

# Screening endoscopy for gastric cancer: time for quality control

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Globally, gastric cancer is the third-leading cause of cancer-related death in men and the fifth-leading in women (1), and is especially prevalent in Eastern Asia, including Korea (2). To lower gastric cancer mortality, a national gastric cancer screening program including esophagogastroduodenoscopy (EGD) has been introduced in Korea since 1999 (3). Korean people aged 40 years or older are invited to participate in the National Gastric Cancer Screening Program biennially. The Korean National Cancer Screening Program has been expanding steadily. The participation rate of gastric cancer screening has increased from 7.4% in 2002 to 45.4% in 2011 (4).

When the Korean National Cancer Screening Program began in 1999, there was limited evidence regarding the benefits of gastric cancer screening, which caused clinicians to hesitate when recommending screening endoscopies for gastric cancer. A cohort study in China demonstrated that screening endoscopies did not reduce gastric cancer mortality rates, although screening helped to diagnose gastric cancer at an early stage (5). However, recently a large nested case-control study based on the data of the Korean National Cancer Screening Program reported that the overall odds ratio for gastric cancer mortality among ever-screened subjects was 0.79 [95% confidence interval (CI), 0.77–0.81], compared to subjects who had never been screened (6). Additionally, as the number of endoscopic screening tests performed per subject increased, the odds ratios of gastric cancer mortality decreased [one *vs.* two *vs.* three or more times: 0.63 (95% CI, 0.57–0.63) *vs.*

0.32 (95% CI, 0.28–0.37) *vs.* 0.19 (95% CI, 0.14–0.26). A dose-response relationship between the number of endoscopic screening tests and reduction of mortality strongly supports the benefit of endoscopic screening for gastric cancer in regions where gastric cancer is prevalent.

Besides the efficacy of endoscopic screening, the optimal endoscopic screening interval may be another issue. Although individuals aged 40 years or older undergo either EGD or gastric fluoroscopy every two years within the Korean National Cancer Screening Program, this 2-year screening interval had been determined arbitrary without solid evidence. Recent studies, however, support the effectiveness of “biennial” gastric cancer screening (7,8). In a study on the relationship between endoscopic screening interval and early gastric neoplasms, biennial endoscopic screening decreased the proportion of patients diagnosed with advanced gastric cancer and increased the proportion of endoscopically treatable gastric neoplasms (7). Annual endoscopic screening, however, did not facilitate the detection of early gastric neoplasms when compared to biennial endoscopic screening. This finding may reflect the relatively long natural history of gastric adenoma and early gastric cancer. A follow-up study on the natural history of 56 early gastric cancers demonstrated that half of the lesions remained at an early stage of gastric cancer 44 months after diagnosis (9). Another study on gastric adenomas revealed that only 4 out of 27 lesions progressed to early gastric cancers during the median follow-up period of 66 months (10). Even if a patient diagnosed with early

gastric cancer had undergone screening endoscopy a year earlier, this patient may have been diagnosed with early gastric cancer, rather than adenoma, because of the long natural history of gastric adenoma and early gastric cancer. Therefore, shortening the screening interval from 2 years to 1 year may not be helpful for the early diagnosis of gastric neoplasms. Nevertheless, some people upon screening have been diagnosed with advanced gastric cancer (7). Some lesions may be a rapidly growing gastric cancer; however, most of the cases diagnosed as advanced lesions may be due to lesions that were missed during the previous screening endoscopy. In other words, simply shortening the screening interval does not prevent lesions from being missed.

Therefore, it is now time to pay attention to the quality of EGD. Advanced lesions may be prevented by increasing the quality of EGD rather than shortening the screening interval. The first identified endoscopic quality indicator for EGD in gastric cancer screening is the detection rate of gastric subepithelial lesions and gastric diverticula (11). An endoscopist who detects gastric subepithelial lesions and gastric diverticula better identifies early gastric neoplasms. No blind areas may be required to ensure that gastric subepithelial lesions, gastric diverticula, and early gastric neoplasms are not overlooked. More recently, Park *et al.* demonstrated that the observation time is an important quality indicator in EGD (12). In that study, endoscopists were classified into the fast *vs.* slow endoscopists groups. The mean duration time was 2 minutes 38 seconds for the fast endoscopists group, and 3 minutes 25 seconds for the slow endoscopists group. Even approximately a minute difference in observation times significantly affected the detection rate of gastric adenoma or cancer (0.17% *vs.* 0.25%). Another interesting finding of that study was that the observation time of each endoscopist did not significantly change over the course of the study period. We think that this implies that observation time may be an intrinsic characteristic of endoscopists, rather than a learned endoscopic skill. The observation time can be regarded as a direct quality indicator of EGD in gastric cancer screening.

If the observation time is widely accepted as a good-quality indicator in EGD, endoscopists are likely to prolong their observation times because of the Hawthorne effect. The Hawthorne effect is a type of reactivity in which individuals modify an aspect of their behavior in response to their awareness of being observed (13,14). If this holds true, our question now is whether increasing the observation time really helps improve the performance of screening endoscopy. In a recent study on colonoscopy, increased

rates of adenoma detection were revealed to be associated with reduced risk of colorectal cancer and mortality (15). It may be hoped that subsequent studies will suggest that prolonged observation time in gastric cancer screening leads to an increase in the detection rate of gastric neoplasms.

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## Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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