

Disparities in prevalence, location, and shape characteristics of colorectal neoplasia between South Korean and U.S. patients

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Background: Colon cancer screening is being introduced in many countries, but standard Western screening approaches may not be appropriate for Asian societies if differences in colon cancer epidemiology exist. Comparative analysis of colorectal neoplasia patterns in South Korean and Western subjects has implications for appropriate screening approaches in non-Western societies.

Methods: The results of concurrent screening colonoscopies performed in average-risk patients 50 to 69 years old in 2 teaching hospitals, Kyung Hee University Hospital (Seoul, South Korea) and Virginia Mason Medical Center (Seattle, Wash), were compared with respect to prevalence, histologic features, anatomic distribution, and shape characteristics of colorectal neoplasia.

Results: The U.S. (n = 3460) and South Korean (n = 2193) cohorts were similar with regard to the prevalence of adenomas (28.5% vs 29.8%, respectively, $P = .312$) and advanced neoplasia (6.4% vs 5.4%, respectively, $P = .102$), but the proportion of proximal adenomas was greater in the U.S. cohort (62.8% vs 45.9%, $P < .001$). The prevalence of adenomas and advanced neoplasia was similar in male patients, but there was a greater prevalence of neoplasia (23.5% vs 18.8%, $P = .006$) and advanced neoplasia (5.1% vs 2.7%, $P < .001$) in U.S. women than South Korean women. When large (≥ 10 mm) adenomas were considered, proximal location and nonpolypoid (flat) shape were more common in the U.S. cohort (79.4% vs 37.1%, $P = .003$ and 43.5% vs 12.3%, $P < .001$, respectively). The overall prevalence of large flat adenomas in the U.S. cohort was 5 times that of the South Korean cohort (2.6% vs 0.5%, $P < .001$). Adjustment for sex ratio discrepancies (48.3% men in the U.S. cohort vs 60.8% in the South Korean cohort, $P < .001$) did not result in any significant changes in the conclusions.

Conclusion: Compared with Westerners, South Koreans have a more distal distribution of adenomas and advanced neoplasia and lower prevalence of large flat adenomas. South Korean women have a lower prevalence of colorectal neoplasia than Western women. Such disparities suggest that Western screening strategies cannot be directly adopted by other countries, but need to be customized by society. (*Gastrointest Endosc* 2015;82:1080-6.)

In recent years, there has been a steady increase in the incidence of colorectal cancer (CRC) in South Korean¹ and other Asian populations.² This phenomenon has been attributed to environmental changes, including Westerniza-

tion of lifestyle and dietary habits. Current U.S. guidelines recommend screening colonoscopy based only on age and family history.³ However, other factors, such as race and country of origin, may influence the prevalence,

Abbreviations: CRC, colorectal cancer; GDKHUH, Gang Dong Kyung Hee University Hospital; VMCC, Virginia Mason Medical Center.

DISCLOSURE: All authors disclosed no financial relationships relevant to this article.



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0016-5107/\$36.00

<http://dx.doi.org/10.1016/j.gie.2015.04.018>

Received January 15, 2015. Accepted April 8, 2015.

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distribution, and characteristics of colorectal neoplasia. Although large-scale colonoscopic screening has been shown to be feasible and effective in the United States,^{4,6} it may not be appropriate to apply screening data from Western populations to Asian populations.

In this study, we compared the prevalence and characteristics of colorectal neoplasia in average-risk U.S. and South Korean subjects undergoing concurrent screening colonoscopy.

METHODS

Patients

The results of screening colonoscopies performed concurrently in 2 teaching hospitals, Gang Dong Kyung Hee University Hospital (GDKHUH) in Seoul, South Korea, and Virginia Mason Medical Center (VMMC) in Seattle, Washington, were compared. Asymptomatic patients 50 to 69 years of age undergoing their first screening colonoscopy were eligible for inclusion. Potential subjects were excluded if they met any of the following criteria: (1) history of colonoscopy or sigmoidoscopy, (2) incomplete colonoscopy due to poor bowel preparation or failure to achieve cecal intubation, (3) personal history of colorectal neoplasia or inflammatory bowel disease, or (4) family history of CRC in 1 or more first-degree relatives. In addition, patients with a diagnosis of hereditary nonpolyposis CRC or familial adenomatous polyposis syndrome were excluded. This study was approved by the institutional review board of each participating hospital (KHNMC 2015-01-032 and VMMC IRB 14034).

Data abstraction

VMMC is a 400-bed teaching hospital and has operated an open-access screening colonoscopy clinic for asymptomatic patients for the past 15 years, as described previously.⁷ For quality assurance purposes, VMMC maintained an ongoing, prospectively updated colonoscopy database until 2011. We used this database to identify potentially eligible U.S. subjects (U.S. cohort). GDKHUH is a 650-bed teaching hospital in Seoul, South Korea that has operated a Health Promotion Center for asymptomatic individuals for the past 8 years. Screening colonoscopy is part of the Health Promotion Program offered to healthy, asymptomatic patients.⁸ We reviewed the database of the GDKHUH Health Promotion Center to identify eligible South Korean subjects (South Korean cohort).

Patients who underwent colonoscopy between January 2007 and January 2010 (U.S. cohort) and between June 2006 and June 2009 (South Korean cohort) were included. Demographic data, colonoscopic findings, and histologic diagnoses were abstracted from the 2 databases.

Endoscopic procedures

The colonoscopies were performed by 10 board-certified attending gastroenterologists for the U.S. cohort and 9 for

the South Korean cohort; all endoscopists were highly experienced gastroenterology attending physicians at teaching hospitals (with adenoma detection rates consistently $\geq 25\%$) and had performed 1000 to 20,000 previous colonoscopies. The vast majority of colonoscopies were performed with patients under conscious sedation. The bowel preparation regimens used were predominantly polyethylene glycol-based agents. The quality of the bowel preparation was assessed as excellent, good, fair, or poor⁹; subjects with poor bowel preparation were excluded from data analysis. All detected polyps were removed and sent for histopathologic examination, with the exception of some diminutive (≤ 2 mm) sessile polyps in the rectum that appeared to be hyperplastic based on endoscopic characteristics (pale color and type 1 or 2 pit pattern).¹⁰ Polyps were divided into polypoid and nonpolypoid subtypes based on the Paris classification.¹¹ Polypoid lesions included pedunculated, semipedunculated, and sessile polyps, whereas nonpolypoid lesions included flat, carpet-like, and depressed polyps. Advanced neoplasia was defined as adenomas with tubulovillous or villous features, high-grade dysplasia, or that were 1 cm or larger in size, as well as malignancies; thus, the advanced neoplasia category included all cases of cancer. The proximal colon was defined as all areas proximal to the splenic flexure, whereas the distal colorectum included all areas distal to and including the splenic flexure.

Data analysis

The primary endpoint was the prevalence of colorectal neoplasia, advanced neoplasia, and nonpolypoid neoplasia in U.S. and South Korean subjects. Secondary endpoints included the prevalence of adenomas stratified by sex and the anatomic distribution of lesions. The χ^2 test or Fisher exact test was used to compare proportions, and the Student *t* test or nonparametric Mann-Whitney *U* test to compare means. All *P* values were 2 tailed, and a *P* value $< .05$ was considered statistically significant. Statistical analyses were performed by using SPSS version 19.0 for Windows (SPSS Inc, Chicago Ill).

RESULTS

U.S. cohort

Table 1 shows the U.S. cohort of 3460 asymptomatic subjects (48.3% men; mean age, 56.2 ± 5.5 years), which did not include 28 patients with incomplete colonoscopies (cecal intubation rate of 99.2%). Approximately 6% of these subjects were of Asian-American background, reflective of the general population of the American West Coast. Colonic neoplasia was found in 987 subjects (28.5%), of whom 620 (62.8%) had only proximal lesions. Advanced neoplasia was found in 223 patients (6.4%), including 11 patients with CRC (0.3%). As expected, the prevalence of neoplasia and advanced neoplasia was significantly greater in men than in women (33.9% vs 23.5%, respectively, and

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