

Gastric Mucosa Atrophy and Metaplasia in Patient with *Helicobacter pylori* Infection

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ABSTRACT

Background: *Helicobacter pylori* (*H. pylori*) is one of the most common bacteria found in human and cause chronic infection. Recent study conducted in one of private hospitals in Jakarta shows that there is a trend of declining prevalence of *H. pylori* from 12.5% in 1998 to 2.9% in 2005. The aim of this study is to obtain the prevalence of gastric atrophy and metaplasia in patients with *H. pylori* infection based on histopathology.

Method: This was a case control study between June to August 2014 with 69 cases and 71 controls using medical records data and histopathology results. Control sample was taken consecutively from patient undergone esophagogastroduodenoscopy procedure in 2013.

Results: The average age for patient with *H. pylori* was 51 years slightly higher than patient with negative *H. pylori* ($p > 0.05$). Generally, the prevalence rate among males was slightly lower than females ($p > 0.05$). From Histopathology findings, active chronic gastritis was found in 62.3% patients with positive *H. pylori* than only 12.7% in patient with negative *H. pylori* (95% CI = 4.86-26.7; OR = 11.31). Mild and moderate atrophy was higher among *H. pylori* positive ($p = 0.09$). Gastric mucosa metaplasia was also higher (10% vs. 1.4%) among positive *H. pylori* patient ($p = 0.03$).

Conclusion: *H. pylori* infection can cause atrophy and metaplasia in gastric mucosa. Prevalence of gastric metaplasia caused by *H. pylori* infection is lower in this study compared to the same study abroad.

Keywords: *H. pylori*, histopathology, mucosa atrophy, metaplasia

ABSTRAK

Latar belakang: *Helicobacter pylori* (*H. pylori*) merupakan salah satu bakteri yang paling sering ditemukan pada manusia dan menyebabkan infeksi kronik. Penelitian terbaru yang dilakukan di salah satu rumah sakit swasta di Jakarta menunjukkan bahwa terdapat penurunan prevalensi *H. pylori* dari 12,5% pada tahun 1998 menjadi 2,9% pada tahun 2005. Tujuan penelitian ini adalah mendapatkan angka prevalensi atrofi dan metaplasia pada mukosa lambung pasien dengan infeksi *H. pylori* berdasarkan histopatologi.

Metode: Menggunakan desain kasus kontrol dengan menggunakan data-data rekam medis dan hasil histopatologi. Penelitian dilakukan pada bulan Juni - Agustus 2014 melibatkan 69 kasus dan 71 kontrol.

Hasil: Rerata usia pasien dengan *H. pylori* adalah 51 tahun, sedikit lebih tinggi dari pasien dengan *H. pylori* negatif. ($p > 0,05$) Secara umum, prevalensi *H. pylori* pada laki-laki sedikit lebih rendah dari perempuan ($p > 0,05$). Dari temuan Histopatologi, gastritis kronis aktif ditemukan pada 62,3% pasien dengan positif *H. pylori* dibanding hanya 12,7% pada pasien dengan *H. pylori* negatif (95% CI = 4.86-26.7; OR = 11.31). Atrofi ringan dan sedang ditemukan lebih tinggi di antara *H. pylori* positif ($p = 0,09$). Metaplasia mukosa juga ditemukan lebih tinggi (10% vs. 1,4%) di antara positif *H. pylori* pasien ($p = 0,03$).

Simpulan: Infeksi *H. pylori* dapat menyebabkan atrofi dan metaplasia di mukosa lambung. Prevalensi dari metaplasia lambung disebabkan oleh infeksi *H. pylori* lebih rendah dalam penelitian ini dibandingkan dengan penelitian yang sama di luar negeri.

Kata kunci: *H. pylori*, histopatologi, atrofi mukosa, metaplasia

INTRODUCTION

Helicobacter pylori (*H. pylori*) is one of the most commonly found bacteria that cause human chronic infection. It is associated with upper gastrointestinal symptom, such as chronic gastritis, peptic ulcer, and gastric malignancy. Worldwide data showed a decrease in its prevalence, but still impact on significant morbidity. In Indonesia, epidemiological study in one of the private hospital showed that *H. pylori* infection reduce from 12,5% in 1998 into 2,9% in 2005.¹

Endoscopic findings is a clinical data that firstly found in specific examination of *H. pylori* infection. A study in Iran investigated endoscopic characteristic of patient with *H. pylori* infection and non-steroidal anti inflammation drugs (NSAID). The result showed that both of duodenum ulcer (55,2% vs. 13,3%) and peptic ulcer (48,1% vs. 15,5%) were found higher in *H. pylori* infection patient than NSAID user.² This study also concluded that gastric antrum is the location with the highest *H. pylori* infection. Another similar study in Japan also showed that 56% of peptic ulcer from *H. pylori* were located in antrum.³

Besides endoscopic findings, histopathology examination also plays an important role in diagnosis of *H. pylori* infection. From histopathology examination, it can be seen any *H. pylori* microorganism or any inflammation and infiltration of inflammatory cell. Increase inflammatory cell activity with mucosa atrophy and gastric antrum inflammation were specific to predict *H. pylori* infection.⁴ This study were aimed to investigate the prevalence of gastric mucosa atrophy, metaplasia, and gastritis activity in patient with *H. pylori* infection and its correlation.

METHOD

This is a case control retrospective study conducted in Cipto Mangunkusumo Hospital, Indonesia. Cases

groups were chosen from patients aged 18 years old or above with positive *H. pylori* biopsy test between 2009 and 2013, while control group were chosen randomly from patients with negative *H. pylori* biopsy test. The study was conducted from June to August 2014 involved 69 cases and 71 control sample, with exclusion criteria of melena hematemesis and gastric malignancy. Bivariate analysis for categorical variable are using Chi-square test and its alternatives, while for numerical variable are using non-paired t-test and its alternatives. Variable with p value < 0.25 on bivariate analysis will be continued to logistic regression multivariate analysis. The outcome result was in odds ratio (OR) value.

RESULTS

In this study, 69 case and 71 control samples were involved. The mean age of positive *H. pylori* patients were relatively higher than control group (51.0 vs. 47.9, $p > 0.05$). There were no statistical difference among gender of both groups ($p > 0.05$). Histopathology findings of active chronic gastritis were found higher in positive *H. pylori* patient than in control group (62.3% vs. 12.7%; 95% CI = 4.86-26.7; OR = 11.31). Mild to moderate atrophy findings were found higher in positive *H. pylori* patients than control group ($p = 0.09$). Metaplasia findings also found higher in positive *H. pylori* patients (10.1% vs. 1.4%); $p = 0.03$).

Table 1. Odds ratio in chronic gastritis

	<i>H. pylori</i> +	<i>H. pylori</i> -	OR (95% CI)
Chronic gastritis			
Active	43 (62,3%)	9 (12,7%)	11.39 (4.86-26.7)
Inactive	26 (37,7%)	62 (87,3%)	
Atrophy			
Non-atrophic	38 (53,5%)	22 (31,9%)	1
Mild Atrophy	3 (4,2%)	36 (52,2%)	2 (1.01- 4.23)
Moderate Atrophy	3 (4,2%)	11 (15,9%)	6.33 (1.59-25.2)
Metaplasia			
None	62 (69,9%)	70 (98,6%)	
Present	7 (10,1%)	1 (1,4%)	7 (0.946 – 66)

DISCUSSION

Histopathology examination were gold standard for *H. pylori* infection diagnosis, while sometimes its accuracy were depend on sampling method, location and number of tissue taken for biopsy, staining method, and unstandardized pathologist ability to diagnose.⁵ This histopathological diagnosis were important as many patients undergo esophagogastroduodenoscopy still using proton pump inhibitor (PPI) drugs, which can reduce sensitivity of further several non-invasive examination because of its antimicrobial effect. This examination also plays an important role in identifying gastritis and other findings caused by bacterial infection. Among the benefits of this examination was that any pathological changes could be identify, such as inflammation, mucosa atrophy, intestinal metaplasia, and sign of malignancy.⁵

Generally, *H. pylori* were inducing inflammation in gastric mucosa, trigger active chronic gastritis activity as shown by lymphocyte and neutrophil infiltration. Besides, metaplasia focus with atrophy findings, lymphatic aggregation, and lymphoid follicle also commonly found in this condition. This findings were seen in this study and there were significant differences between *H. pylori* infection and active chronic gastritis. Emami et al showed that *H. pylori* infection were a risk factor of gastric antrum inflammation and gastric mucosa atrophy.⁴ It is believed that *H. pylori* infection were plays an important role in gastric malignancy, begins with infection, atrophy, metaplasia, and ends with dysplasia.

In this study, the correlation between *H. pylori* infection and intestinal mucosa were found, although statistically insignificant. On the other hand, mucosa activity and atrophy were strongly associated with *H. pylori* infection. The same result were also found in El Guindy et al study, shown that *H. pylori* infection were associated with the presence of gastritis and gastric mucosa atrophy.⁶ Another study conducted in North East Malaysia, where *H. pylori* infection were very low, showed a statistically significant difference between intestinal metaplasia and dysplasia in chronic atrophic gastritis patients and *H. pylori* infection ($p = 0.029$; $p < 0.001$).⁷ Other study in Myanmar also showed an association between *H. pylori* infection and gastric mucosa activity, either the presence of atrophy in antrum or corpus of the stomach, while *H. pylori* and intestinal metaplasia association only found in gastric mucosa activity on antrum area.⁸ This study also found the increasing risk of gastric mucosa activity, although statistically insignificant, because of

the biopsy location is not distinguished between antrum and corpus during the procedure.

H. pylori is a bacteria commonly lived inside the stomach, trigger inflammation reaction and cause a destruction in mucosa, resulting in ulcer formation. Gastric ulcer could begin with mucosa metaplasia that lost its function as defensive barrier system. It is supported by Jacobus et al in Semarang, Indonesia, which showed that the more severe an ulcer, the more incidence of gastric mucosa atrophy and intestinal metaplasia in *H. pylori* infected patients.⁹ Although metaplasia and gastric mucosa atrophy were found higher in *H. pylori* infected patient both in this study and other study aboard, we could not concluded yet why gastric malignancy prevalence in Indonesia is lower compared to other country. Another study conducted to compare the histopathology of gastric mucosa in *H. pylori* infection patient in Indonesia and Japan also showed a lower gastritis activity in Indonesian. Mucosa atrophy prevalence in positive *H. pylori* infection patient also found higher in Japan population study than Indonesia. In addition, severe gastric atrophy and intestinal metaplasia also found higher in Japan population. The difference between those two populations also showed a significance in statistic.¹⁰

From several study above, we can understand that gastric mucosa atrophy and metaplasia in *H. pylori* infection could increase the risk of gastric malignancy, while the association among them is still unclear because of its lower prevalence than other country.

CONCLUSION

Histopathology examination were useful not only to find *H. pylori* bacteria, but also to evaluate gastric mucosa condition. Prevalence of active chronic gastritis, mucous atrophy, and metaplasia were found higher in patient with *H. pylori* infection.

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