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Screening patients for gastric cancer: art and science are better together

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Gastric cancer is currently the fourth most common malignancy and the second most common cause of cancer deaths worldwide [1]. The prevalence and mortality of gastric cancer varies among regions around the world. Age-standardized incidence rates range from 3.9 in Northern Africa to 42.4 in Eastern Asia for men and from 2.2 in Southern Africa to 18.3 in Eastern Asia for women [1]. Moreover, in the same region, prevalence of gastric cancer is diverse among countries. Countries in Eastern Asia (including Japan, Korea, and China) have a high incidence of gastric cancer (i.e., >40 cases per 100,000 men). By contrast, most other countries in Western and Southern Asia have a relatively low cancer incidence (i.e., <10 cases per 100,000 men) [2]. Even in multiethnic countries such as Malaysia and Singapore, gastric cancer incidence varies among Chinese, Malay and Indian origins [3]. These differences are explained by both host [4] and bacterial [5] factors. Whether gastric cancer screening, especially of the mass population, should be done remains controversial because, even in a very high-risk country such as Japan, there is only some evidence that mass screening reduces mortality from gastric cancer [6]. Therefore, selection of high-risk populations to undergo screening is fundamental for the early detection of gastric cancer in countries with medium to low incidence.

Diagnostic tests are performed to increase the percentage or probability of a disease in a target population or an individual. Each diagnostic test has a certain sensitivity and specificity (i.e. accuracy) that improve post-test probability. However, when we consider actual outcome of the diagnostic test, not only accuracy, but also prevalence of disease i.e. pre-test probability, affect the post-test probability. Currently, endoscopy plays a pivotal role in gastric cancer screening because of its high lesion detection rate and the ability to remove biopsy specimens for histological diagnosis providing the best diagnostic performance. However, there are substantial limitations for endoscopy such as the restricted number of gastroscopies and experienced endoscopists and the potential risks of perforation, cardiopulmonary events, aspiration pneumonia, and bleeding. So when we apply endoscopy to low pre-test probability subjects, even though it has a high diagnostic accuracy, false positive rates increase considerably with constant occurrence of the complications. Traditionally, in order to avoid this situation, experienced clinicians wisely select high-risk patients for endoscopy by careful interview and physical examination. Recently, biomarkers such as the combination of serum pepsinogen and *Helicobacter pylori* antibody are used to identify high-risk patients for gastric cancer [7].

Tata and colleagues developed MARK's quadrant scoring system, the symptom-based targeted screening tool, to select high-risk patients for gastric cancer from referred patients in Malaysia, a low incidence country [8]. The MARK's quadrant scoring system consisted of groups according to age, modified alarm symptoms, dyspepsia and history of upper GI bleed, and they demonstrated that the system significantly increased gastric cancer detection rate from 1% (10/998) to 8.6% (18/210) (P<0.0001). They also showed that, interestingly, although they used only alarm symptoms i.e. anemia, epigastric mass, persistent vomiting, significant weight loss, dysphagia and early satiety, suggestive of advanced cancers as parameters; they found five early gastric cancer (25% of all gastric cancers) among high MARK's quadrant score patients. This is an interesting and practical approach to converting ordinary experience-based symptom evaluation to an evidence-based scoring system. The system could improve our practice without increasing medical costs and interfering with blood sampling. A few things to be considered in this study are as follows: 1) Prevalence of gastric cancer in their study sample (28/1208=2.3%) was higher than in the general population in low incidence countries. Thus, this may indicate that their population might be primarily filtered by primary health care providers with symptom interview and physical examination. This may suggest the importance of experienced primary care physicians because inexperienced doctors could not rule out disease in low pre-test probability [9]. 2) Endoscopic procedure in this study followed the European Society of Gastrointestinal Endoscopy (ESGE) recommendations for quality of endoscopy [10]. In this recommended procedure, eight anatomical sites including four in the stomach were recorded, however, four images are not enough to cover and record the entire stomach. Recently, Yao has proposed a minimum required standard, the "systematic screening protocol for the stomach (SSS)". With this method, images are arranged according to the order of the procedure, and pictures of 4 or 3 quadrant views (total of 22 images) are taken in either a clockwise or counterclockwise manner [11]. Application of such an endoscopic procedure

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to high-risk populations may further improve detection of early gastric cancer.

Evidence-based medicine is one of the greatest trends in modern medicine and it has yielded many benefits to our patient care. Concerning the grade of evidence, the expert's opinion ranks as the lowest level of evidence. However, the experts' experience or skill usually contains important elements that do not appear in academic papers, and might lead to ideas that could generate hypotheses for future evidence. Although the experience (art) and scientific evidence (science) are often thought of as polar opposites, we should carefully acknowledge their importance in balancing each other to achieve good clinical outcome. Art and science are always better together in clinical practice.

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