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Screening of gastric cancer in Asia

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A B S T R A C T

In North-Eastern Asian countries, where incidence and mortality of gastric cancer remain very high, population-based gastric cancer screenings have been conducted under governmental subsidy in Japan and Korea. Reduction of gastric cancer mortality by the screening was documented in Japan, but the Japanese gastric cancer screening with the X-ray photofluorography is criticized for its high cost and a low uptake rate. Although the Korean program seems to achieve a high-rate of uptake with increasing use of endoscopy, the work load is substantial. In the meantime, more attention in the world turns to primary prevention through eradication of *Helicobacter pylori*. Indeed, fairly large-scale studies to examine the feasibility of mass-eradication to prevent gastric cancer are underway in China and Taiwan. In the future, gastric cancer screening should incorporate 'screen to treat' of *H. pylori* infection at younger age followed by endoscopic surveillance for subjects at risk.

Introduction

Gastric cancer remains the third leading cause of cancer mortality in the world with estimated 720,000 gastric cancer-related deaths in 2012 [1]. Among various geographical regions in the world, the highest incidence and mortality of gastric cancer were registered from North-Eastern Asian countries, including China, Japan, and Korea, accounting for more than half of the world totals. Indeed the incidence and mortality of gastric cancer in these countries rank the highest among the digestive tract cancers.

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In Japan, population-based gastric cancer screening was initiated in late 1950's–1960 in Nagano and Miyagi prefecture respectively, when the age-adjusted mortality rate (AMR) of gastric cancer was the highest among all the malignant neoplasms [2]. In 1983, gastric cancer screening was integrated into national program under the Health and Medical Services Law for the Elderly (HMSLE) [3]. In this population-based screening, standard gastric cancer screening has been conducted by indirect X-ray photofluorography in a medical vehicle equipped with X-ray device. In some private health check organizations or municipal areas, direct X-ray examination or endoscopic screening have also been used for gastric cancer screening.

In South Korea, where the AMR (world population) of gastric cancer is higher than Japan, population-based gastric screening was launched in 1999 and established in 2002 as part of the National Cancer Screening Program (NCSP) [4]. In this program, the screening can be done either by radiological examination or by endoscopic examination depending on the preference of the recipients. These two countries are the only ones with a nation-wide gastric cancer screening program [5].

Over the past several decades, however, epidemiology of gastric cancer has greatly changed; AMR of gastric cancer in Japan dropped to less than one-thirds in both sexes since 1960 (Fig. 1). Obviously, this decline cannot be explained by the effect of the mass-screening, since reduction of AMR of gastric cancer are world-wide phenomena including countries without nation-wide screening programs [1]. Secondly, discovery of *Helicobacter pylori* (*H. pylori*) revolutionized our understanding of the pathogenesis of gastric cancer that links the infection as the most important causal factor of distal gastric cancer. The monographs issued by International Agency for Research on Cancer (IARC) declared *H. pylori* infection as a group I carcinogens [6,7]. In 2014, based on documentations that eradication of *Helicobacter pylori* (*H. pylori*) reduced gastric cancer in asymptomatic subjects [8–10], IARC issued a statement that recommend eradication of *H. pylori* as the primary preventive measure for gastric cancer, if feasible [11]. Therefore, in other Asian countries including China and Taiwan, emphasis of gastric cancer prevention seems to be shifting from secondary prevention through mass screening to primary prevention of gastric cancer by eradication of *H. pylori*.

In this article, I will review the current situations of the gastric cancer screening programs conducted in Japan and Korea and discuss about future perspective of gastric cancer screening which is facing such a drastic paradigm shift in terms of gastric cancer prevention strategy. Readers interested in this topic may also refer to the excellent review articles [12,13].

Gastric cancer screening in Japan

Radiographic screening

Since the inception, indirect X-ray photofluorography has been used in gastric cancer screening [3]. Although this method was shown to reduce gastric cancer mortality [14,15], which is the gold standard

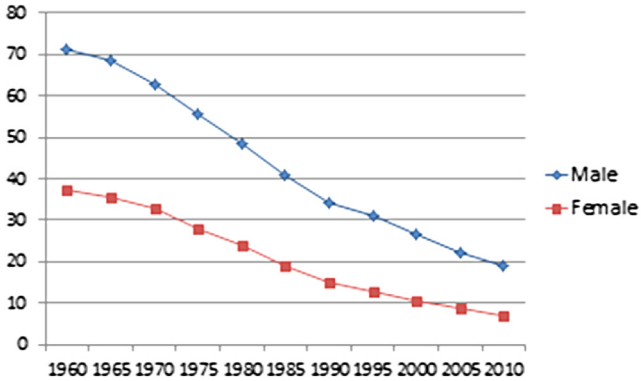

Fig. 1. Age-adjusted (world population) mortality rate of gastric cancer in Japan over the 50 years. The graph was depicted by using the data obtained from http://gdb.ganjoho.jp/graph_db/gdb4.