ORIGINAL ARTICLE

Outcomes and Efficiency of National Gastric Cancer Screening Program in Korea

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Background/Aims: The National Cancer Screening Program (NCSP) for Medicaid recipients has contributed to reduction of cancer-related mortality in Korea. Although biennial gastric cancer screening by endoscopy has been increasing in Korea as part of the NCSP, few studies have evaluated its efficiency. Therefore, we analyzed the outcomes and efficiency of the NCSP for gastric cancer using endoscopy in Korea.
Materials and Methods: We reviewed results from the NCSP for gastric cancer at Chung-Ang University Yong-San Hospital in Korea from March 2003 to March 2008. The study population comprised of Medicaid recipients more than 40 years old, who were taken from the National Health Insurance Corporation.
Results: A total of 7,278 asymptomatic subjects underwent endoscopy for gastric cancer screening. The mean age of the screened subjects was 51.3 years for men and 48.9 years for women. The male to female ratio of the screened subjects was 1.2:1. Gastric cancer was diagnosed in 32 (0.44%) of 7,278 subjects (22 men and 10 women). Their mean age was 54.4 years. Of these, 21 subjects (0.29%) were diagnosed as early gastric cancer (EGC) and 11 subjects (0.15%) were diagnosed as advanced gastric cancer. The proportion of EGCs among total gastric cancers was 65.6%.
Conclusions: Despite accomplishments of the NCSP for gastric cancer in Korea, its effectiveness remains an issue. Efficiency and cost-effectiveness analysis will be needed for successful progression. **(Korean J *Helicobacter* Up Gastrointest Res 2013;13:95-98)**

Key Words: Stomach neoplasms; National Cancer Screening Program; Medicaid; Endoscopy

INTRODUCTION

Since the Korean Government launched the National Cancer Screening Program (NSCP) in 1999, it has continued to expand its target population and target cancers.[1] Recently, the NCSP constructed a health screening system for five major cancers, including stomach, breast, uterine cervix, liver, and colorectal cancers. Goals of the NCSP include the reduction of mortality from cancer and mitigation of the intensity and severity of treatment, thereby reducing morbidity and healthcare costs. This governmental effort puts up a good show in early detection and treatment of several cancers and has contributed to reduction of mortality from some cancers, especially gastric cancer in Korea.

Gastric cancer is a major cause of death and a substantial socioeconomic burden in Korea. Endoscopy may be cost-effective screening tool in Korea, where the cost of endoscopy and upper gastrointestinal series are similar and the gastric cancer incidence is high. Japan is also the country that have high incidence of gastric cancer. Most of Japanese studies on the efficiency of mass screening for gastric cancer have dealt with photoflurography as a screening tool.[2] Although biennial gastric cancer screening by endoscopy has been increasing in Korea as part of the NCSP, few studies have evaluated its efficiency. Furthermore, the results of this program are confined to data from several national health institutions; not all of these were participant hospitals. Therefore, this study was performed in order to analyze the outcomes and efficiency of the NCSP for gastric cancer using endoscopy in a single center.

MATERIALS AND METHODS

1. Subjects

We performed a retrospective review of the medical records of 23,106 subjects who had taken part in the

NSCP at Chung-Ang University Yong-San Hospital in Korea during the 5-year period between March 2003 and March 2008. The information on age, gender was all collected from a standardized questionnaire based on medical check-up results from the National Health Insurance Corporation.

2. Gastric cancer screening

For stomach cancer screening, all of the subjects aged 40 and older were free to choose between esophagogastroduodenoscopy (EGD) and upper gastrointestinal series (UGIS) as photoflurography. However, subjects with abnormal findings on UGIS were supposed to be re-evaluated with EGD. EGDs were performed by 4 well-trained gastroenterologists with at least 5 years of endoscopy experience. They used a flexible endoscope (Q260 or Q240, Olympus Optical Co., Tokyo, Japan). In this study, endoscopic findings were classified as gastritis, gastric ulcer, duodenal ulcer, gastric cancer (early gastric cancer [EGC] and advanced gastric cancer [AGC]). When an EGD was suggestive of gastric cancer, we obtained biopsy specimens, fixed them in 10% of formalin, and examined them histologically.

This study was approved by the Institutional Review Board of the Chung-Ang University Medical Center in Korea (IRB No. 2008-059-11).

RESULTS

A total of 10,438 subjects were screened for gastric cancer during the period. Of these, EGD was performed in 7,278 subjects and UGIS in 3,160 subjects. Endoscopic findings are summarized in Table 1. Ten of 3,160 subjects underwent UGIS were found to be suspicious for gastric

Table 1. Endoscopic Fidings

Endoscopic findings	Number of subjects (%)
Gastritis	5,691 (78.19)
Gastric ulcer	191 (2.62)
Duodenal ulcer	284 (3.90)
Gastric cancer	32 (0.44)
Early gastric cancer	21 (0.29)
Advanced gastric cancer	11 (0.15)
Total	7,278 (100.0)

cancer. However, only five subjects among them were further evaluated by EGD, and were then found to have no cancer.

The mean age of the screened subjects was 51.3 years for men and 48.9 years for women. The male to female ratio of the screened subjects was 1.2:1. Gastric cancer was diagnosed in 32 (0.44%) of 7,278 subjects (22 men and 10 women). Their mean age was 54.4 years. Of these, 21 subjects (0.29%) were diagnosed as early gastric cancer and 11 subjects (0.15%) were AGC. The proportion of EGCs among total gastric cancers was 65.6%.

DISCUSSION

In Korea, the entire population is covered by a mandatory social insurance system (the National Health Insurance Program), which is financed through contributions paid by the insured and their employers.[3] Currently, NCSP provides Medical Aid recipients and National Health Insurance beneficiaries within the lower 50% income bracket with free screening services for gastric, liver, colorectal, breast, and uterine cervix cancer.[4] Owing to this effort, cancer-related mortality has decreased.[5] Despite the accomplishments of NCSP in Korea during the past 10 years, efficiency has remained an issue. The present study evaluated the efficiency of NCSP in Korea by analysis of gastric cancer. Gastric cancer mortality from stomach cancer has been falling continuously in Korea.[6] As a result, overall incidence of gastric cancer in our hospital during the past five is increasing, when compared to crude annual incidence in the general population reported in 2005.[7]

Mass-screening is recommended for high-risk regions, such as Japan and Korea, where gastric cancer is highly prevalent.[8] Previous studies from Japan have revealed that screen-detected gastric cancers showed an earlier stage distribution and had a lower mortality rate than symptom-diagnosed cases.[9] The proportion of EGCs among total gastric cancers is more than 50% in Japan, whereas it is less than 10% in Western countries.[10] The difference is generally attributed to the mass-screening program implemented in Japan in the 1960s.[11] In this study, the proportion of EGCs in screened group is approximately 1.4

times the proportion of AGCs (65% vs. 35%). Moreover, the proportion of patients diagnosed with EGCs was 65%, whereas EGC was 0% in patients screened with UGIS. This disparity may be partly explained by the ability of EGD to detect gastritis-like EGCs that show only a faint mucosal irregularity or discoloration.[12] Thus, in Korea, where the costs of unsedated EGD and UGIS are similar, and gastric cancer incidence is similar to that of Japan, EGD might be a cost-effective screening method.[8,13] Unfortunately, optimal screening intervals for EGC detection have yet to be evaluated in well designed studies. As gastric cancer screening tools were composed of EGD and UGIS, overall incidence of stomach cancer in this study was estimated to be 0.3%.

This study demonstrated that in Korea, despite national efforts, gastric cancer has tended to increase. In a national cancer control program, programs should be organized to ensure that a large proportion of the target group is screened and that those individuals in whom abnormalities are observed receive appropriate diagnosis and therapy. Agreement should be reached on guidelines to be applied in the national cancer control program. When establishing appropriate cancer screening recommendations, several factors should be considered. First, for establishment of the starting age, age-specific incidence and mortality rate, life lost in person-years, and cost-effectiveness can be considered. Second, for frequency of screening, it is necessary to understand the natural history of the disease. Third, for choosing the best testing tool, sensitivity and specificity, compliance, cost, and adverse effects can be considered. However, up to now, less than 10% of members of the target population, on the whole, have participated in the program. In addition to the low participation rate in early detection programs, public education and publicity also are not active. Consequently, the rate of early detection of cancer is relatively low.

According to the National Cancer Center in Korea, compliance with the NCSP is still very low, despite a progressive increase from 12.9% in 2002 to 23.5% in 2007.[4] Low rates of compliance with cancer screening have been associated with patient- and physician-related factors; therefore, reasons for non-compliance are various.

In Japan, absolute numbers of gastric cancer patients have been increased due to the aging of the population, whereas age-standardized incidence rate and mortality of gastric cancer have been decreased in several decades.[14] Since the population has been aged, and the proportion of gastric cancer patients more than 60 years has been increased in Korea,[15] it is expected that absolute numbers of gastric cancer have been increased like Japan. Therefore, the effort that increases the compliance with NCSP is needed. In an effort to increase the compliance rate of the NCSP, issues related to improvement of satisfaction with and quality of screening services have been addressed.

This study had some limitations. This study could hardly be representative of the general population in Korea in that randomization and sample survey were not guaranteed. Another limitation of this study is the absence of information on risk factors.

Finally, this study did not cover clinical courses after diagnosis, including stage work-up, treatment, and prognosis, such as survival. However, the present study reflects the present features of gastric cancer under a mass screening program and may have an influence on the future plan for gastric cancer control.

In conclusion, NCSP in Korea has been available for several years, and has played a role in early detection of major cancers. However, despite accomplishments of the NCSP for gastric cancer in Korea, its effectiveness remains an issue. Efficiency and cost-effectiveness analysis will be needed for successful progression.

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