. Tan CC, Freeman JG. Throat spray for upper gastrointestinal endoscopy is quite acceptable to patients. Endoscopy 1996; 28: 277-82. [CrossRef]
24. Solomon SA, Kajla VK, Banerjee AK. Can the elderly tolerate endoscopy without sedation? J R Coll Physicians Lond 1994; 28: 407-10.
25. Dhir V, Swaroop VS, Vazifdar KF, Wagle SD. Topical pharyngeal anesthesia without intravenous sedation during upper gastrointestinal endoscopy. Indian J Gastroenterol 1997; 16: 10-1.
26. Xiao DH, Shen SR, Xu CX, Tang WL, Wang XY, Wang F. Effect of various uses of propofol on the upper gastrointestinal endoscopy. Zhong Nan Da Xue Xue Bao Yi Xue Ban 2007; 32: 443-6.
27. Ristikankare M, Julkunen R, Heikkinen M, Mattila M, Laitinen T, Wang SX, et al. Sedation, topical pharyngeal anesthesia and cardiorespiratory safety during gastroscopy. J Clin Gastroenterol 2006; 40: 899-905. [CrossRef]
28. Díaz del Olmo García M, Figueroa Reyna C, Mauricci Ciudad J, Arribasplata Cruz R, Albines Core D. The sedation role in upper digestive endoscopy. Rev Gastroenterol Peru 2004; 24: 328-34.
29. Parsonnet J, Harris RA, Hack HM, Owens DK. Modeling cost effectiveness of Helicobacter pylori screening to prevent gastric cancer: a mandate for clinical trials. Lancet 1996; 348: 150-4. [CrossRef]
30. Wong BC, Lam SK, Wong WM, Chen JS, Zheng TT, Feng RE, et al. Helicobacter pylori eradication to prevent gastric cancer in a high risk region of China: a randomized controlled trial. JAMA 2004; 291: 187-94. [CrossRef]
31. You WC, Brown LM, Zhang L, Li J-Y, Jin ML, Chang YS, et al. Randomized double-blind factorial trial of three treatments to reduce the prevelance of precancerous gastric lesions. J Natl Cancer Inst 2006; 98: 974-83. [CrossRef]
32. Güneri HE, Düzköylü Y, Özoran E, Koç O, Sarı YS, Bektaş H, et al.Helicobacter Pylori Positivity and the Need for Obtaining Pathologic Samples from Patients with Gastroscopic Findings. İstanbul Med J 2013; 14: 181-3. [CrossRef]
33. İbiş M, Arhan M, Ödemiş B, ve ark. endoskopik olarak tanımlanan gastrit ile histolojik bulgular arasındaki ilişki. Akademik Gastroenter Derg 2009; 8: 12-7.
34. Ozdil K, Sahin A, Kahraman R, Yuzbasioglu B, Demirdag H, Calhan T, et al. Current prevalence of intestinal metaplasia and Helicobacter pylori infection in dyspeptic adult patients from Turkey. Hepatogastroenterology 2010; 57: 1563-6.

35. Uyanıkoğlu A, Coşkun M, Binici DN, ve ark. Endoskopi yapılan hastalarda Helicobacter pylori sıklığı. Dicle Tıp Derg 2012; 39: 197-200. [CrossRef]
36. Özardalı Hİ, Bitiren M, Nazlıgül Y, Yılmaz N. Şanlıurfa yöresinde non erosiv gastritlerde Helicobacter pylori sıklığı. Genel Tıp Derg 1998; 8: 149-52.
37. Demirtaş L, Sayar İ, Akbas EM, Özçiçek A, Özçiçek F, Timuroglu A, et al. Distribution of the incidence and location of the Helicobacter pylori according to age and gender in patients who undergone endoscopy. Dicle Med J 2014; 41: 507-11. [CrossRef]
38. Çıkman A, Parlak M, Güdücüoğlu H, Berktaş M. Van Yöresinde Helicobacter Pylori Prevalansı, Yaş ve Cinsiyete Göre Dağılımı. ANKEM Derg 2012; 26: 30-34.
39. Craanen ME, Blok P, Dekker W, Ferwerda J, Tytgat GN. Subtypes of intestinal metaplasia and Helicobacter pylori. Gut 1992; 33: 597-600. [CrossRef]
40. Fraser AG, Peng S, Jass JR. Intestinal metaplasia subtypes and Helicobacter pylori infection: A comparison of ethnic groups in New Zealand. J of Gastroenterol Hepatol 1998; 13: 560-5. [CrossRef]
41. Voutilainen M, Farkkila M, Juhola M. Mecklin JP, Sipponen P. et al. Complete and incomplete intestinal metaplasia at the oesophagogastric junction: prevalances and associations with endoscopic erosive oesophagitis and gastritis. Gut 1999; 45: 644-8. [CrossRef]
42. Craanen ME, Dekker W, Blok P, Ferwerda J, Tytgat GN. Intestinal metaplasia and Helicobacter pylori: an endoscopic bioptic study of the gastric antrum. Gut 1992; 33: 16-20. [CrossRef]
43. Akpolat N. Helicobacter pylorinin midede oluşturduğu morfolojik değişiklikler. Van Üniversitesi, Uzmanlık tezi. 1998.
44. Adım ŞB, Filiz G, Gürel S, Yerci Ö, Özgür T. Kronik Gastrit Olgularında İntestinal Metaplazi Sıklığı ve İntestinal Metaplazi İle Helicobacter Pylori İlişkisi. Uludağ Üni Tıp Fak Derg 2008; 34: 1-4.
45. Konakçı N, Gülten M, İbanoğlu MS, ve ark. Kronik aktif gastritli olgularda Helicobacter pylori sıklığı. Uludağ Üniv Tıp Fak Derg 2010; 36: 7-10.
46. Mihara M, Haruma K, Kamada T, Komoto K, Yoshihara M, Sumii K, et al. The role of endoscopic findings for the diagnosis of Helicobacter pylori infection: evaluation in a country with high prevalence of atrophic gastritis. Helicobacter 1999; 4: 40-8. [CrossRef]
47. Stolte M, Eidt S. Lymphoid follicles in antral mucosa: Immun respons eto Campylobacter pylori. J Clin Pathol 1989; 42: 1269-71. [CrossRef]
48. Zaitoun AM. The prevalance of lymphoid follicles in Helicobacter pylori associated gastritis in patients with ulcers and non-ulcer dyspepsia. J Clin Pathol 1995; 48: 325-9. [CrossRef]
49. Wyatt JL, Dixon MF. Chronic gastritis a pathogenetic aproach. J Pathol 1988; 154: 113-24. [CrossRef]
50. Çelebi A, Alicanoğlu R, Keskin S, Temeloğlu E, Koç D, Esin D, ve ark. Helicobacter pylori pozitif kronik aktif gastrit ve duodenal ülserli hastalarda MALT prevalansı. Türkiye Klinikleri J Med Sci 2005; 25: 627-35.