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Implementation of gastric cancer screening — The global experience



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Gastric cancer (GC) is still an important global healthcare problem, and in absolute figures it is going to remain at the present level in foreseeable future. In general, survival of patients with GC is poor mainly due to advanced-stage diagnosis. Early-stage GC can be cured by endoscopic resection or less invasive surgical treatment. Unfortunately, there is no appropriate screening strategy available for global application. This article provides a description of established national and regional GC screening programs and the screening modalities used. This review also summarizes current approaches to develop cancer-screening biomarkers. Although candidates with initial promising results have been suggested, moving discovery into clinical practice is still a major challenge. Well-designed biomarker studies, with systematic validation steps, are needed to decrease the burden of this fatal disease.

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Introduction

Although declining in incidence globally, gastric cancer (GC) is still the 3rd leading cause of cancer-related deaths [1], and the absolute number of cases is not going to decline in the near future [2]. Most of GC cases are originating in Eastern Asia (58.1%), Europe (14.7%) and part of Central and Latin America (7.8%) [1]. The development of GC is characterized by a multistage process that hypothetically provides ample opportunity for intervention.

With the exception of Japan [3], the five-year survival rate for patients with GC is poor. In Western populations, including Europe and the United States, five-year survival rates do not exceed 25–30% [4,5]. This is mainly related to late detection of the disease at symptomatic stages. Therefore, there is a need for improvement in the detection of early-stage GC, and screening is one of the tools to reach this objective.

The current review provides insight on potential GC prevention approaches, and describes major programs and methods used in GC screening.

Approaches to reduce GC incidence and mortality

Primary and secondary prevention strategies may have an effect in decreasing GC-related mortality (Fig. 1). Primary prevention includes lifestyle (i.e., smoking cessation) and diet (i.e., reduce salt intake) modifications as well as preventing or eradicating *Helicobacter pylori* infection. On the other hand, secondary prevention focuses on detection of precancerous lesions (atrophy, intestinal metaplasia, dysplasia) and early-stage cancer [6]. Thus, screening approaches may have different targets. The primary goal of screening for early-stage GC is to decrease mortality. Detection, surveillance and management of precancerous lesions aim to reduce both mortality and incidence. Finally, *H. pylori* eradication (including a “screen-and-treat” strategy) aims to decrease GC incidence [6].

Although subjects with atrophic gastritis or intestinal metaplasia (IM) are at higher risk for GC, the majority of these patients will never develop cancer; however surveillance of the patients is recommended [7,8]. Dysplasia is considered an advanced precancerous gastric lesion and those with high-grade dysplasia should be under strict endoscopic surveillance [9]. According to the results from a nation-wide study in the Netherlands, the annual incidence of GC is 0.1% for patients with atrophic gastritis, 0.25% for IM, 0.6% for mild-to-moderate grade dysplasia, and 6% for severe dysplasia [10].

GC screening may be considered as a two-stage approach with a primary screening test (e.g. X-ray, pepsinogens or other blood-based test) to identify individuals at high GC risk, who then would be referred to upper endoscopy as a confirmatory method. When endoscopy is used as the primary screening tool, this would be a one-stage screening modality.

An organized population-based screening program is substantially more effective in decreasing the mortality than disarticulated control and prevention activities. The International Agency for Research on

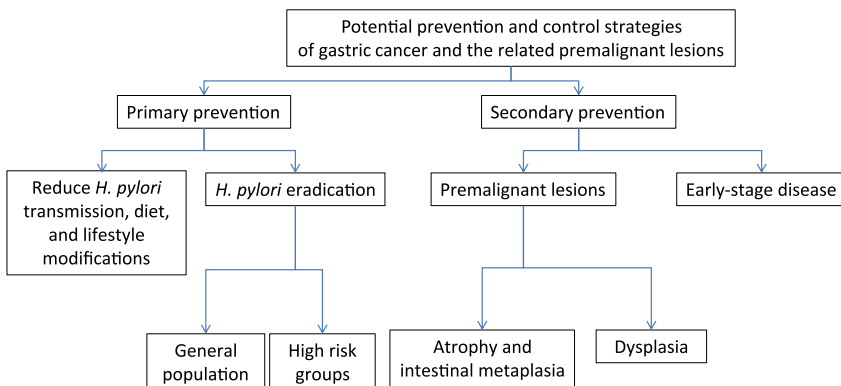


Fig. 1. Potential prevention and control strategies of gastric cancer and the related premalignant lesions.

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