Questionnaire-Based Survey on Diagnostic and Therapeutic Endoscopies and *H. pylori* Eradication for Elderly Patients in East Asian Countries

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Key Words

Endoscopy · Aging · *Helicobacter pylori* · Colorectal polyp · East Asian countries

Abstract

Background: Gastrointestinal endoscopy and *Helicobacter pylori* (*H. pylori*) eradication therapy are commonly performed even among the elderly population. The aim of this study was to understand the way endoscopists viewed the application of endoscopy and *H. pylori* eradication in the el-

derly of East Asian countries. **Methods:** Self-administered questionnaires containing 13 questions on endoscopy and *H. pylori* eradication in the elderly were distributed to major institutions in Japan, South Korea, China, Indonesia, and the Philippines. **Results:** Two hundred and fifteen endoscopists (111 in Japan, 39 in China, 24 in Korea, 21 in Indonesia, and 20 in the Philippines) participated in this study. In the institutions where these endoscopists were associated, around 50% of patients undergoing endoscopy were above the age of 60 years. The participating endoscopists indicated that the necessity of screening esophagogastroduodenoscopy

and colonoscopy was lower in populations aged over 81 than the other age groups. They hesitated to perform therapeutic endoscopy, such as endoscopic submucosal dissection or endoscopic retrograde cholangiopancreatography, more often in patients over 85. They also hesitated to perform *H. pylori* eradication in patients aged over 81, especially in Japan. **Conclusion:** Endoscopists had significantly different attitudes regarding the indications for screening or therapeutic endoscopy and *H. pylori* eradication therapy in younger and elderly populations in East Asian countries.

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Introduction

In the rapidly aging societies of East Asia, endoscopic procedures are commonly performed even in elderly patients to diagnose and treat gastrointestinal (GI) disorders. Screening colonoscopy (CS) and the endoscopic removal of colorectal adenomas can result in a reduction in the number of colorectal carcinomas and colorectal cancer deaths [1, 2]. Screening esophagogastroduodenoscopy (EGD) also decreases gastric cancer deaths [3]. In addition, *Helicobacter pylori* (*H. pylori*) eradication can decrease the development of gastric cancer, especially in the subgroup of *H. pylori* carriers without precancerous lesions [4, 5]. However, age-specific benefits for screening endoscopies and *H. pylori* eradication have not been reported.

Endoscopic procedures are thought to be generally safe in elderly patients, with complication rates that are similar to those seen in younger patients [6]. However, a meta-analysis of studies of elderly patients undergoing CS found that patients aged 80 years and above appeared to have a higher risk of complications, such as perforation, GI bleeding, or cardiovascular/pulmonary complications [7].

Thus, a number of factors have to be considered when performing an endoscopic procedure on elderly patients, including the expected benefits of endoscopy as well as the increased risks of adverse events [6]. The aim of this study was to examine the attitude of East Asian endoscopists toward performing diagnostic or therapeutic GI endoscopy and *H. pylori* eradication in the elderly patients.

Methods

Participants

This is the 8th questionnaire-based survey conducted by the International Gastrointestinal Consensus Symposium (IGICS). The IGICS holds a yearly gathering at the annual meeting of the

Japanese Gastroenterological Association. Gastroenterologists and endoscopists at major institutions in Japan, China, South Korea, Indonesia, and the Philippines participated in this survey. Representative members from the IGICS committee provided a questionnaire to major institutions in each country, starting at the beginning of October 2014. Responses were collected until the end of January 2015. The questionnaire contained 13 questions focused on the following items: number of patients undergoing EGD, CS, or endoscopic retrograde cholangiopancreatography (ERCP) per week in each institution, upper/lower GI cancer screening strategy for each age group, indication for therapeutic endoscopy, such as endoscopic submucosal dissection (ESD), endoscopic mucosal resection (EMR), and ERCP for each age group, indication for *H. pylori* eradication therapy for each age group, and the comorbidities that influence the indication for screening endoscopy. The contents of the questionnaire are described in the Appendix.

Statistical Analysis

The differences between age groups were compared by using Fisher's exact test for categorical variables and the unpaired Student's *t* test for continuous variables. Regarding the question of comorbidities, participants selected the three most concerning comorbidities when considering the indication for screening endoscopy from the 8 choices. Selected answers were scored as 1–3 points in each participant, and the average score points were calculated for each choice. Statistical analyses were performed by using IBM SPSS statistics 22 (IBM Corporation, N.Y., USA). Data are expressed as mean $\pm$ SD. Two-sided *p* values <0.05 were considered statistically significant.

Results

Participant Characteristics

Study participants consisted of 215 endoscopists in Japan, China, South Korea, Indonesia, and the Philippines. Responses to questionnaires were obtained from all of them. The number of participants in each country and the characteristics of participating institutions are shown in table 1. The number of patients who underwent endoscopy in one institution was surprisingly greater in China and Korea than in the other countries.

Age distribution of patients who underwent endoscopy is shown in figure 1. In Japan, more than 70% of patients who underwent endoscopy were over 60 years of age, and about 40% of patients were over 70 years of age. In the other countries, about 50% of patients were over 60 years of age.

Indication for Endoscopy

Regarding the indication for screening EGD, the necessity (fig. 2a, b) and appropriate interval (fig. 2c, d) for each generation were investigated. Since the risk of gastric cancer would be different between patients with and

Table 1. Characteristics of participating institutions

Country	Number of endoscopists responding (n = 215), %	Experience of endoscopists, years, mean $\pm$ SD	Number of patients per week, per institute, mean $\pm$ SD		
			EGD	CS	ERCP
Japan	111 (52)	16.1 $\pm$ 7.9	80.1 $\pm$ 5.2	33.4 $\pm$ 2.3	5.6 $\pm$ 0.6
China	39 (18)	8.4 $\pm$ 6.7	511.5 $\pm$ 252.7	274.2 $\pm$ 129.0	23.7 $\pm$ 8.4
Korea	24 (11)	8.7 $\pm$ 7.3	381.0 $\pm$ 47.5	148.3 $\pm$ 17.7	30.0 $\pm$ 6.1
Indonesia	21 (10)	7.3 $\pm$ 5.1	29.5 $\pm$ 5.9	19.3 $\pm$ 4.3	4.1 $\pm$ 1.7
Philippines	20 (9)	14.1 $\pm$ 8.4	41.5 $\pm$ 1.5	33.1 $\pm$ 3.0	7.7 $\pm$ 0.8

without a history of *H. pylori* infection, the indications for screening EGD for *H. pylori*-eradicated population or *H. pylori*-negative population were investigated separately. In all countries, the necessity of screening EGD for patients aged 81–90 years was lower than what was needed in the other age groups. The need to screen for EGD was not different when compared to the needs of the *H. pylori*-eradicated population and *H. pylori*-negative population. On the other hand, the average screening interval of EGD was not remarkably different between the age groups. For the *H. pylori*-eradicated population, the recommended average interval of screening EGD was approximately 1 year in Japan, 1.5 years in Korea and Indonesia, and 3–4 years in China and Philippines. For *H. pylori*-negative population, the average interval of screening EGD was 2 years in Japan, Korea, and Indonesia, but was 3–6 years in China and Philippines.

Regarding the indication for screening CS, the authors examined the necessity (fig. 2e, f) and appropriate interval (fig. 2g, h) for each age group. Considering the risk of colorectal cancer, the indication for screening CS for population with or without past history of colorectal adenoma was investigated separately. The necessity of screening CS for 81–90 years of age was lower than in the other age groups except for patients following adenoma removal in Indonesia. The average screening interval of CS was not remarkably different between age groups. For post-adenoma removal patients, screening CS every 2–4 years was recommended in Japan, China, Korea, and the Philippines; screening CS annually was recommended in Indonesia. For patients without a history of adenoma, screening CS every 3–8 years was recommended.

Persistent unconsciousness, use of antiplatelet or anti-coagulant, severe respiratory failure, and life-threatening cancer were selected as the most critical comorbidities for screening endoscopy (table 2). Respondents considered these comorbidities as the highest risks of adverse events

in screening endoscopy. In addition, the effectiveness of screening endoscopy would be controversial for patients with such life-threatening conditions.

Subsequently, the authors asked whether participating endoscopists hesitate to order therapeutic endoscopies, such as ESD in the stomach, EMR in the duodenum, EMR in the colon, ESD in the colon, ERCP for acute cholangitis, and ERCP for asymptomatic common bile duct stone, for patients without comorbidities in each age group. Except for Indonesia, they often hesitated to perform therapeutic endoscopies on patients 85 years of age as compared with those aged 65 or 75 years (fig. 3). These results showed that age affects the indication for therapeutic endoscopies regardless of the types of procedures.

Indication for H. pylori Eradication Therapy

The indication for *H. pylori* eradication in the healthy population varies among countries (fig. 4). For the younger population, most endoscopists in Japan, Indonesia, and the Philippines performed *H. pylori* eradication, whereas about a half of participating endoscopists did not perform *H. pylori* eradication therapy in China and Korea. Interestingly, Japanese endoscopists were the most reluctant to perform eradication therapy for the elderly population in the participating five countries.

Discussion

This study addresses the attitudes of East Asian endoscopists toward screening or performing therapeutic GI endoscopy and *H. pylori* eradication in the elderly. It is obvious that most endoscopists think that the necessity of screening both EGD and CS differs between younger and elderly populations. On the contrary, they did not indicate that the surveillance interval of screen-

Fig. 1. Age distribution of patients undergoing EGD (a), CS (b), or ERCP (c) in East Asian countries.

ing EGD and CS should be changed by age. There is no precise evidence or guideline to optimize GI screening strategies, especially for the elderly population so far. A recent guideline, entitled 'Modification in endoscopic practice for the elderly,' addressed that screening CS in patients of advanced age should be individualized based

on general health and comorbid medical illnesses [8]. The effectiveness and risk of the screening endoscopy must be different between age groups. Interestingly, participants in all countries answered that the interval of screening EGD should be shorter in *H. pylori*-eradicated population than in *H. pylori*-negative population.

Fig. 2. **a** The necessity of screening EGD after *H. pylori* eradication. **b** The necessity of screening EGD in population with no history of *H. pylori* infection. **c** The average interval of screening EGD after *H. pylori* eradication. **d** The average interval of screening EGD with no history of *H. pylori* infection. **e** The necessity of screening CS after colorectal adenoma removal. **f** The necessity of

screening CS with no history of colorectal adenoma. **g** The average interval of screening CS after colorectal adenoma removal. **h** The average interval of screening CS with no history of colorectal adenoma. Error bars indicate the SE of the mean. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ as compared with the lowest age group in each country.

However, the evidences for the optimal interval of screening EGD have still been limited. A recent large-scale retrospective study showed that the optimal interval for screening EGD was 24 months in both men and women [9], although did not address the influence of *H. pylori* infection on the optimal screening interval.

Especially, the appropriated interval for the *H. pylori*-eradicated population has never been investigated. Further investigations are needed to optimize the interval of screening endoscopy considering the cancer risks including age, gender and *H. pylori* status.

Fig. 3. Rate of hesitation for performing ESD in the stomach (a), EMR in the duodenum (b), EMR in the colon (c), ESD in the colon (d), ERCP for acute cholangitis (e), and ERCP for asymptomatic

CBDS (f) * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ as compared with the lowest age group in each country. CBDS = Common bile duct stone.

Table 2. Critical comorbidities for screening endoscopy

Japan	Persistent unconsciousness Use of antiplatelet or anticoagulant Life-threatening cancer
China	Persistent unconsciousness Use of antiplatelet or anticoagulant Severe respiratory failure
Korea	Severe respiratory failure Persistent unconsciousness Use of antiplatelet or anticoagulant
Indonesia	Severe respiratory failure Persistent unconsciousness History of cerebrovascular diseases
Philippines	Persistent unconsciousness Life-threatening cancer Use of antiplatelet or anticoagulant

Regardless of the kind of therapeutic endoscopy, the participating endoscopists hesitated to perform therapeutic procedures more often in octogenarians than in younger groups. Although there are several studies to evaluate the safety of therapeutic endoscopies in the elderly [10, 11], these studies are likely to have potential selection bias because high-risk patients would be excluded. Therefore, more large-scale prospective studies are warranted to evaluate the risk of therapeutic endoscopy in the elderly.

H. pylori test and treatment strategy in elderly people should be regarded as an important goal in clinical practice due to its crucial role in GI disorders, such as gastric cancer and peptic ulcer [12]. The standard methods for diagnosis and treatment of *H. pylori* infection could be safe and effective for chronic atrophic gastritis [13, 14]. However, the effectiveness of eradication therapy as a prevention of gastric cancer has not been fully evaluated in the elderly population. Current knowledge confirms

Fig. 4. Performance rates of *H. pylori* eradication therapy in a healthy population (a), for those with a peptic ulcer scar (b), for those with an active or healing peptic ulcer (c), and for those with

a history of endoscopic resection for early gastric cancer (d) * p < 0.05; ** p < 0.01; *** p < 0.001 as compared with the lowest age group in each country.

that eradication therapy should be ideally administered early, before the development of premalignant gastric atrophy to prevent gastric cancer [4]. According to the results of our study, Japanese endoscopists were reluctant to perform eradication therapy on the elderly population, suggesting that they did not believe the effectiveness of *H. pylori* eradication in octogenarians. An investigation of the cost-effectiveness of *H. pylori* eradication therapy in elderly people is required.

The limitation of this study includes that surveyed responders were selected by representative IGICS committee members and were not randomly selected from each country. Responders belonged to a university or large general hospitals in urban areas within each country. Therefore, selection bias may affect the present results. These limitations necessitate future studies to validate the findings, although this study gives important information for understanding attitudes regarding endoscopic man-

agement and *H. pylori* eradication for the elderly population in East Asian countries.

In conclusion, the indication for screening or therapeutic endoscopy and *H. pylori* eradication therapy were significantly affected by age in all of the investigated East Asian countries. However, optimal management strategies for the elderly population have not been fully evaluated. Multidimensional approaches including the evaluation of social conditions and comorbidities are required in future research to manage older patients better [15].

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Appendix

Questionnaire on Diagnostic and Therapeutic Endoscopy for Elderly Patients in Asia

1 On average, how many patients undergo endoscopy per week in your institute?

(a) EGD

- Overall n = ()
- 61–70 years of age n = ()
- 71–80 years of age n = ()
- 81–90 years of age n = ()

(b) CS

- Overall n = ()
- 61–70 years of age n = ()
- 71–80 years of age n = ()
- 81–90 years of age n = ()

(c) ERCP

- Overall n = ()
- 61–70 years of age n = ()
- 71–80 years of age n = ()
- 81–90 years of age n = ()

2 In your opinion, how often should patients undergo EGD for cancer screening after *H. pylori* eradication?

- <61 years of age every () year(s)/☐not necessary
- 61–70 years of age every () year(s)/☐not necessary
- 71–80 years of age every () year(s)/☐not necessary
- 81–90 years of age every () year(s)/☐not necessary

3 In your opinion, how often should patients with no history of *H. pylori* infection undergo EGD for cancer screening?

- <61 years of age every () year(s)/☐not necessary
- 61–70 years of age every () year(s)/☐not necessary
- 71–80 years of age every () year(s)/☐not necessary
- 81–90 years of age every () year(s)/☐not necessary

4 In your opinion, how often should patients undergo CS for cancer screening after adenoma removal?

- <61 years of age every () year(s)/☐not necessary
- 61–70 years of age every () year(s)/☐not necessary
- 71–80 years of age every () year(s)/☐not necessary
- 81–90 years of age every () year(s)/☐not necessary

5 In your opinion, how often should patients with no history of colorectal adenoma or cancer undergo CS for cancer screening?

- <61 years of age every () year(s)/☐not necessary
- 61–70 years of age every () year(s)/☐not necessary
- 71–80 years of age every () year(s)/☐not necessary
- 81–90 years of age every () year(s)/☐not necessary

6 In your opinion, should eradication therapy be performed for healthy patients with *H. pylori*?

- <51 years of age ☐Yes/☐No/☐If desired by patient
- 51–60 years of age ☐Yes/☐No/☐If desired by patient
- 61–70 years of age ☐Yes/☐No/☐If desired by patient
- 71–80 years of age ☐Yes/☐No/☐If desired by patient
- 81–90 years of age ☐Yes/☐No/☐If desired by patient

7 In your opinion, should eradication therapy be performed for patients with *H. pylori* as well as active or healing peptic ulcers?

- <51 years of age ☐Yes/☐No/☐If desired by patient
- 51–60 years of age ☐Yes/☐No/☐If desired by patient
- 61–70 years of age ☐Yes/☐No/☐If desired by patient
- 71–80 years of age ☐Yes/☐No/☐If desired by patient
- 81–90 years of age ☐Yes/☐No/☐If desired by patient

8 In your opinion, should eradication therapy be performed for patients with *H. pylori* as well as peptic ulcer scars?

- <51 years of age ☐Yes/☐No/☐If desired by patient
 - 51–60 years of age ☐Yes/☐No/☐If desired by patient
-

Appendix (continued)

-
- 61–70 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 71–80 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 81–90 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
-

9 In your opinion, should eradication therapy be performed for patients with *H. pylori* after endoscopic resection for early gastric cancer?

- <51 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 51–60 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 61–70 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 71–80 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
- 81–90 years of age	☐ Yes/ ☐ No/ ☐ If desired by patient
-

10 Do you hesitate to order the following procedures for healthy 65-year-old patients?

- Screening EGD	☐ Yes/ ☐ No/ ☐ Unknown
- Screening CS	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for gastric cancer	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for duodenal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for cholangitis	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for asymptomatic CBD stone	☐ Yes/ ☐ No/ ☐ Unknown
-

11 Do you hesitate to order the following procedures for healthy 75-year-old patients?

- Screening EGD	☐ Yes/ ☐ No/ ☐ Unknown
- Screening CS	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for gastric cancer	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for duodenal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for cholangitis	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for asymptomatic CBD stone	☐ Yes/ ☐ No/ ☐ Unknown
-

12 Do you hesitate to order the following procedures for healthy 85-year-old patients?

- Screening EGD	☐ Yes/ ☐ No/ ☐ Unknown
- Screening CS	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for gastric cancer	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for duodenal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- EMR for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ESD for colorectal adenoma	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for cholangitis	☐ Yes/ ☐ No/ ☐ Unknown
- ERCP for asymptomatic CBD stone	☐ Yes/ ☐ No/ ☐ Unknown
-

13 In your opinion, which are the most critical comorbidities that influence the indication for screening endoscopy? Select 3 answers in the order of importance.

- (a) Persistent unconsciousness
- (b) Life-threatening cancer
- (c) Severe respiratory failure
- (d) History of cardiovascular disease
- (e) History of cerebrovascular disease
- (f) On hemodialysis
- (g) Dementia
- (h) Use of antiplatelets or anticoagulants
- (i) Others (please describe:)

The most critical comorbidities are:

- 1 ()
2 ()
3 ()
-

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