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Original Article

Are endoscopic findings predictive for the presence of *H.* pylori infection? What about indirect histologic findings?

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Abstract

BACKGROUND: It is still controversial whether certain endoscopic features can be used to diagnose Helicobacter pylori related gastritis. Our aim was to determine how macroscopic findings were related to histomorphological changes and the presence of H. pylori in patients undergoing endoscopy.

METHODS: The study population involved 501 consecutive gastrointestinal (GI) clinic admissions who underwent esphagogastroduodenoscopy for upper GI symptoms between October 2002 and March 2004. At least 2 antral and 2 body biopsies were obtained from each patient and were examined histologically for the presence of gastritis and were stained for H. pylori using modified Giemsa staining method. Endoscopic findings were reviewed retrospectively by two experts blinded to the H. pylori status and patients history. The endoscopic findings of gastritis, classified by a modification of the Sydney system and histological findings were determined by updated Sydney system. Statistical analysis was done using SPSS 11.

RESULTS: A total of 501 consecutive patients (256 females, 245males) ranging from 8 to 91 years (mean, 49.5 years) were studied. H. pylori was found in 326 patients (65.1%). Relative frequency of H pylori in females was 53% and in males was 47%. Rugal hypertrophy, raised erosion and bleeding were observed only in patients with H. pylori infection (specificity = 100%). Neutrophil activity also was observed only in patients with H. pylori infection. Among endoscopic findings, erythema showed a high sensitivity (81.3%) and positive predictive value (87.1%) for the diagnosis of H. pylori infection. Gastritis was present in 84.3% of all patients and 97% (316/326) of those with H. pylori and 56.6% (99/175) of those without H. pylori. There was significant statistical correlation between H. pylori infection and gastritis ($P<0.001$). H. pylori was present in 76% (316/415) of gastritis patients and 5.1% (4/77) of patients without gastritis.

CONCLUSIONS: An accurate endoscopic assessment of gastritis according to the Sydney system along with the histological findings is valuable indicator of H. pylori infection.

KEY WORDS: Helicobacter pylori, gastritis, Sydney system, peptic ulcer.

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Helicobacter pylori (H. pylori) infection is widespread, and it is also recognized as being strongly associated with chronic gastritis, duodenal ulceration and probably gastric carcinoma and it is a major risk factor for them [1-3]. But, there is no single test to be100% accurate for its diagnosis [4]. Recent studies highlighted that the presence of H. pylori could be assessed on the basis of the macroscopic patterns [5,6], but it is still unknown how macroscopic findings are related to histomorphological changes and the presence of H. pylori in the gastric mucosa [7,8]. The Sydney system is a method for the classification of

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endoscopic and histologic findings [9]. In 1991, an international group at the World Congress of Gastroenterology in Sydney recognized the following endoscopic features of inflammation: edema, erythema, friability, exudate formation, flat erosions, raised erosions, rugal hyperplasia, rugal atrophy, visible vessels, intramural bleeding and nodularity. Combinations of these changes were used to define seven endoscopic categories of gastric inflammation, the commonest being erythematous/exudative gastritis [10,11]. In relation to H. pylori, most studies have found that the frequency of endoscopic abnormalities is higher in infected than in non-infected patients. However, common endoscopic categories such as erythematous/exudative gastritis, atrophic gastritis, flat erosive gastritis and raised erosive gastritis show only weak associations with H. pylori. In contrast, stronger associations (higher positive predictive values) have been described for uncommon endoscopic manifestations such as antral nodularity and hyperplasia of folds in the body of stomach [12]. Since development of fibrogastroscopy techniques, endoscopic inspection without the need for biopsies would be a convenient way to diagnose such gastritis, if possible. So the patients could have the diagnosis immediately after gastroscopy and the need and costs for biopsy with histological examination would be less [13,14]. Our aim was to identify endoscopic and histologic features associated with H. pylori infections in patients undergoing endoscopy.

Methods

Patients

Our study population involved 501 consecutive GI clinic admissions who underwent esphagogastroduodenoscopy for upper GI symptoms between October 2002 and March 2004. Exclusion criteria were the use of antibiotics known to be effective against H. pylori during the last 4 weeks, anti acids, H2-receptor antagonists and non-steroidal anti-inflammatory drugs during the last 14 days. Study was approved by the local ethics committee, and informed written consent was obtained from all participants.

Endoscopic examination and detection of H-pylori

All participants were asked to be fast for at least 8 hours before gastroscopy and it was carried out after pharyngeal anesthesia with lidocaine spray. During endoscopy (Pentax EPM-3300, EG 2940 scope) multiple pictures were saved. At least 2 antral and 2 body sample biopsies were obtained from each patient and sent to Histopathologic Department. Samples were fixed in 10% buffered formalin, embedded in paraffin cut in 4 mm sections, and stained with Hematoxylin-Eosin for histologic examination and modified Giemsa staining method for H. pylori identification H. Pylori was diagnosed using histology and rapid urease test (RUT).

Endoscopic Assessment of Gastritis

Endoscopic findings were reviewed retrospectively by two experts who were blind to the H pylori status and patients history. Endoscopic gastritis was diagnosed by the modified criteria of the Sydney system (15) which involves subjective assessment of presence or absence of the possible findings as of the following: erythema, exudative gastritis, raised erosive gastritis, flat erosive gastritis, hemorrhagic gastritis, rugal hypertrophy, rugal atrophy and nodularity. The gastric and duodenal mucosa was evaluated during endoscopy to find any ulcer.

Histologic Assessment of Gastritis

Histologic diagnosis was made by a single pathologist who was blind to the endoscopic findings. Gastritis was evaluated according to the updated Sydney system [15]; i.e. inflammation (mononuclear cell infiltration), activity (neutrophil infiltration), atrophy and intestinal metaplasia.

Statistical Methods

Statistical analysis was done using SPSS 11 for windows. Clinical data were analyzed by t-test (for age) and Fisher's exact test (for sex). Sensitivity, specificity, and positive and negative predictive values were

calculated. P-value less than 0.05 was considered significant. Odds ratios (OR) for endoscopic gastritis were derived by multiple conditional logistic regression analysis.

Results

A total of 501 consecutive patients (256 females, 245 males) with a mean age of 49.5 years ranging from 8 to 91 years were studied. H. pylori was found in 326 patients (65.1%). Relative frequency of H pylori in females was 53% and in males was 47%. Frequencies of this infection among different age groups are shown in table 1. Endoscopic and histologic findings in patients with and without H. pylori are presented in table 2. Rugal hypertrophy, raised erosion, bleeding and neutrophil activity were observed only in patients with H. pylori infection. The sensitivities and specificities of various macroscopic features according to histomorphological examination are given in table 3. Among endoscopic findings, erythema showed high sensitivity (81.3%) and positive predictive value (87.1%) for diagnosis of H. pylori infection. Rugal hypertrophy, raised erosion and bleeding showed a high specificity (100%).

TABLE 1. Relative frequency of H. pylori infection among different age groups.

H. pylori status	Age groups		
	<30	30-60	>60
H. pylori positive	65 (13%)	54 (10.7%)	207 (41.3%)

Gastritis was present in 84.3% of all patients and 97% (316/326) of those with H. pylori and 56.6% (99/175) of those without H. pylori. There was significant statistical correlation between H. pylori infection and gastritis (P<0.001). H. pylori was present in 76% (316/415) of gastritis patients and 5.1% (4/77) of patients without gastritis. H. pylori was present in 75.3% (55/73) of patients with duodenal ulcer and 73% (19/26) of those with gastric ulcer. Gastric ulcer was present in 5.8% (19/326) of patients with H. pylori and 4% (5/175) of those without H. pylori (OR = 1.48). Duodenal ulcer was found in 17% (55/326) of patients with H. pylori and 10.3% (18/175) of those without H. pylori (OR = 1.77).

TABLE 2. Endoscopic and histologic characteristics of patients with and without H. pylori.

Characteristics	Infected	Not infected	OR
Endoscopic findings			
Erythema	79.8%	20.2%	1.25
Exudates	73.7%	26.3%	1.55
Flat erosion	78.8%	21.2%	2.08
Raised erosion	100%	0%	-
Rugal hypertrophy	100%	0%	-
Rugal atrophy	42.9%	57.1%	0.39
Bleeding	100%	0%	-
Nodularity	74.4%	25.6%	1.63
Histological findings			
Antral Inflammation	68.8%	33.3%	1.18
Neutrophil activity	100%	0%	-
Gastric mucosal atrophy	66.7%	33.3%	1.08
Intestinal metaplasia	44.1%	55.9%	0.39

TABLE 3. Sensitivities and specificities of various macroscopic and histologic findings.

Characteristics	Sensitivity	Specificity	PPV	NPV
Endoscopic finding				
Erythema	81.3%	22.3%	87.1%	66.3%
Exudates	8.6%	94.2%	14%	3.2%
Flat erosion	8%	96%	13.4%	2.2%
Raised erosion	0.6%	100%	1.1%	0%
Rugal hypertrophy	3.7%	100%	6.4%	0%
Rugal atrophy	1.9%	95.4%	3.4%	2.4%
Bleeding	1.8%	100%	3.3%	0%
Nodularity	9.9%	93.7%	16.3%	3.6%
Histological findings				
Antral inflammation	3.4%	97.1%	6.1%	1.5%
Neutrophil activity	0.6%	100%	1.1%	0%
Gastric mucosal atrophy	3.1%	97.1%	5.6%	1.5%
Intestinal metaplasia	4.7%	89%	8.9%	5.8%

Discussion

The kind and frequency of endoscopic changes associated with gastritis in subjects infected with H. pylori are not known in details [16]. This study indicates that although there are some sensitive endoscopic characteristic findings for H. pylori related gastropathy, they are too non-specific. On the other hand, there are some highly specific endoscopic findings which are very insensitive. We should actually look for the positive predictive value and the negative predictive value of each finding or combinations of findings to decide weather we could accurately rely on them to predict H. pylori positivity. Our data indicates no single finding to be highly predictive either for H. pylori positivity or negativity, which is compatible with some studies [17,18] and incompatible with some other ones [16,19].

In this study, H. pylori infection rate was significantly higher in patients with endoscopic findings for gastritis (determined by the Sydney system) than that in subjects with normal endoscopic findings which was similar to some of the previous studies [17,18]. Erythema was the most frequently endoscopic abnormality seen in our study; i.e. the highest sensitivity and positive predictive value for diagnosing H. pylori infection. However, in some reports, erythema was found to be less frequent than before in patients infected with H. pylori [20,21].

While Stolte et al found that raised erosion was a specific finding in H. pylori infection [22], our study showed a high specificity of rugal hypertrophy and bleeding in addition to raised erosion for detecting H. pylori infection. The same results about rugal hypertrophy were shown by some other studies too [23-25]. More over, two studies have demonstrated that enlarged gastric folds improved after eradication of H. pylori [24]. Yasunaga et al also reported that increased interleukin 1B and hepatocyte growth factor production caused by H. pylori infection may contribute to fold thickening of the stomach by simulating epithelial cell proliferation and foveolar hyperplasia in rugal hypertrophy [25]. Our study confirmed the results of Laine et al study which reported antral nodularity is a fairly reproducible finding and is very specific, though not sensitive, for H. pylori gastritis [23].

The data from this and previous studies confirm that H. pylori is associated with histologic gastritis [26,27]. H. pylori is believed to be the etiologic agent of this gastritis [28,29] and cannot be considered to be a simple commensal of the human stomach. Gastritis was more common in infected subjects adding further evidence to the contention that H. pylori is the cause of the histologic lesion. A small number of subjects have gastritis in the absence of H. pylori on gastric biopsy. Some of these indi-

viduals are noted to have an antibody response to H. pylori. It is possible that biopsies have failed to detect H. pylori in these subjects. Alternatively, the subjects might have cleared the bacterium spontaneously, while the antibody response persisted [30].

We also studied the relative frequency of H pylori in patients undergoing endoscopy (65.1%). This index was >60% in Eastern European populations and <50% in Western communities [31,32]. The factors responsible for the differences in prevalence rates of H. pylori among different nations and different ethnic groups within the same nation are unknown [33,34]. There are many methods for diagnosing H. pylori infection but, there is no absolutely valid method [19]. Therefore, a combination of several methods is recommended to ensure accurate diagnosis. However, a combination requires multiple biopsy specimens which increases patient costs.

Conclusions

Although there is no single endoscopic feature pathognomic for the presence of H. pylori infection but a combination of endoscopic with or without an indirect histologic finding could be diagnostic. Neutrophil activity in histology was observed only in patients with H. pylori infection. Therefore, an accurate endoscopic assessment of gastritis according to the Sydney system may show the H. pylori status confidently and may obviate the needs for biopsy in those with apparently normal endoscopy. But, we may still need to do biopsy to rule out dysplasia and probably early carcinoma especially in high risk populations.

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