Turk J Med Sci
33 (2003) 307-310

CLINICAL INVESTIGATIONS

The Frequency of *Helicobacter pylori* in Various Gastric Mucosal Appearances

Mehmet DURSUN[1], Mustafa KARABULUT[2], Fikri CANORUÇ[1], Şerif YILMAZ[1], Mehmet YALDIZ[3]

[1]Department of Gastroenteorology, Faculty of Medicine, Dicle University, Diyarbakır - Turkey

[2]Department of Internal Medicine, Faculty of Medicine, Dicle University, Diyarbakır - Turkey

[3]Department of Pathology, Faculty of Medicine, Dicle University, Diyarbakır - Turkey

Received: March 14, 2003

Abstract: Our purpose was to investigate whether *Helicobacter pylori* (Hp) has a specific mucosal appearance. Eighty-eight (female / male: 53/35) patients included in the study underwent endoscopy to determine the macroscopic appearance of their gastric mucosa. Biopsies taken from the antrum, incisura angularis and corpus of each patient were stained with toluidine blue and examined for Hp under a light microscope. Thirty were Hp negative and 58 Hp positive. Thirty-six percent of the patients had normal mucosa, 21.59% had spotty erythema in the antrum, 31.81% had a mosaic pattern in the antrum and/or corpus and 10.23% had acute duodenal ulcer. Fifty-six percent of those with normal mucosal appearance, 63.16% of those with spotty erythema in the antrum, 75% of those with a mosaic pattern in the antrum and/or corpus and 77.78% of those with acute duodenal ulcers were positive for Hp. No difference was found in positivity between the groups. There is no mucosal appearance specific to Hp, and so diagnosis by conventional methods is indispensable.

Key Words: *Helicobacter pylori*, endoscopic appearance

Introduction

Helicobacter pylori (Hp) is an infectious agent with an extremely high incidence worldwide, infecting an estimated 50% of the population (1). It is Gram-negative, curved, motile and able to live in acidic environments. Although at the time of its discovery there was initial controversy over whether it was an opportunistic, commensal bacillus, today it is agreed to be the main cause of gastritis and peptic ulcer, not to mention specific gastritis types and ulcers associated with nonsteroidal anti-inflammatory drugs, and it is linked to gastric atrophy, intestinal metaplasia, MALT lymphoma and even gastric adenocarcinoma (2-6). Hp causes lifelong chronic inflammation, and spontaneous recovery is extremely rare. Diagnostic tests, both invasive and noninvasive, are performed on millions of people every year. While invasive tests relying on biopsy such as histology, culture, and PCR are time consuming and expensive, rapid urease tests have achieved widespread usage because of their high reliability, low cost, and rapid results. With all diagnostic methods relying on biopsy there is a risk of sampling error because of patchy involvement (7). The noninvasive H2 breath test has only a limited range of use because it requires expensive systems and has a high unit test cost. The Hp blood serology test has low reliability in post-eradication follow up. Recent years have seen the development of the HpSA test, a noninvasive method that identifies Hp antigens in faeces, and it is thought that this will gain wide usage. We wished to investigate whether the determination of Hp infection based on isolated endoscopic appearance is a feasible alternative to other diagnostic methods.

Materials and Methods

Patients with various upper gastrointestinal system (GIS) complaints seeking treatment at Dicle University Medical Faculty Gastroenterology Clinic were included in the study. GIS endoscopy was performed with an Olympus GIF XQ 30 in 88 patients who had not

previously undergone Hp eradication. A total of 5 biopsies were taken from each patient using Olympus FB-25K biopsy forceps: 2 from the antrum, 2 from the corpus, and 1 from the incisura angularis. The biopsy specimens were placed in separate tubes filled with 10% formalin, which were labelled and sent to the pathology laboratory within 1 h. The biopsies were fixed in 10% formaldehyde solution for 1 day. The following day, they were embedded in paraffin blocks after routine follow-up procedures. Cross-sections 4 µm thick were stained with toluidine blue for the identification of Hp and examined under a light microscope.

The patients were grouped according to endoscopic mucosal appearance (Table 1).

Patients in the acute duodenal ulcer group had completely normal gastric mucosae. Four patients with the mosaic pattern in the antrum and/or corpus with concurrent acute duodenal ulcer were assigned to group 3. All 88 patients were assigned to 1 of 4 groups based on endoscopic appearance.

Statistical analysis was performed with SPSS 7.5 software using the chi-square test. Values of $P < 0.05$ were considered significant.

Results

Of the 88 patients, 53 (60.2%) were female and 35 (39.8%) were male, and their average ages were 45.5 and 42.05 respectively. Thirty (34.1%) were negative for Hp in all 5 biopsies. Fifty-eight (65.9%) tested positive for the Hp bacillus in at least 1 of the 5 biopsies, and even on 1 preparation; these patients were included in the Hp+ group. The highest positivity, 94.83%, was found in the incisura angularis region.

Thirty-two (36.36%) of the 88 patients had normal mucosal appearance, 19 (21.59%) had spotty erythema in the antrum, 28 (48.27%) had a mosaic pattern in the antrum and/or corpus, and 9 (10.23%) had acute duodenal ulcer. The respective Hp positivity rates according to endoscopic mucosal appearance, shown in Table 2, are as follows: 18 (56.25%), 12 (63.15%), 21 (75%), and 7 (77.77%).

Table 1. Classification according to mucosal appearance.

Group	Mucosal appearance
I	Normal mucosa
II	Spotty erythema in the antrum
III	Mosaic pattern in the antrum and/or corpus
IV	Acute duodenal ulcer

While the highest positivity was determined in patients exhibiting the mosaic pattern in the antrum and/or corpus, there was no statistically significant difference between appearances ($P > 0.05$).

The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for each endoscopic appearance are shown in Table 3.

Discussion

In invasive techniques for the diagnosis of Hp, endoscopic examination is mandatory because of the need for a biopsy. We wished to investigate the possibility of determining the presence of Hp according to endoscopic mucosal appearance without recourse to biopsy. The lack of standardisation among endoscopists in the description of appearances leads to difficulties in evaluation, and attempts have been made to establish relationships between Hp and antral nodes, erosion, red patches, goose-pimple-like appearance, spotty erythema, bizarre reddening and pale areas, mucosal oedema, rugal hypertrophy and changes in vascular pattern (8-22). A number of studies (8-10,12-15,17,20,22) have drawn attention to the close correlation between Hp and antral nodes, which is the most striking of the appearances associated with Hp and is especially common in children, suggesting that it may be considered an Hp indicator (14,17,20). However, there are also studies showing gastric nodes to be a bad predictor of gastric inflammation (10). Antral nodes are less frequently encountered in adults, but, when determined, they are known to have a close correlation with Hp. It was not possible for us to comment on this issue in the context of the present work, as antral nodes were not encountered in any of our patients.

Labenz et al. have reported a close correlation between Hp and chronic antral erosions, spotty erythema in the antrum, complex changes in the antral mucosa including bizarre reddening and pale regions, and diffuse or fine spotty erythema in the corpus mucosa and increased areolar spots, and they determined these endoscopic findings to be associated with a PPV rate of

Table 2. Hp frequency according to endoscopic appearance.

Endoscopic appearance	*Helicobacter pylori*		
	Positive	Negative	Total
Normal mucosa	18	14	32
Spotty erythema in the antrum	12	7	19
Mosaic pattern in the antrum and/or corpus	21	7	28
Acute duodenal ulcer	7	2	9
Total	58	30	88

Table 3. The significance of endoscopic appearance.

Endoscopic appearance	*Helicobacter pylori*			
	Senst	Spec	PPV	NPV
Normal mucosa	31	53	56	39
Spotty erythema in the antrum	21	77	63	33
Mosaic pattern in the antrum and/or corpus	36	76	75	38
Acute duodenal ulcer	12	93	78	35

85.5% (16). Yela et al. found the sensitivity of red patches to be 48% and PPV to be 0.76 (13). Ohlasa et al. pointed out a correlation between Hp and oedema, erythema, and reddish streaks (22). In a study by Dill (23), 9 out of 11 patients having gastric mucosae with multicoloured spots and a slight mild mosaic character were Hp+.

In the present study, we determined that Hp positivity increased in parallel with the erythematic region. Antral spotty erythema was as high as 75% in cases with 63% PPV and a mosaic pattern in the antrum and/or corpus.

Perhaps the most important results to stress are those in mucosa with normal endoscopic appearance. Loffeld found Hp positivity in 29.8% of individuals with normal antrum mucosa (8). Calabrese et al. found an Hp positivity rate of 30.9% in individuals with normal mucosa (9). Mihare et al. found a lower rate of 17%. Endoscopic appearance was completely normal in 32 (36.36%) of the patients in the present study, in 18 (56.25%) of whom Hp was positive. PPV occurred at a rate of 56% in normal mucosa, which is not insignificant.

It is clear that there is no mucosal appearance specific to Hp, and that attempts to determine the presence of Hp based on endoscopic gastric mucosal appearance may yield misleading results, thus having limited reliability in the diagnosis of gastritis associated with Hp. In conclusion, we think that it is not possible to diagnose Hp-associated gastritis by endoscopic appearance alone, and that any such diagnosis must be supported by conventional diagnostic methods.

Corresponding author:
Mehmet DURSUN
Department of
Gastroenteorology
Faculty of Medicine
Dicle University,
Diyarbakır-Turkey
e-mail:dursunm@dicle.edu.tr

References

1. Fukuda Y, Tomita T, Hori K, et al. Epidemiology of *H. pylori* infection. Nippon Rinsho 59: 234-8, 2001.
2. Peterson WL, Graham DY. *Helicobacter pylori*. Sleisenger and Fordtran's Gastrointestinal and Liver Disease. Pathophysiology/Diagnosis/Management. (Eds: M. Feldman, MH Sleisenger and BF Scharschmidt. 6th edition) Saunders. Philadelphia, 1998, pp: 604-19.
3. Blaser MJ. Helicobacter and related organisms. Principles and practice of infectious diseases. (Eds: Mandell GL, Bennet JE, Dolin R. 4th edition) Churchill Livingstone, New York, 1956-64, 1995.
4. Kuipers EJ, Thijs JC, Festen HP. The prevalence of *Helicobacter pylori* in peptic ulcer disease. Aliment Pharmacol Ther 9(Suppl 2): 59, 1995.
5. Wotherspoon AC, Ortiz-Hidalgo C, Falzon MR, Isaacson PG. *Helicobacter pylori*-associated gastritis and primary B-cell gastric lymphoma. Lancet 338: 1175-6, 1991.
6. Stolte M. *Helicobacter pylori* gastritis and gastric MALT-lymphoma. Lancet 339: 745-746, 1992.
7. Logan RPH, Walker MM. Epidemiology and diagnosis of *H. pylori* infection. BMJ 323: 920-2, 2001.
8. Loffeld RJ. Diagnostic value of endoscopic signs of gastritis: with special emphasis to nodular antritis. Neth J Med 54: 96-100, 1999.
9. Calabrese C, Di Febo G, Brandi G, et al. Correlation between endoscopic features of gastric antrum, histology and *Helicobacter pylori* infection in adults. Ital J Gastroenterol Hepatol 31: 359-65, 1999.
10. Elitsur Y, Raghuverra A, Sadat T, et al. Is gastric nodularity a sign for gastric inflammation associated with *Helicobacter pylori* infection in children? J Clin Gastroenterol 30: 286-8, 2000.
11. Bah A, Saraga E, Armstrong D, et al. Endoscopic features of *Helicobacter pylori*-related gastritis. Endoscopy 27: 593-6, 1995.
12. Sbeih F, Abdullah A, Sullivan S, et al. Antral nodularity, gastric lymphoid hyperplasia, and *Helicobacter pylori* in adults. J Clin Gastroenterol 22: 227-30, 1996.
13. Yela MC, Manzano ML, Rodriguez-Munoz S, et al. Assessment of the usefulness of endoscopic signs in *Helicobacter pylori* associated gastritis. Rev Esp Enferm Dig 89: 3-12, 1997.
14. Luzza F, Pensabene L, Imeneo M, et al. Antral nodularity identifies children infected with *Helicobacter pylori* with higher grades of gastric inflammation. Gastrointest Endosc 53: 60-4, 2001.
15. Laine L, Cohen H, Sloane R, et al. Interobserver agreement and predictive value of endoscopic findings for *H. pylori* and gastritis in normal volunteers. Gastrointest Endosc 42: 420-23, 1995.
16. Labenz J, Gyenes E, Ruhl GH, et al. Is *Helicobacter pylori* gastritis a macroscopic diagnosis? Dtsch Med Wochenschr 118: 176-80, 1993. [ABSTRACT]
17. Conti-Nibali S, Sferlazzas C, Fera MT, et al. *Helicobacter pylori* infection: a simplified diagnostic approach. Am J Gastroenterol 85: 1573-5, 1990.
18. Haruma K, Okamoto S, Sumii K, et al. *Helicobacter pylori* infection and gastroduodenal disease: a comparison of endoscopic findings, histology, and urease test data. Hiroshima J Med Sci 41: 65-70, 1992.
19. Crocker JD, Bender GN. Antral nodularity, fold thickness, and narrowing. Signs on the upper gastrointestinal series that may indicate chronic active gastritis secondary to *Helicobacter pylori*. Invest Radiol 30: 480-83, 1995.
20. Luzza F, Pensabene L, Imeneo M, et al. Antral Nodularity and Positive CagA Serology are Distinct and Relevant Markers of Severe Gastric Inflammation in Children with *Helicobacter pylori* Infection. Helicobacter 7: 46-52, 2002.
21. Mihara M, Haruma K, Kamada T, 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 4: 40-48, 1999.
22. Ohkusa T, Fujiki K, Takashimizu I, et al. Endoscopic and histological comparison of nonulcer dyspepsia with and without *Helicobacter pylori* infection evaluated by the modified Sydney system. Am J Gastroenterol 95: 2195-9, 2000.
23. Dill JE. Visual endoscopic indicator of *Helicobacter pylori* infection. Am J Gastroenterol 87: 1062-63, 1992.