RESEARCH ARTICLE

Low Re-infection Rate of *Helicobacter pylori* after Successful Eradication in Thailand: A 2 Years Study

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Abstract

Background: *H. pylori* is an important cause of chronic gastritis, peptic ulcers and gastric cancer. Re-infection rates after successful eradication vary in different regions of the world but only limited studies have been performed in ASEAN Countries to clarify this important issue. The present study was designed to evaluate the *H. pylori* re-infection rate and predictors of re-infection in Thailand. **Methods:** We recruited patients with chronic gastritis after 1 and 2 years successful *H. pylori* eradication from Thammasat University Hospital, Pathumthani (Central urban area) and Maesod district, Tak (Northern rural area), Thailand. 13C-UBT was performed to evaluate re-infection status after cessation of PPI, H2 blocker and antibiotics for at least 4 weeks. Statistical analysis was performed using SPSS for Windows Version 22.0 (IBM Corp., Armonk, NY). **Results:** A total of 105 subjects were enrolled (40 M and 65F with a mean age of 53.1 years). The overall re-infection rate was 6/105 (5.7%). The 1-year and 2-year *H. pylori* re-infection rates after successful eradication were only 5.1% (2/39) and 6.1% (4/66). 1-year and 2-year reinfection rates in urban areas were 2/39 (5.1%) and 1/26 (3.8%), while the 2-year reinfection rate in rural areas was 3/40 (7.5%). Location (urban vs rural area) and sex did not show any association with either 1-year or 2-year *H. pylori* re-infection. With 2-year reinfection, the mean age of *H. pylori* re-infected patients was significantly higher than those who remained cured (63.0 years vs. 51.6 years, p-value = 0.01). The annual *H. pylori* infection rate was 2.9%. **Conclusions:** 1-year and 2-year *H. pylori* re-infection rates after successful eradication in Thailand appear low in both rural and urban areas. *H. pylori* eradication for prevention of significant upper GI disease should be recommended and confirmation of successful eradication should be the aim. Patients at higher risk such as the elderly should be monitored for possible risk of *H. pylori* re-infection.

Keywords: Low Re-infection rate- *Helicobacter pylori*- Thailand

Introduction

Helicobacter pylori (H. pylori) is one of the important chronic infection and is associated with upper gastrointestinal diseases including chronic gastritis, peptic ulcer, MALT lymphoma and gastric cancer (Mahachai et al., 2016; Phiphatpatthamaamphan et al., 2016; Prapitpaibool et al., 2015; Punjachaipornpon et al., 2016; Vilaichone et al., 2016). Currently, the indications for *H. pylori* treatment have expanded whereas the efficacies of conventional standard triple therapies have globally declined. The efficacy of triple therapy has reduced to less than 80% in many parts of the world including Thailand. Thailand consensus for *H. pylori* treatment in 2015 suggested using sequential or concomitant therapy as first line regimen which demonstrated high eradication rate (>90%) in Thailand (Mahachai et al., 2016). Confirmation of eradication of *H. pylori* infection by UBT or stool antigen tests should be performed in all treated patients to warrant cure (Vilaichone et al., 2006).

However, re-infection rate of *H. pylori* remains an important issue and might lead to serious diseases such as gastric cancer and peptic ulcer with complications. Furthermore, the information on the re-infection rate of *H. pylori* is limited in ASEAN countries. In the present study, we aimed to evaluate *H. pylori* re-infection rate and determine predictors of re-infection in Thailand.

Materials and Methods

Patients

A total of 105 patients' age 18-75 years who underwent gastroscopic examination at Thammasat University Hospital and during community survey in Maesod district, Tak (Northern rural area), Thailand for dyspeptic symptoms were included in this study. *H. pylori* eradication was successfully performed in all patients in those 2 areas. 1 and 2 years later, 13C-Urea breath tests (UBT) were performed to evaluate re-infection status.

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The diagnosis of H. pylori re- infection and Post-therapy follow-up

After successful eradication for 1 and 2 years, all patients at Thammasat university hospital and Maesod district, Tak were re-evaluated of re-infection of *H. pylori* by using 13C-UBT. All patients have never received proton pump inhibitor (PPI), H2-blocker, bismuth compound or antimicrobial agents in the past 1 month to avoid false negative results. Clinical information was assessed by personal interview using open-ended questions.

Statistical analysis

The association between clinical characteristics and re-infection rate were compared using chi-squared or Fisher's exact where appropriated. The p-value < 0.05 was considered to be statistically significant. The statistical analysis was performed by using SPSS for Windows Version 22.0 (IBM Corp., Armonk, NY). This study was conducted according to the good clinical practice guideline, as well as the Declaration of Helsinki, and was approved by our local ethics committee.

Results

A total of 105 subjects were enrolled (40 M and 65F with mean age of 53.1 years). Overall re-infection rate was 6/105 (5.7%). The 1-year and 2-year *H. pylori* re-infection rate after successful eradication were 5.1% (2/39) and 6.1% (4/66) as demonstrated in Table 1. 1-year and 2-year reinfection rate in urban area were 2/39 (5.1%) and 1/26 (3.8%) respectively. Whereas, 2-year reinfection rate in rural area was 3/40 (7.5%). Location (urban vs rural area) and sex were not associated with 1-year and 2-year *H. pylori* re-infection as shown in Table 2 and 3. Mean age of *H. pylori* patients re-infected after 2 years significantly higher than eradicated patients (63.0 years vs. 51.6 years, p-value = 0.01) as shown in Table 3. The annual *H. pylori*

Table 1. Demographic Data and *H. pylori* re-Infection Rate

Parameters	N=105
Age (years)	53.1 ± 11.6
Male/Female (n)	40/65
Rural/urban (n)	40/65
1-year reinfection rate	5.10%
2-year reinfection rate	6.10%
Overall re-infection rate	5.70%

Table 2. Clinical Factors and 1-Year *H. pylori* re-Infection Rate

Parameters	1 year *H. pylori* reinfection	*H. pylori* cured
Number (%)	2 (5.1%)	37 (94.9%)
Age (Mean±SD years)	65.5±16.3	53.9±11.2
Age > 60 years	1(50%)	11(29.7%)
Female (n)	0(0%)	21(56.8%)
Rural area (n)	0(0%)	0(0%)

All P-value >0.05

Table 3. Clinical Factors and 2-Year *H. pylori* re-Infection Rate

Parameters	2-year *H. pylori* reinfection	*H. pylori* cured
Number	4 (6.1%)	62 (93.9%)
Age (Mean±SD years)	63.0±5.5*	51.6±11.6
Age > 60 years	3(75%)	15(25%)
Female (n)	3(75%)	41(66.1%)
Rural area (n)	3(75%)	37(59.7%)

*P-value, 0.01

infection rate was 2.9%.

Discussion

Currently, chronic gastritis with *H. pylori* infection remains a global health issue and is considered being a cause of gastric cancer. Eradication of this infection should be achieved to reduce the risk of gastric cancer and confirmation of eradication should be obtained either by 13C-UBT or stool antigen test (Vilaichone et al., 2016). Recently, ASEAN consensus for *H. pylori* treatment suggested that the first line therapy for *H. pylori* eradication in ASEAN should depend on the local antibiotic susceptibility tests in each country and the second-line regimes should contain antibiotics not used previously or resistance is unlikely to have developed such as amoxicillin, bismuth, or tetracycline. This important guideline aimed to reduce the treatment failure in this region. However, *H. pylori* re-infection stills a major concern to consider effective eradication therapy. In this study, we demonstrated that 1-year and 2-year *H. pylori* re-infection rates after successful eradication in Thailand were low (only 5.1% and 6.1% respectively).

H. pylori reinfection rate varies in different parts of the world such as 29.8% in almost 9-year follow-up (annual infection rate= 3.4%) in Lithuania (Jonaitis et al., 2016), 12-22% in 2-year follow-up in Alaska (Bruce et al., 2015), annual recurrence rates between 2-9.3% in 2-year follow-up in Korea (Kim et al., 2014), 0.45% of 1-year reinfection rate in Morocco (Benajah et al., 2013), 1-year reinfection rate of 6% in Pakistan (Yakoob et al., 2013) and annual reinfection rate of 0.2% in Japan (Take et al., 2012). In this study we demonstrated that the annaul *H. pylori* reinfection rate in Thailand was 2.9% which consider low compared to other regions. Previous studies indicated that peptic ulcer disease, low education level, higher proportion of household members infected with *H. pylori* (Bruce et al., 2015), male and low income (Kim et al., 2013) were considered being risk factors for *H. pylori* reinfection. Our findings demonstrated that elderly group (mean age of 63 years) carries a higher risk of reinfection. Elderly patients were considered having underlying diseases eg. diabetes, hypertension and dyslipidemia and are at risk to be immunocompromised which might make them more susceptible to *H. pylori* re-infection than the younger group.

Annual *H. pylori* re-infection rate after successful eradication in Thailand was low both in rural and urban areas. *H. pylori* eradication for curing significant upper

GI diseases should be continued and confirmation of successful eradication should be obtained. Patients at risk such as elderly group should be monitored for possible risk of *H. pylori* re-infection. Our results supported the idea to eradicate their bacteria in Thailand without too much concern about the re-infection.

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