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RAPID COMMUNICATION

Comparing mass screening techniques for gastric cancer in Japan

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Abstract

AIM: To discuss the efficacy of endoscopic mass screening for gastric cancer.

METHODS: The data used in this study were the results of mass screening programs for gastric cancer in Niigata City from 2002 to 2004. The number of participants was 35089 in 2002, 34557 in 2003 and 36600 in 2004. The finding ratio referred to the final diagnosis of gastric cancer after a double check of endoscopic files and histological findings. The costs of identifying one case of gastric cancer were calculated based on the total expense for each screening program and additional close examinations.

RESULTS: From the analysis of individual screening program with endoscopy, individual screening program with X-ray (ISX) and mass screening program with photofluorography (MSP) in reference to the finding ratio of gastric cancer, endoscopic examination was the best for detecting early gastric cancer, the finding ratio was 0.87% in 2004, approximately 2.7 and 4.6 times higher than those of the ISX and MSP groups. In addition, this novel method was the cheapest means regarding the cost of identifying one case of gastric cancer, which was estimated to be 1608000 Japanese yen in 2004.

CONCLUSION: Endoscopic mass screening is a promising method and can be effectively applied if a sufficient number of skilled endoscopists become available to staff the system and if city offices support it.

Key words: Mass screening; Gastric cancer; Endoscopy; Cost effectiveness

INTRODUCTION

Gastric cancer is recognized worldwide as the second leading cause of cancer mortality[1]. In Japan, non-cardia gastric cancer still remains the major cause of cancer death, although recently the mortality rate has begun to decrease [2]. With reference to this change, it has been reported that early detection of gastric cancer may contribute to decreases in the mortality rate[3,4].

Japan has carried out ongoing programs to prevent gastric cancer death by mass X-ray screening methods to detect gastric cancer in its early stages[4,5]. In recent years, endoscopy has been applied instead of X-ray as the initial mass screening method in several cities in Japan, and endoscopic mass screening has been utilized in Niigata City since 2003. The efficacy of endoscopic mass screening is discussed herein.

It is known that the finding ratio of early gastric cancer with endoscopy is higher than that with X-ray[6], making endoscopy a highly effective screening method[7]. There are, however, cost problems related to applying endoscopic mass screening[6,7]. Endoscopic screening is more expensive than direct X-ray screening (ordinary upper GI) in the Japanese medical system. Although the balance is approximately 3400 Japanese yen, because of financial problems in city offices, at the start of the present study, the costs for the two screening procedures were decided to be the same for a while.

MATERIALS AND METHODS

Subjects

The data used in this study were the results of mass screening programs for gastric cancer in Niigata City from 2002 to 2004. The number of participants was 35089 in 2002, 34557 in 2003 and 36600 in 2004. As employees have their own mass screening system of Japan, nonemployees participated in these mass screenings. All screening participants aged 40 or over could choose one of the three programs utilizing endoscopy (ISE), direct X-ray (ISX) and photofluorography (MSP: indirect X-ray

Table 1 Transition before and after adoption of endoscopic screening program

		2002	2003	2004
Participants (*n*)	ISE	-	8118	11 679
	ISX	28 332	20 058	19 011
	MSP	6757	6381	5910
Detection rate (%)	ISE	-	0.81	0.87
	ISX	0.33	0.31	0.32
	MSP	0.25	0.22	0.19
Rate of early gastric cancer (%)	ISE	-	74.2	75.5
	ISX	40.8	56.5	63.9
	MSP	46.7	71.4	54.5
Cost (J YEN)	ISE	-	1 693 000	1 608 000
	ISE^2		2 113 000	1 998 000
	ISX	5 113 000	4 365 000	4 177 000
	MSP	2 712 000	2 792 000	3 290 000

ISE: Individual screening program with endoscopy; ISE^2: Cost analysis with ordinary endoscopic examination fee; ISX: Individual screening program with X-ray; MSP: Mass screening program with photofluorography; Cost: Total cost of finding one gastric cancer patient.

with a small sized film) each.

Analysis

The finding ratio referred to the final diagnosis of gastric cancer after a double check of endoscopic files and histological findings. The costs of identifying one case of gastric cancer with each method were calculated based on the total expense for each screening program and additional close examinations.

Every citizen participates in some type of a medical insurance program, which enables all Japanese have access to medical services for next close examinations at the same costs. X-ray examination of suspected gastric cancer in ISX and MSP groups showed that the patients with suspected lesion could be referred to the endoscopists to receive endoscopy with biopsy for getting a final histogical diagnosis. We included these close examination fees in addition to the screening fee for cost analysis. In ISE group the costs of endoscopic screening and additional biopsy at the same time (if needed) were also counted.

RESULTS

Finding ratio

In 2004, the finding ratio in the ISE group was 0.87%, approximately 2.7 and 4.6 times higher than those of the ISX and MSP groups respectively and the rate of early gastric cancer in the ISE group was the highest among the three groups.

Cost analysis

The cost of identifying one case of gastric cancer was estimated to be 1 608 000 Japanese yen in ISE, 4 177 000 Japanese yen in ISX, and 3 290 000 Japanese yen in MSP in 2004. In the same condition of ordinary medical fee for endoscopic examination, the cost of ISE increased to 1 998 000 Japanese yen.

These results indicated that endoscopic mass screening was the best and cheapest means for detecting and identifying gastric cancer. The results of each mass screening are shown in Table 1.

DISCUSSION

To decrease cancer death, early detection and subsequent surveillance are necessary[8]. Although eradication of *H pylori* infection is the most effective, the incidence of gastric cancer would remain high for several decades to come[9]. Endoscopic mass screening for gastric cancer is effective in identifying cancer in its early stages[6], but endoscopic screening is more expensive than direct X-ray screening in the Japanese medical system. In this study our cost analysis showed that even if we applied ordinary examination fee for endoscopic mass screening, this novel approach was still the most superior method in cost-effectiveness for finding gastric cancer patients.

On the other hand, endoscopic mass screening is practically not appropriative for wide application due to the limited number of skilled endoscopists[6]. In Niigata City, however, we fortunately have enough endoscopists who have the title of authorized specialists as a board-certified member to examine more than 10 000 cases yearly, making it feasible to adopt an endoscopic screening system.

In mass screening systems for gastric cancer, endoscopic examination is a promising method and can be effectively applied if a sufficient number of skilled endoscopists become available to staff the system and if city offices support it.

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REFERENCES

1 **Moayyedi P**, Ford A. Recent developments in gastroenterology. *BMJ* 2002; **325**: 1399-1402
2 **Sun J**, Misumi J, Shimaoka A, Aoki K, Esaki F. Stomach cancer-related mortality. *Eur J Cancer Prev* 2001; **10**: 61-67
3 **Lambert R**, Guilloux A, Oshima A, Pompe-Kirn V, Bray F, Parkin M, Ajiki W, Tsukuma H. Incidence and mortality from stomach cancer in Japan, Slovenia and the USA. *Int J Cancer* 2002; **97**: 811-818
4 **Kampschöer GH**, Fujii A, Masuda Y. Gastric cancer detected by mass survey. Comparison between mass survey and outpatient detection. *Scand J Gastroenterol* 1989; **24**: 813-817
5 **Shiratori Y**, Nakagawa S, Kikuchi A, Ishii M, Ueno M, Miyashita T, Sakurai T, Negami J, Suzuki T, Sato I. Significance of a gastric mass screening survey. *Am J Gastroenterol* 1985; **80**: 831-834
6 **Takemoto C**, Isechi T, Matsumoto J, Kusano K, Mishige K, Nuruki F. Current status and problems of screening for gastric cancer using endoscopy. *Nihon Shokaki Shudankenshin Gakkaishi* 2004; **42**: 322-330 (in Japanese)
7 **Waye JD**, Aabakken L, Armengol-Miro JR, Llorens P, Williams CB, Zhang QL. Screening for GI cancer and payment mechanisms. *Gastrointest Endosc* 2002; **55**: 453-454
8 **Whiting JL**, Sigurdsson A, Rowlands DC, Hallissey MT, Fielding JW. The long term results of endoscopic surveillance of premalignant gastric lesions. *Gut* 2002; **50**: 378-381
9 **McColl KE**. Screening for early gastric cancer. *Gut* 2005; **54**: 740-742

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