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### Prevention strategies for esophageal cancer: Perspectives of the East vs. West



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Esophageal cancer is the eighth most common cancer worldwide. Esophageal adenocarcinoma (EAC) and esophageal squamous cell carcinoma (ESCC) are the two major phenotypes in Western and Eastern countries, respectively. Because of different pathways in carcinogenesis, the risk factors and effective steps for prevention of esophageal cancer are different between EAC and ESCC. The carcinogenesis of EAC is initiated by the acid exposure of the esophageal mucosa from stomach while that of the ESCC are related to the chronic irritation of carcinogens mainly by the alcohol, cigarette, betel quid, and hot beverage. To eliminate the burden of esophageal cancer on the global health, the effective strategy should be composed of the primary, secondary, and tertiary prevention. In this article, we perform a systematic review of the preventive strategies for esophageal cancer with special

*Abbreviations:* ACG, American college of gastroenterology; ADH, alcohol dehydrogenase; AFI, autofluorescence imaging; AGA, American gastroenterological association; ALDH, aldehyde dehydrogenase; APC, argon plasma coagulation; ASGE, American society for gastrointestinal endoscopy; BE, Barrett's esophagus; BSG, British society of gastroenterology; BMI, body mass index; CIS, carcinoma in situ; EAC, esophageal adenocarcinoma; EMR, endoscopic mucosal resection; ESCC, esophageal squamous cell carcinoma; ESD, endoscopic submucosal dissection; GERD, gastroesophageal reflux disease; HGIN, high-grade intraepithelial neoplasia; H. pylori, Helicobacter pylori; HR, hazard ratio; IEE, image-enhanced endoscopy; IPCL, intraepithelial papillary capillary loop; LES, lower esophageal sphincter; LGIN, low-grade intraepithelial neoplasia; NBI, narrow-band imaging; OR, odds ratio; PDT, photodynamic therapy; RCT, randomized controlled trial; RFA, radiofrequency ablation; RR, relative risk; SIM, specialized intestinal metaplasia; SIR, standardized incidence ratio.

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emphasis on the differences from the perspectives of Western and Eastern countries.

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## Introduction

Globally, esophageal cancer is the eighth most common cancer which accounts for 5% of all cancer deaths in 2012 [1]. In Western countries, the majority of the esophageal cancers were composed of esophageal adenocarcinoma (EAC), while in Eastern countries, the squamous cell carcinoma (ESCC) were predominant. Regarding the absolute number, over 90% of the esophageal cancers occur in countries located in the “esophageal cancer belt”, which stretches from the Caspian Sea across Central Asia to the West Pacific, and belong to the subtype ESCC [1]. In addition to two distinct histological subtypes, the genetic and epigenetic alterations of esophageal cancer in the multistep carcinogenic process are different [2–6]. For EAC, specialized intestinal metaplasia (SIM) occurs after chronic inflammation of esophageal mucosa due to acid reflux while for ESCC, basal cell hyperplasia and dysplasia develop after chronic exposure to carcinogens. Mutation of tumor suppressor genes, multiple allelic losses, hypermethylation of promoter genes, genetic overexpression, and changes in miRNA expression profile are found in both EAC and ESCC (Fig. 1). On rare occasions, other histological subtypes may occur while they may only represent less than 5% of all esophageal cancers [1].

To eliminate the burden of esophageal cancers, a multidisciplinary approach should be considered (Fig. 2). From the gastroenterologists' perspective, identification and elimination of risk factors is an important first-step for primary prevention, which may include the precipitating factors for gastro-esophageal reflux disease (GERD) and environmental carcinogens for EAC and ESCC. The secondary means of prevention are composed of the identification of precancerous lesions [i.e., Barrett's esophagus (BE) and dysplastic squamous neoplasm] and cancer at the early stage when endoscopic treatment is possible. For tertiary means of prevention, endoscopic surveillance for the detection of metachronous neoplasm is the mainstay (Table 1).

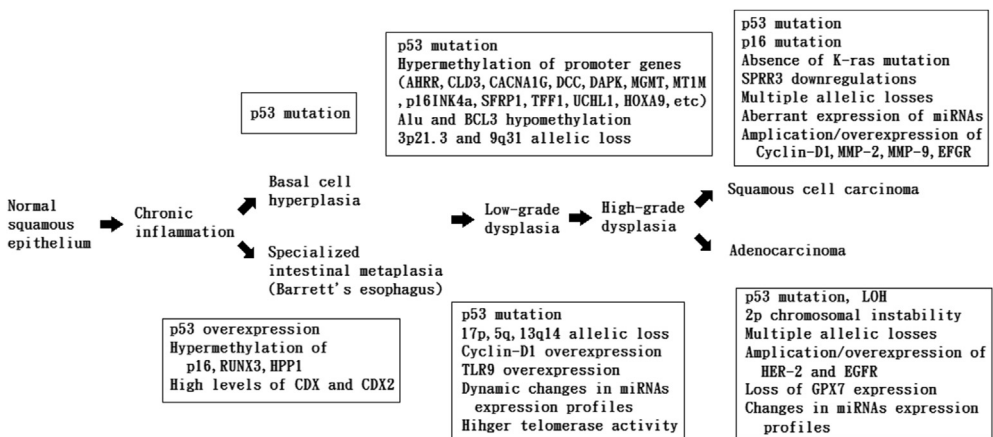


Fig. 1. The carcinogenic processes of the esophageal cancers, stratified by Western and Eastern countries.

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