

Theory of Additional Corpus Biopsy for Epidemiology and Diagnosis of Helicobacter Pylori

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Abstract

Background

There is still debate on the best sites for biopsy-based tests of Helicobacter pylori infection in patients with gastritis. This study was designed to determine if it is important to add corpus biopsies to the routine antral ones for identification of H. pylori, especially in case of gastric atrophy and/or intestinal metaplasia.

Methods

A causative role is now accepted for Helicobacter (formerly Campylobacter) pylori in type B gastritis, and evidence is accumulating that H. pylori infection plays a major contributory role in peptic ulcer disease. Preliminary studies have reported that the prevalence of H. pylori infection increases with age, but detailed information on the prevalence of the bacteria in any defined population and on the factors that may influence the pattern of distribution remains scanty.

Results

Up to 85% of people infected with H. pylori never experience symptoms or complications. Acute infection may appear as an acute gastritis with abdominal pain (stomach ache) or nausea. Where this develops into chronic gastritis, the symptoms, if present, are often those of nonulcer dyspepsia: stomach pains, nausea, bloating, belching, and sometimes vomiting or black stool.

Conclusion

H. pylori has been associated with colorectal polyps and colorectal cancer. It may also be associated with eye disease.

Key Words

gastric atrophy; sydney system; h. pylori; gastritis

Introduction

Helicobacter pylori affect nearly half of the population among the world. It is one of the most frequent and persistent bacterial infections worldwide [1]. It is responsible for many of the upper gastrointestinal tract diseases; chronic gastritis, gastrointestinal ulcers, Mucosa Associated Lymphoid Tissue Lymphoma (MALT) and gastric cancer as well [2]. Thus it has been known as "definitive biological carcinogen" by WHO in 1994 [3].

It is also linked to the development of duodenal ulcers and stomach cancer. However, over 80% of individuals infected with the bacterium are asymptomatic, and it may play an important role in the natural stomach ecology [4].

Up to 85% of people infected with H. pylori never experience symptoms or complications.[5] Acute infection may appear as an acute gastritis with abdominal pain (stomach ache) or nausea.[3] Where this develops into chronic gastritis, the symptoms, if present, are often those of nonulcer dyspepsia: stomach pains, nausea, bloating, belching, and sometimes vomiting or black stool.[6][7]

Individuals infected with H. pylori have a 10 to 20% lifetime risk of developing peptic ulcers and a 1 to 2% risk of acquiring stomach cancer.[5][7] Inflammation of the pyloric antrum is more likely to lead to duodenal ulcers, while inflammation of the corpus (body of the stomach) is more likely to lead to gastric ulcers and gastric carcinoma. However, H. pylori possibly plays a role only in the first stage that leads to common chronic inflammation, but not in further stages leading to carcinogenesis.

A meta-analysis conducted in 2009 concluded the eradication of H. pylori reduces gastric cancer risk in previously infected individuals, suggesting the continued presence of H. pylori constitutes a relative risk factor of 65% for gastric cancers; in terms of absolute risk, the increase was from 1.1% to 1.7%. This study was designed to determine if it is important to add corpus biopsies to the routine antral ones for identification of H. pylori, especially in case of gastric atrophy and/or intestinal metaplasia.

Methods and Materials

At least half the world's population is infected by the bacterium, making it the most widespread infection in the world. Actual infection rates vary from nation to nation; the developing world has much higher infection rates than the West (Western Europe, North America, Australasia), where rates are estimated to be around 25%.

The age when someone acquires this bacterium seems to influence the pathologic outcome of the infection. People infected at an early age are likely to develop more intense inflammation that may be followed by atrophic gastritis with a higher subsequent risk of gastric ulcer, gastric cancer, or both. Acquisition at an older age brings different gastric changes more likely to lead to duodenal ulcer.[5] Infections are usually acquired in early childhood in all countries. However, the infection rate of children in developing nations is higher than in industrialized nations, probably due to poor sanitary conditions, perhaps combined with lower antibiotics usage for unrelated pathologies.

In developed nations, it is currently uncommon to find infected children, but the percentage of infected people increases with age, with about 50% infected for those over the age of 60 compared with around 10% between 18 and 30 years. The higher prevalence among the elderly reflects higher infection rates in the past when the individuals were children rather than more recent infection at a later age of the individual. In the United States, prevalence appears higher in African-American and Hispanic populations, most likely due to socioeconomic factors. The lower rate of infection in the West is largely attributed to higher hygiene standards and widespread use of antibiotics. Despite high rates of infection in certain areas of the world, the overall frequency of *H. pylori* infection is declining. However, antibiotic resistance is appearing in *H. pylori*; many metronidazole- and clarithromycin-resistant strains are found in most parts of the world.

Patients

Three hundred and twenty eight consecutive patients of uninvestigated dyspepsia, who underwent upper endoscopy were enrolled, (Mansura university hospital - Egypt, Benha University hospital - Egypt, Hafer Albatin Central Hospital, KSA) from June 2014 to December 2015. Patients who received antibiotic or proton pump inhibitor treatment one month before hand were excluded. All procedures in the study were performed in accordance with the institutional research board (IRB) committee in our institute.

Study Protocol

All patients underwent upper gastrointestinal endoscopy and two standard gastric biopsies were taken from both antrum (2-3 cm from the pylorus both lesser and greater curvature) and corpus (8-10 cm from the cardia both lesser and greater curvature) for the histological examination [15].

Histological Examination

Endoscopic biopsies were processed as formalin fixed paraffin embedded tissues, cut into 3 μm thick sections, and then stained with H&E and modified Giemsa stain. These were scored semi-quantitatively according to the updated Sydney classification [15] (Figure 1). The following features were evaluated on each slide, inflammatory activity, glandular atrophy and intestinal metaplasia. According to these histological criteria, there were four grades of atrophy; 0- none; 1- mild; 2- moderate and 3- severe.

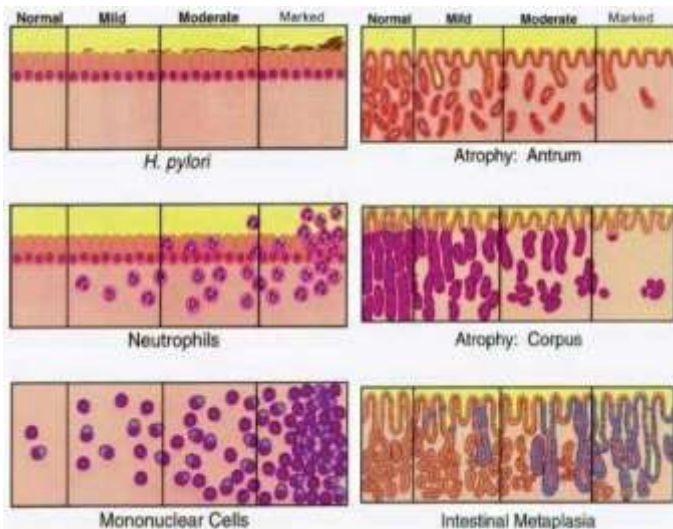


Figure 1: Sydney classification for gastric biopsy.

Criteria for positivity and negativity of *H. pylori* were set: Patients were defined positive for *H. pylori* if either one or both was positive with Giemsa stained slides. Patients were considered negative if all specimens were negative. The histological evidence of atrophy was identified when the gastric glands were found decreased in amount and/or widely separated [16].

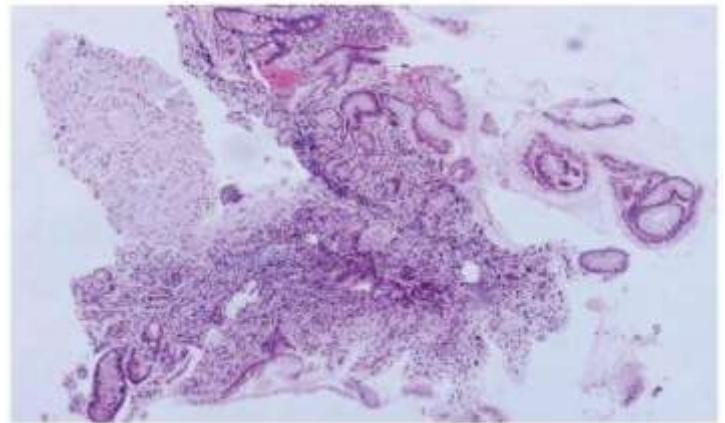


Figure 2: Gastric biopsy showed marked gastric atrophy (H&E X100).

Results

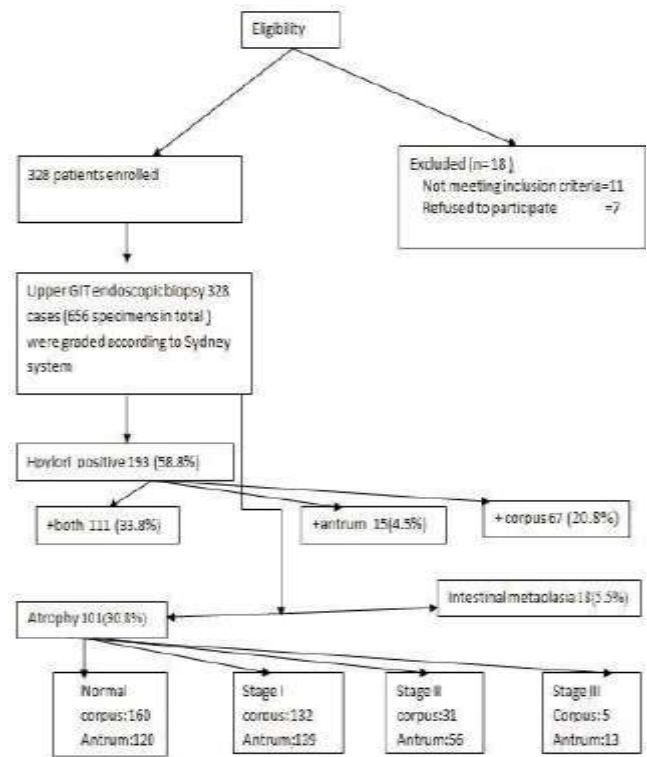


Figure 3: Patients' flowchart.

Figure 3 shows the flow chart for the whole study population. A total of 328 consecutive patients underwent an upper endoscopy procedure during the study period. The mean age of our patients was 39 ± 12 years; 145 (44.3%) were men. Upper gastrointestinal endoscopy was indicated for functional dyspepsia in 113 (34.5%), epigastric pain in 118 (35.9%) or heart burn in 97 (29.6%) patients. Endoscopic diagnosis was peptic ulcer disease in 52 (15.9%), gastritis or duodenitis in 173 (52.7%), or reflux esophagitis in 103 (31.4%) patients. None of our patients were diagnosed with gastric carcinoma. Regardless of the biopsy site, a total of 656 biopsy specimens were received for histological evaluation (Table 1).

In endoscopic diagnosis, atrophy was found in 101 (30.8%) of our patients. Atrophic gastritis was significantly more often in the antrum than the corpus (29.2 vs 11.9%, respectively, *p* < 0.05). Intestinal metaplasia was identified in 17 (5.2%) patients and antrum was more often than the corpus (4 vs 2% of all patients, respectively). Patients with only positive corpus biopsies showed more incidences of both atrophy and intestinal metaplasia compared with the other possible outcomes, 55 vs 24.5% for atrophy and 10 vs 4.6% for metaplasia (Table 1, 2).

Variables	N = 328	Both +ve	both -ve	C +ve only	A +ve only
Gender					
-Male	215	63%	58%	62%	47%
-Female	113	37%	42%	38%	53%
Age in years	31 ± 9	32 ± 8	27 ± 6	33 ± 7	34 ± 9.5
Endoscopic diagnosis					
-Peptic ulcer	87	33%	24%	26%	29%
-Gastritis/duodenitis	101	27%	29%	22%	16%
-GERD	63	29%	18%	31%	24%
-Normal	11%	13%	21%	31%	31%
Microscopic findings					
-Atrophy	101 (30.8%)	43 (38.7%)	19 (14%)	2 (13%)	37 (55%)
Corpus and antrum	34	19	-	-	13
Antrum only	62	24	15	-	23
Corpus only	5	-	4	-	1
-Intestinal metaplasia	18 (5.5%)	6 (5.4%)	5 (3.7%)	-	7 (10%)
Corpus and antrum	3	-	1	-	2
Antrum only	11	5	4	-	2
Corpus only	4	1	-	-	3

Table 1: Histology outcomes by patients’ characteristics (+: positive, -: negative, A: antrum, C: corpus).

Sites - based biopsy	Score (Variables)	Activity	Mononuclear inflammation	Metaplasia	Atrophy
Corpus	Normal (0)	128	170	321	289
	Mild (1)	104	74	7	31
	Moderate (2)	64	54	0	7
	Severe (3)	32	30	0	1
Total		328	328	328	328
Antrum	Normal (0)	150	182	315	232
	Mild (1)	86	84	7	69
	Moderate (2)	66	44	6	27
	Severe (3)	26	38	0	5
Total		328	328	328	328

Table 2: Histopathological classification of submitted biopsies according to Sydney system.

Discussion

In the clinical setting, it is desirable to find a rapid and cost-effective method for detection of *H. pylori*. There are many methods for detection of *H. pylori* infection [17]. Endoscopic mucosal biopsy and histopathology are considered as valuable diagnostic tools for *H. pylori* detection. As well as, it provides a proper evaluation of gastric mucosal changes that have been attributed to chronic *H. pylori* infection i.e. glandular atrophy and/or intestinal metaplasia. It is still widely used as a main diagnostic method in suspicious patients with upper gastrointestinal symptoms or in highly prevalent areas [7]. We reported in our study that 193 (58.8%) have been detected to have *H. pylori*, 111 (38.8%) patients, both antral and corpus biopsies were identified positive for *H. pylori*. Totally 30.8% of our patients had atrophy in the antrum and/or corpus or both. Intestinal metaplasia was identified in 17 (5.2%) patients.

There is always a debate about the best location of gastric mucosal biopsy that can yield more sensitive detection of *H. pylori* especially in presence of atrophic gastritis [18]. In our work; we found that the frequency of *H. pylori* detection in case of gastritis without atrophy or metaplasia was higher with additional corpus biopsy compared with only antrum-based biopsy.

Conclusion

H. pylori associated atrophic gastritis decreases sensitivity of detection rates of *H. pylori*. Atrophic changes are predominantly affect antrum first. Adding corpus biopsy to the routine antrum biopsy during endoscopy is recommended for proper evaluation of *H. pylori* infection case of gastric atrophy and to avoid false negative diagnosis.

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