



The burden of gastric cancer

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Although the incidence of gastric cancer has decreased worldwide, it is the fifth most common cancer in the world. In 2018, 1,033,701 new cancers and 782,685 deaths occurred globally (1). These account for 5.7% of total new cancer cases and 8.2% of total cancer deaths. The incidence of gastric cancer has differed from country to country. The incidence of gastric cancer has been high in East Asian countries, particularly in China, Korea, and Japan. Although the age-standardized incidence of gastric cancer is 11.1 (/100,000) for both sexes worldwide, the incidence in Asian countries is higher, as follows: 20.7 (/100,000) in China, 39.6 (/100,000) in the Republic of Korea, and 27.5 (/100,000) in Japan. In Western countries, the incidence of gastric cancer is lower than in East Asian countries. However, some countries in Latin America and Southern and Eastern Europe have a relatively high incidence of gastric cancer.

The 5-year survival rate has not been higher in low-incidence countries. In 2014, net survival rates compared with expected survival rates of general populations were lower than 40% in the UK, New Zealand, Australia, Canada, Denmark, and Norway (2), while the age-standardized incidence rates were lower than 10.0 (/100,000). On the other hand, the survival rate has been higher in high-incidence countries, particularly in the Republic of Korea and Japan (3,4). Both countries have national programs for gastric cancer screening using radiography and endoscopy. Japan has a long history of gastric cancer screening, for which the radiographic technique was originally developed (5).

The treatment results are similar in both countries, and the survival rates have been reported to be over 70% (3,4).

The incidence of gastric cancer has decreased in both sexes, and gastric cancer has not been common in the USA (6). Thus, there is insufficient data on hospitalization for gastric cancer. Solanki *et al.* reported on the burden of gastric cancer inpatients in the USA (7). Liu and colleagues also assessed the trends of hospitalization, mortality, and hospitalization cost of gastric cancer inpatients based on the National Inpatient Sample database (8). Their results were similar. They reported that the mortality of gastric cancer has improved over the past decade. Admission days have decreased, and costs have increased even when adjusted for inflation (8).

Additionally, Solanki *et al.* focused on the difference in burden between different inpatient race groups (7). The number of hospitalizations for gastric cancer patients has been around 250,000, and the race distribution of inpatients has not changed. The white population accounted for the biggest proportion among inpatients for gastric cancer, but the percentage of Asian or Pacific Islanders has been at 5–7% of all inpatients. Actually, the incidence of gastric cancer has been higher in their original countries, but they are not a major part of the patients in the USA. All-cause mortality rates among different races have also been reported by Solanki *et al.* (7). The highest mortality rate was in black patients, but the rates were similar among other race patients. The results also suggested that the burden of gastric cancer is not limited to Asian patients in the USA.

The *H. pylori* infection rate has decreased in the younger population, and the incidence of gastric cancer has shifted to the older population (9). From 2001 to 2011, hospitalization increased in individuals aged 65 years and over, but the hospitalization of individuals aged below 65 years decreased or flattened (7). The highest hospitalization rate was observed in individuals aged between 75 and 84 years in the USA. Similar trends have been observed in Japan, and the incidence of gastric cancer has shifted to older people (4). As the age distribution has changed, the treatment pattern has also changed. Endoscopic submucosal dissection (ESD) has been used for older patients (10-12). Though most older people have co-morbidities, all treatment costs for inpatients with gastric cancer cannot easily be allocated between gastric cancer and their co-morbidities. Although the mortality rate has improved in gastric cancer inpatients, the main proportion of which has changed to older people, and specific treatment including ESD could be used for older patients. Sumiyoshi reported that over 80% of older patients could have complete ESD performed, resulting in resected gastric cancer (10). After the resection, there were no serious adverse effects. The 5-year survival rate for patients with complete resection of gastric cancer was nearly equal to the expected survival of the general population. The results suggested that gastric cancer cases in older patients include cases of overdiagnosis, which cannot lead to death (13).

Overdiagnosis is defined as the diagnosis of diseases which would not cause symptoms or death in the lifetime of the patient if unrecognized by examination (14). Although the proportion of overdiagnosis by upper intestinal endoscopy in clinical practice, is unknown; the diagnosis of gastric cancer was twice the expected numbers (15). The finding included both gastric cancers which would likely progress and overdiagnosis cases. Since overdiagnosis is caused by overuse, it has become a serious problem in all fields in medical services (16). For example, over frequent colonoscopy was provided for 34% of patients without cancer regardless of the appropriate interval defined by the guidelines (17). Unnecessary examination leads to harm, not benefits. The American College of Physicians has recommended high-value care based on a value framework (18). The basic concept of cancer screening on a value framework could be adapted to clinical practice.

The value of examinations is determined as a trade-off between benefits as opposed to harms and costs. As the intensity of examination increases, the benefits of cancer screening rapidly increase. However, if the intensity of cancer screening increases beyond an optimal level, the increase in benefits slows, but the harms and costs increase rapidly, decreasing the value of care. Thus, to minimize overdiagnosis, unnecessary examination should be avoided based on evidence-based guidelines (19). This concept is also useful to decrease the overdiagnosis of gastric cancer in clinical practice, particularly in endoscopic examinations for older patients. The increase of older inpatients could be a major reason why treatment costs have not decreased even if mortality has decreased in all inpatients. Overtreatment might increase the treatment costs for gastric cancer. Although there is no information regarding overdiagnosis by upper intestinal endoscopy, sufficient reason to examine patients should always be considered.

The burden of gastric cancer has remained in the USA. Though it is a common issue across all races, the number of older patients has increased. However, increasing hospitalization of gastric cancer inpatients might be induced by overdiagnosis. To determine the real burden of gastric cancer, further study is needed to clarify the details of treatment.

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Footnote

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