

ORIGINAL ARTICLE

Endoscopy Screening in High-Risk Populations as a Strategy to Improve Early Detection of Gastric Cancer in the United States

Eunjung Lee^{1,2*}, MiHee Lee^{1,2}, Sung Min Han³, Aaron Ahn⁴, Amie E. Hwang^{1,2}, Aiden Ahn⁵, Elizabeth Ko⁶, Dennis Deapen^{1,2}, Jennifer Tsui^{1,2}, Jennifer B. Unger¹, Jeongseon Kim⁷, Joo Ha Hwang⁸ and Sang Hoon Ahn⁹

BACKGROUND: Korean Americans experience significant disparities in the incidence of gastric cancer, with five times higher incidence than non-Hispanic whites (NHWs). Although Korean Americans are diagnosed at an earlier stage than other racial/ethnic groups in the United States, they are diagnosed at a later stage compared with those in South Korea, where >70% of screening-eligible adults are adherent to the bi-annual gastric cancer screening guidelines. We conducted a pilot survey to characterize patterns of endoscopy use among Korean American and NHW gastric cancer patients.

METHODS: We recruited 37 Korean American and 48 NHW gastric cancer patients in California diagnosed between 2005 and 2019 and collected information on medical history related to gastric cancer. Descriptive analyses were conducted to compare the frequency and recency of endoscopy prior to the diagnosis of gastric cancer between Korean Americans and NHWs.

RESULTS: A higher percentage of Korean American patients with gastric cancer (78%) reported prior endoscopy compared with NHWs (36%; $P < 0.001$), with a significantly higher frequency of use (P for trend < 0.001). About 46% of Korean American patients underwent two or more endoscopies prior to the diagnosis of gastric cancer vs. 21% of NHWs ($P = 0.014$). The percentage of patients who underwent endoscopy within 3 years before diagnosis was also higher among Korean Americans than in NHWs (49% vs. 17%; $P = 0.002$).

CONCLUSIONS: Prior endoscopy was more frequent among Korean American patients with gastric cancer than in NHWs, potentially contributing to an earlier stage diagnosis. These observations underscore the need for screening and surveillance endoscopy in high-risk populations in the United States.

KeyWords: endoscopy ■ screening ■ surveillance ■ gastric cancer ■ stomach cancer ■ Korean American ■ cancer disparity

In 2019, the estimated number of newly diagnosed gastric cancer cases and deaths reported in the United States (US) were 27,510 and 11,140, respectively,¹ and only ~30% of gastric cancer patients are diagnosed at a localized stage. When diagnosed at a localized stage, the 5-year relative survival rate is 70%; however, when diagnosed at a regional or distant stage, the rates are 32 and 6%, respectively.¹ As such, the 5-year survival rate in the US (~30%) is much lower than those in high-risk countries, such as Korea and Japan (~70%),²⁻⁴ which have population-based screen-

ing programs and higher proportions of localized-stage gastric cancer (~60%).^{5,6} In Korea, bi-annual stomach cancer screening is recommended for those aged ≥ 40 , and ~90% of screening is conducted with upper endoscopy.⁷ In the US, screening endoscopy without medical indications has not been generally recommended even for high-risk populations, except the guidelines from the American Society for Gastrointestinal Endoscopy recommending endoscopy screening for first-generation immigrants from high-risk countries aged ≥ 40 years.⁸

Correspondence to: Eunjung Lee, Department of Preventive Medicine, Keck School of Medicine, University of Southern California/Norris Comprehensive Cancer Center, Room 4449A, 1441 Eastlake Avenue, Los Angeles, CA 90089. Tel: 323 865 0827, Fax: 323 865 0827. Email: leee@usc.edu

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POPULAR SCIENTIFIC SUMMARY

- Korean Americans experience five times higher incidence of gastric cancer than non-Hispanic whites and are diagnosed at an earlier stage than others in the United States.
- In this pilot study, upper endoscopy prior to gastric cancer diagnosis was more frequent among Korean American patients than non-Hispanic white patients.
- Our pilot data underscore the need for screening and surveillance endoscopy in high-risk populations in the US.

Asian Americans experience significant disparities in the incidence of gastric cancer. The incidence rate in Asian Americans is about two times that of non-Hispanic whites (NHWs). Among Asian American subgroups, Korean Americans have the highest incidence rate: approximately five times higher than NHWs and two times higher than Japanese Americans, the racial/ethnic group with the second-highest incidence in the US.^{1,5} Korean Americans are diagnosed at a relatively early stage (38% at localized stage) than all other racial/ethnic groups (25–32%).¹ A study analyzing Medicare claims data between 2004 and 2013 (i.e. including only fee-for-service plan enrollees) reported that a significantly higher proportion of Korean American gastric cancer patients have ever had an endoscopy prior to diagnosis compared with other Asian American gastric cancer patients (~43 vs. ~20%).⁹ The difference in frequencies of endoscopy use was not reported. To better understand the use of pre-diagnostic endoscopy among Korean American patients, a high-risk group for gastric cancer, we conducted a pilot study on patterns of endoscopy use in Korean American gastric cancer patients.

MATERIALS AND METHODS

We conducted a pilot survey study among 37 Korean American and 48 NHW gastric cancer patients in California between 2019 and 2020. About half of the Korean American patients, who were diagnosed between 2013 and 2018, were recruited from the California Cancer Registry (CCR). The other half were recruited consecutively among patients cared for by a Korean American medical oncologist at the University of Southern California Norris Comprehensive Cancer Center, who were diagnosed between 2005 and 2019 and largely originating from a community cancer center in Koreatown in Los Angeles, California. NHW patients diagnosed between 2013 and 2018 were recruited as a comparison group from the CCR (matched to Korean

American patients on cardia/non-cardia subsite; all had non-cardia gastric cancer). Information on gastric cancer diagnosis, gastric symptoms or diseases (including epigastric pain or discomfort, ulcer, gastritis, acid reflux, and excessive gastric acid), proton pump inhibitor use, family history of gastric cancer, and history of endoscopy use was collected using structured questionnaires mailed out to participants for self-administration, with a small subset completing the questionnaire by in-person or telephone interviews. Descriptive analyses were conducted to compare frequency and time since the most recent pre-diagnosis endoscopy between Korean Americans and NHWs, and by stage at diagnosis within Korean Americans. *P*-values were computed using Cochran-Armitage tests for trend, chi-square tests, and Fisher's exact tests. All *P*-values reported are two-sided. This study was approved by the University of Southern California institutional review board (IRB) and the California Committee for the Protection of Human Subjects. A written informed consent was obtained from participants.

RESULTS AND DISCUSSION

In this pilot study of prevalent gastric cancer cases (i.e. survivors) predominantly diagnosed with the non-metastasized disease, about 36% of NHW patients and about 78% of Korean American patients reported a history of prior endoscopy (Table 1; *P* < 0.001). Furthermore, the frequency of prior endoscopy was higher, and the time between the most recent endoscopy and cancer diagnosis was shorter among Korean American patients compared with NHW patients (*P* for trend < 0.001 for both). For example, 46% of Korean American patients underwent two or more endoscopies before diagnosis (vs. 21% of NHWs; *P* = 0.014), and 49% of Korean Americans underwent endoscopy within 3 years before diagnosis (vs. 17% of NHWs; *P* = 0.002). These percentages, particularly the percentage observed in Korean Americans, are higher than those observed from the SEER-Medicare data (43% in Korean Americans; 20% in other Asian Americans),⁹ as well as the percentage from an urban tertiary referral center in New York (25%).¹⁰ These findings are likely to be attributable to our inclusion of prevalent cases, the majority (~90%) of whom were diagnosed with non-metastasized disease, because prior endoscopic examination has been associated with earlier detection and increased survival.^{9,11} However, when evaluating the history of endoscopy use separately among the population-based sample of Korean American patients (i.e. CCR patients), only about half of the patients ever underwent prior endoscopy. Increased frequency and recency of endoscopy appeared to be associated with earlier diagnosis among Korean

Table 1. Frequency of and time since most recent endoscopy prior to diagnosis in Korean American and NHW gastric cancer patients

	Non-Hispanic whites (n = 48) N (%)	Korean American (KA) (n = 37) N (%)	KA			
			P	Stage I (n = 15) N (%)	Stage II or higher (n = 22) N (%)	P
N of endoscopy prior to diagnosis						
Never	31 (65%)	8 (22%)		3 (20%)	5 (23%)	
1	7 (15%)	12 (32%)		3 (20%)	9 (41%)	
2–3	10 (21%)	11 (30%)		5 (33%)	6 (27%)	
≥4		6 (16%)		4 (27%)	2 (9%)	
P value for trend [§]			<0.001			0.19
P value (≥2 vs. never or 1) [†]			0.014			0.16
Time between most recent pre-diagnosis endoscopy and gastric cancer diagnosis						
Never	31 (65%)	8 (22%)		3 (20%)	5 (23%)	
≥10 years	4 (8%)	5 (14%)		0	5 (23%)	
4–9 years	5 (10%)	6 (16%)		2 (13%)	4 (18%)	
≤3 years	8 (17%)	18 (49%)		10 (67%)	8 (36%)	
P value for trend [§]			<0.001			0.15
P value (≤3 vs. ≥4 years) [†]			0.002			0.070
Gastric symptoms or diseases prior to diagnosis**						
Never	23 (48%)	8 (25%)		-	-	
Ever	25 (52%)	24 (75%)		-	-	
P [†]			0.003			
Family history of gastric cancer						
No	45 (94%)	22 (60%)		-	-	
Yes	3 (6%)	15 (40%)		-	-	
P ^{††}			<0.001			

§, Cochran–Armitage trend test.

†, Chi-square test.

** , Includes proton-pump inhibitor use. Numbers do not add up due to missing data.

††, Fisher's exact test.

Americans, although these associations did not reach statistical significance due to the limited sample size (Table 1).

Understanding the characteristics of Korean American patients associated with increased use of endoscopy and patient-level and provider-level determinants of endoscopy use, including the role of primary care providers, will be crucial in improving the early diagnosis of gastric cancer in the US. Although this information was not collected in this pilot study, the results of this study indicate that the prevalence of history of gastric symptoms or diseases prior to the diagnosis of gastric cancer and the prevalence of family history of gastric cancer were higher among Korean American patients than in NHW patients, which could have prompted endoscopy use ($P = 0.003$ and $P < 0.001$, respectively; Table 1).

Although the majority of our Korean American participants lived in/near Los Angeles County with a

large Korean ethnic enclave, endoscopy use among Korean American patients observed in this study, particularly among the population-based sample of Korean American patients, is much lower than that in South Korea.⁷ In a population-based survey in South Korea, 86% of adults aged 40–74 years ever underwent screening for gastric cancer, with 85% of them (i.e. 73% of the participants) adherent to the National Cancer Screening Program (NCSP) guidelines (every 2 years), predominantly with endoscopy.⁷ Participants of NCSP who underwent one, two, and three or more screening endoscopies were at 37, 68, and 81% reduced risk of gastric cancer mortality, respectively,¹¹ which is consistent with evidence from Japan, China, and Korea, supporting mortality benefits of endoscopy screening.^{6,12–16}

The results of this study need to be interpreted cautiously considering our inclusion of prevalent case patients, precluding representative sampling of late-stage patients. Nevertheless, these observations highlight

the sub-optimal management and preventive care for gastric diseases in the US, and underscore the need for screening and surveillance endoscopy in high-risk populations in the US, including Korean Americans and other Asian Americans as previously proposed.^{10,17,18} Endoscopic screening at ages 50 years or older and subsequent endoscopic surveillance of pre-cancerous lesions have been shown to be cost effective for Asian Americans.^{19,20} To improve the early detection of gastric cancer in the US, practice guidelines should recommend screening and surveillance endoscopy in high-risk populations. In addition, studies to identify multi-level (e.g. health system, provider, and patient) determinants of endoscopy use in high-risk populations and community-level educational efforts targeting high-risk patients and healthcare providers are warranted.

ARTICLE INFORMATION

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Affiliations

¹Department of Preventive Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; ²Norris Comprehensive Cancer Center, University of Southern California, Los Angeles, CA, USA; ³Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; ⁴Case Western Reserve University School of Medicine, Cleveland, Ohio, USA; ⁵Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA; ⁶College of Osteopathic Medicine, Liberty University, Lynchburg, VA, USA; ⁷Department of Cancer Biomedical Science, Graduate School of Cancer Science and Policy, National Cancer Center, Goyang-si, Korea; ⁸Division of Gastroenterology and Hepatology, Department of Medicine, Stanford University, Stanford, CA; ⁹Division of Medical Oncology, Department of Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Conflict of interest and funding

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