Epidemiology note

Gastric cancer in Brazil

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Stomach cancer is the second most frequent cause of cancer death in Brazil, with 10645 deaths (10% of cancer deaths) according to cancer mortality statistics for 1997. In recent estimates, a total of 19860 persons were expected to develop stomach cancer in 2000, placing this tumor in the fourth rank for cancer development after nonmelanoma skin cancer, breast cancer, and lung cancer. If nonmelanoma skin cancer is excluded, stomach cancer ranks as the third most common cancer for both sexes in Brazil [1]. Thus, stomach cancer in Brazil is still a major public health concern. The incidence of stomach cancer, shows geographic variation within Brazil, with differences from 51.6/100000 in the northern region to 29/100000 in the south of the country

among men (Fig. 1). In the areas of lower risk, in the southeast and south of Brazil, the incidence and mortality rates have been decreasing steadily since the 1980s (Fig. 2 and Fig. 3a,b). The exact causes of this decline are not well understood, but they could include modifications in the diet.

The incidence of stomach cancer in Japanese-born residents of São Paulo exceeds that of non-Japanese Brazilians by more than 30%, but is slightly lower than the incidence in Japanese in Japan. This is in contrast to the Japanese-American experience, which shows a remarkable decrease in incidence after migration. Such findings are consistent with the pattern of stomach cancer occurrence in the host countries, Brazil and the United States — a high- and a low-risk area, respectively [2]. Japanese migrants to Brazil follow the high rate of the host country and maintain a risk for stomach cancer that is higher than that of their counterparts in the United States.

The distribution of stomach cancer deaths in five areas of Brazil shows that more than half of these deaths are concentrated in the southeastern area. Descriptive data on incidence and mortality in the State of São Paulo represent findings for the southeastern region. The incidence of stomach cancer in the State of São Paulo, from 1969 to 1993, is shown in Fig. 2, and data from cancer registries in other areas of Brazil [3,4] are shown in Fig. 1. The incidence for the year 1993 in the State of São Paulo is clearly lower than that found in previous years, compatible with the world tendency towards a reduction in risk for this disease. The incidence for São Paulo in 1993 is ranked in intermediate position when compared with that in other Brazilian cities. In Table 1, the stomach cancer mortality rate in the State of São Paulo is compared with the rates in countries in South and North America, Europe, and Asia. In this context, the State of São Paulo is an area of intermediate risk, in agreement with the pattern observed for the incidence data.

A hospital-based study from a southeastern center in Brazil suggests a decline in the intestinal type of stomach cancer among older individuals of both sexes, and a stable pattern among younger patients, in the period 1980 to 1995 [5].

A case-control study conducted in Brazil revealed positive associations with cigarette consumption and daily use of oil/fat for cooking, and a protective effect

associated with the consumption of vegetables other than yellow or green vegetables (not published, Hamada et al., 2001). In the same study, an analysis of serum pepsinogen I and II levels revealed an association of stomach cancer with a pepsinogen I level lower than 30 ng/ml in both Japanese and non-Japanese Brazilians. A pepsinogen I/II ratio of less than 3 showed poor discriminative ability in Japanese Brazilians. However,

Fig. 1. Stomach cancer incidence (per 100 000 population) in selected areas in Brazil. Source, INCA, Ministry of Health, Brazil, 1995. *Stippled bars, Females; hatched bars, males*

Fig. 2. Stomach cancer incidence (per 100 000 population) in the State of São Paulo from 1969 to 1993. Source, Ministry of Health, Brazil, 1999. *Bars, As in Fig. 1*

Fig. 3a,b. Stomach cancer mortality rates and the mortality rates of the most common cancers in the State of São Paulo, by sex, 1980–1998. **a** Males; *diamonds*, stomach; *squares*, lung; *triangles*, prostate; *dots*, mouth/pharynx. **b** Females; *diamonds*, stomach; *squares*, breast; *triangles*, uterine cervix; *dots*, lung

Table 1. Age-adjusted (world population) stomach cancer mortality rates in the State of São Paulo and in selected countries by sex (rates per/100 000 population)

	Argentina 1991	United States 1991	Japan 1993	Italy 1991	England 1993	São Paulo 1991
Men	11.6	5.2	30.8	16.6	10.3	19.6
Women	4.9	2.3	13.4	7.8	4.3	8.2

Source: SEADE Foundation and World Health Statistics, WHO, 1994 [10]

in non-Japanese Brazilians, stomach cancer was significantly associated with the pepsinogen I/II ratio [6].

Helicobacter pylori was detected in 82.5% of patients with stomach cancer in Brazil in a microbiologic study; there was no correlation between *H. pylori* infection and sites of tumor or histologic types [7]. Similar results were obtained in an analysis of specific anti-*H. pylori* IgG antibodies in the sera of Japanese and non-Japanese Brazilian stomach cancer patients, who showed 61% and 75% positivity, respectively [6]. A cross-sectional survey of randomly selected Japanese residents aged 40–59 years in the city of São Paulo showed a prevalence of *H. pylori* infection of 77% (95% confidence [CI], 70–83), which is similar to findings in Japanese in Japan, and exceeds the positivity rates found in stomach cancer patients reported in previous studies [8].

According to a preliminary analysis of the Brazilian Gastric Cancer Association (BGCA) database (unpublished oral presentation at the IV International Gastric Cancer Congress, New York, NY, 2001), the vast majority of gastric cancer patients in Brazil present with advanced disease, and early gastric cancer accounts for fewer than 16% of the cases. Moreover, 60% of the advanced cancers are associated with lymph node metastasis. These findings are consistent with the data reported from a hospital-based analysis [9]. In the BGCA database, a clear trend of an increase in proximal stomach cancer, reaching 30% of all registered cases, has been demonstrated.

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