



Open Access

Accuracy of Endoscopic Diagnosis of Mild Atrophic Gastritis with *Helicobacter pylori* Infection

Dae Bum Kim and Woo Chul Chung

Department of Internal Medicine, St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, Suwon, Korea

See "Accuracy of Endoscopic Diagnosis for Mild Atrophic Gastritis Infected with *Helicobacter pylori*" by Takuma Okamura, Yugo Iwaya, Kei Kitahara et al., on page 362-367.

Helicobacter pylori infection is responsible for chronic gastritis. The progression from chronic gastritis, atrophy, and intestinal metaplasia to dysplasia is an important mechanism of gastric carcinogenesis. A meta-analysis showed that *H. pylori* eradication reduced the risk of the development of gastric cancer.¹ However, a later study showed that the risk of gastric cancer was still increased in the presence of gastric mucosal atrophy, even after *H. pylori* infection was eradicated.² These findings may imply that gastric cancer is entirely preventable by *H. pylori* eradication in patients with atrophic gastritis. On the basis of previous evidence, we surmise that eradication therapy for *H. pylori* infection could be more efficient in preventing gastric cancer when mucosal atrophy is mild or absent. It is likely that the progression to gastric cancer can be blocked before gastric atrophy develops. In other words, endoscopists should be aware that the identification of mild atrophic gastritis associated with *H. pylori* infection is important in the primary prevention of gastric cancer. This is especially important in the training of beginner endoscopists.

This study showed that the accuracy of endoscopic diagno-

sis of *H. pylori* infection in patients with/without mild atrophic gastritis (C-0, C-I) was approximately 67%.³ In previous studies, the following distinctive endoscopic features were reported and were closely associated with *H. pylori* infection: atrophy, hyperplastic polyp, map-like/patchy/spotty redness, xanthoma, hematin, red streak, intestinal metaplasia, mucosal swelling, depressed erosion, enlarged fold, sticky mucus, fundic gland polyp, multiple white and flat elevated lesions, correctly identified regular arrangement of collecting venules, nodularity, and raised erosion.⁴⁻⁸ Among these endoscopic features, nodularity had the highest diagnostic accuracy for *H. pylori* infection (89.3%), followed by mucosal swelling (76.6%). When endoscopists identified nodularity or mucosal swelling, the rate of diagnostic accuracy was high (Fig. 1). The characteristic histological finding of nodularity is hyperplasia of lymphoid follicles, whereas mucosal swelling is characterized by inflammatory cell infiltration and mucosal edema. In the progression of atrophy, nodularity begins to disappear from the antrum and becomes more localized with scattered type. Therefore, endoscopists should search carefully for characteristic nodularity, especially at the gastric angle and anterior/posterior walls of the antrum. Mucosal swelling is easier to recognize in the gastric body than in the antrum. Close attention to nodularity and mucosal swelling may improve the accuracy of endoscopic diagnosis of *H. pylori* infection in mild atrophic gastritis.

Although a number of studies have discussed endoscopic diagnosis of *H. pylori* infection, the findings have been ambiguous and contradictory. It was previously reported that the accuracy of endoscopic diagnosis of *H. pylori* infection was

Received: May 23, 2018 Revised: May 29, 2018
Accepted: May 29, 2018

Correspondence: Woo Chul Chung
Division of Gastroenterology, Department of Internal Medicine, St. Vincent's Hospital, College of Medicine, The Catholic University of Korea, 93 Jungbu-daero, Paldal-gu, Suwon 16247, Korea
Tel: +82-31-249-7138, Fax: +82-31-253-8898, E-mail: jwchulkr@catholic.ac.kr
ORCID: https://orcid.org/0000-0003-1044-0440

© This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

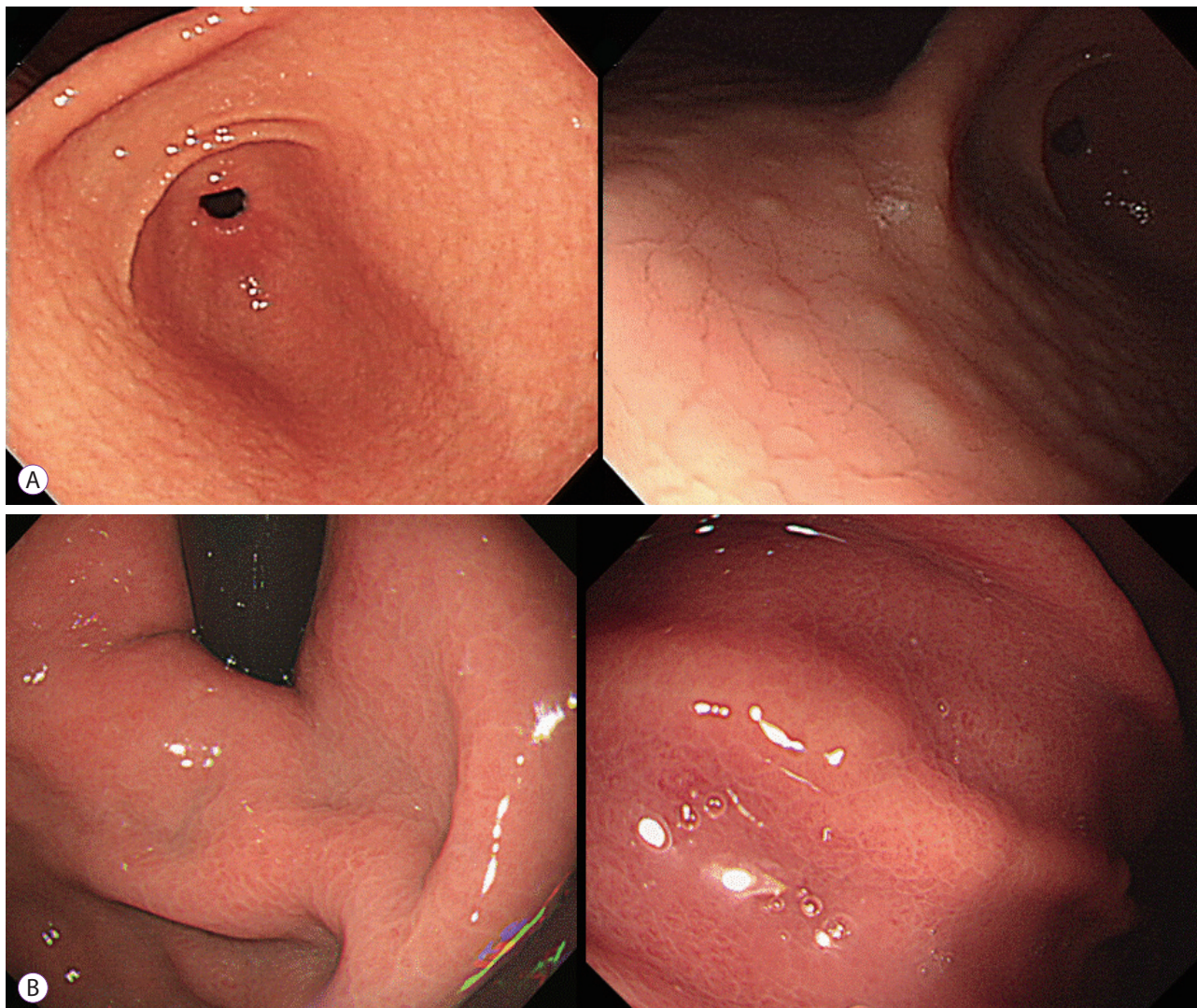


Fig. 1. Endoscopic findings of nodularity or mucosal swelling, which are closely related to the early stage *Helicobacter pylori* gastritis. (A) Nodularity. (B) Mucosal swelling.

only 41.8%.⁹ In a series of studies, several researchers insisted that endoscopic diagnosis of *H. pylori* infection was of no use in clinical practice, because of relatively low diagnostic yield (43%–64%).^{10,11} On the other hand, a study in highly-endemic areas of *H. pylori* infection revealed that the accuracy of endoscopic diagnosis reached 79.5%.¹² Taken together, the inconsistency of diagnostic yields might stem from differences in regional prevalence of *H. pylori* infection. The results of this study were quite acceptable, although the diagnostic yield was relatively low compared with that of previous studies. The reason was that the study was performed only in cases of mild or non-atrophic gastritis. In previous reports, regular arrangement of collecting venules, hemorrhage, and fundic gland polyps showed high positive predictive value and specificity for an *H. pylori*-negative stomach.^{6,13-15} Moreover, the diagnostic yield in *H. pylori*-negative cases was high, and in-

ter-observer agreement was good. In the wake of this research, there are several problems to be solved. First, as for nodularity and mucosal swelling, inter- and intra-observer agreement is questionable. Second, it is necessary to confirm whether endoscopists can distinguish between *H. pylori* infection and *H. pylori* eradication.

Recently, artificial intelligence technology was evaluated in the diagnosis of *H. pylori* gastritis based on endoscopic images, and was able to diagnose *H. pylori* gastritis with higher accuracy.¹⁶ It also shortened the diagnostic time, compared with manual diagnosis by an endoscopist. Endoscopic diagnosis using artificial intelligence has an infinite potential, and it will be supplemented and completed by the accumulation of these findings.

In conclusion, early detection of *H. pylori* gastritis and prompt eradication is a good therapeutic strategy for the pre-

vention of gastric cancer. From this point of a view, this result is promising and will contribute to the early detection of *H. pylori* gastritis.

Conflicts of Interest

The authors have no financial conflicts of interest.

REFERENCES

1. Fuccio L, Zagari RM, Eusebi LH, et al. Meta-analysis: can Helicobacter pylori eradication treatment reduce the risk for gastric cancer? *Ann Intern Med* 2009;151:121-128.
2. Take S, Mizuno M, Ishiki K, et al. The long-term risk of gastric cancer after the successful eradication of Helicobacter pylori. *J Gastroenterol* 2011;46:318-324.
3. Okamura T, Iwaya Y, Kitahara K, Suga T, Tanaka E. Accuracy of endoscopic diagnosis for mild atrophic gastritis infected with Helicobacter pylori. *Clin Endosc* 2018;51:362-367.
4. Kato T, Yagi N, Kamada T, Shimbo T, Watanabe H, Ida K. Diagnosis of Helicobacter pylori infection in gastric mucosa by endoscopic features: a multicenter prospective study. *Dig Endosc* 2013;25:508-518.
5. Watanabe K, Nagata N, Nakashima R, et al. Predictive findings for Helicobacter pylori-uninfected, -infected and -eradicated gastric mucosa: validation study. *World J Gastroenterol* 2013;19:4374-4379.
6. Yagi K, Nakamura A, Sekine A. Characteristic endoscopic and magnified endoscopic findings in the normal stomach without Helicobacter pylori infection. *J Gastroenterol Hepatol* 2002;17:39-45.
7. Mao T, Wang Y, Yin F, et al. Association of endoscopic features of gastric mucosa with Helicobacter pylori infection in Chinese patients. *Gastroenterol Res Pract* 2016;2016:6539639.
8. Bah A, Saraga E, Armstrong D, et al. Endoscopic features of Helicobacter pylori-related gastritis. *Endoscopy* 1995;27:593-596.
9. Khakoo SI, Lobo AJ, Shepherd NA, Wilkinson SP. Histological assessment of the Sydney classification of endoscopic gastritis. *Gut* 1994;35:1172-1175.
10. Belair PA, Metz DC, Faigel DO, Furth EE. Receiver operator characteristic analysis of endoscopy as a test for gastritis. *Dig Dis Sci* 1997;42:2227-2233.
11. Redeen S, Petersson F, Jonsson KA, Borch K. Relationship of gastroscopic features to histological findings in gastritis and Helicobacter pylori infection in a general population sample. *Endoscopy* 2003;35:946-950.
12. 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* 1999;4:40-48.
13. Kaminishi M, Yamaguchi H, Nomura S, et al. Endoscopic classification of chronic gastritis based on a pilot study by the research society for gastritis. *Dig Endosc* 2002;14:138-151.
14. Watanabe N, Seno H, Nakajima T, et al. Regression of fundic gland polyps following acquisition of Helicobacter pylori. *Gut* 2002;51:742-745.
15. Na S, Chung JW, Park HJ, et al. [The usefulness of the regular arrangement of collecting venules pattern for the determination of Helicobacter pylori infection]. *Korean J Gastroenterol* 2011;58:252-257.
16. Shichijo S, Nomura S, Aoyama K, et al. Application of convolutional neural networks in the diagnosis of Helicobacter pylori infection based on endoscopic images. *EBioMedicine* 2017;25:106-111.