Epidemiological Characteristics of Breast Cancer in Korea

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There is overwhelming evidence that ovarian hormones play a crucial role in all stages of the development of breast cancer, and many clinically evident breast cancers remain sensitive to ovarian hormones. Both the major ovarian hormones, estradiol and progesterone, play important roles in increasing risk of breast cancer.

RISK FACTORS FOR FEMALE BREAST CANCER IN KOREA

The major epidemiological risk factors for breast cancer are all explicable in terms of the estrogen augmented by progesterone hypothesis; early menarche increases the risk for breast cancer; early menopause reduces risk; postmenopausal obesity increases risk, but premenopausal obesity decreases risk; menopausal estrogen replacement therapy increases risk; combination type oral contraceptives does not decrease the risk (Pike et al. 1993).

Groups at high risk of breast cancer, based on risk factors identified through epidemiological studies in Korea, have been proposed as follows; women aged over 50, women with a family history of breast cancer among the first-degree relatives, women aged less than 14 before menarche, women aged over 50 at menopause, nulliparous women, women aged over 35 at the time of their first full term pregnancy, women who have never breast feed, and women with a body mass index over 25 kg/m^2 or with body weight more than 64 kg (Yoo et al. 1998 & 2002). In spite of the lower level of breast cancer incidence in Korean women, these findings suggest that there is no difference in the breast cancer risk factors between Korea and Western countries.

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INCIDENCE AND MORTALITY OF BREAST CANCER IN KOREA

Breast cancer ranks second to stomach cancer as the most common site of cancer in Korean women, with the age-adjusted incidence rate for breast cancer being 21.0 per 100,000 women (Seoul Cancer Registry 2001). It has been estimated that approximately 5,000 new cases of female breast cancer will be diagnosed, and about 1,000 women will be died of breast cancer every year (Ministry of Health and Welfare 2002; National Statistical Office 2001). Between 1992 and 1995, the crude mortality from breast cancer in Seoul was 4.3 per 100,000 and the age-standardized mortality was 4.4 per 100,000 (Seoul Cancer Registry Project 1998). Age-standardized mortality rates for breast cancer have steadily increased between 1981 and 2000, an increment ratio of about three (National Statistical Office 2001). As a proxy estimate of incidence, the age-standardized admission rates of breast cancer, as well as the proportion index of admission due to breast cancer, have shown an increasing trend since 1981 in Korea (Yoo and Kim 1992).

The age-specific incidence curve shows that breast cancer is rarely found in Korean girls younger than twenty years old. The incidence rate starts to increase from the time of puberty, and steeply increases until the late forties (Fig. 1). There is then a slow decrease after this age, with a peak incidence rate seen in women aged 50～54 years (Seoul Cancer Registry 2001). In 2000, 3.1% of breast cancer patients were in their 20s or younger, 20.3% in their 30s, 38.2% in their 40s, 23.4% in their 50s, and only 15.0% were over 60 years of age (Ministry of Health and Welfare 2002).

Currently, the Korean age incidence curve for breast cancer is similar to those of other countries with low incidence rates. Will it be changed to the incidence curve than can be seen in countries with high incidence of breast cancer? It seems to be attributable to the burden of the disease in the future in Korea, which is partially related to the breast cancer risk factor.

International differences in breast cancer incidence rates have been hypothesized partially related to variation in risk factors, such as body weight, some aspect of diet, hormonal levels, and reproductive characteristics.

INTERNATIONAL COMPARISON

As can be seen in Fig. 2, there is a large difference in the incidence of breast cancer between Western and non-Western countries; highest in North America and Northern Europe, intermediate in Southern Europe and Latin America, and lowest in Asia and Africa (Parkin et al. 1997). In recent years, the differences in the incidence rates of countries, such as Korea or Japan and the United States, are less than they were previously. Environmental changes within a country may be the central factors in the different risk levels found in the United States and in the Asian countries.

IMMIGRANTS TO THE UNITED STATES

Studies on immigrants to the United States suggest that the environmental factors rather than genetic factors are mainly responsible for the variation in breast cancer rates among countries. Table 1 shows that both Japanese and Chinese migrants had fundamentally higher incidence rates than women in their mother countries, approaching those of their adopted country (American Cancer Society 1995). Even though Korean

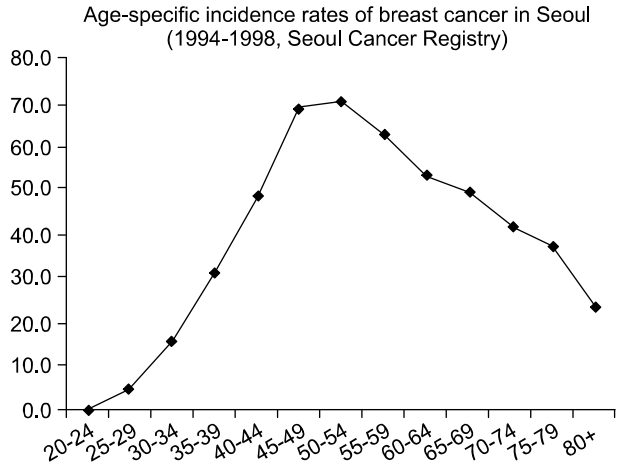

Fig. 1. Age-specific incidence rates for breast cancer in Seoul during 1994～1998.

Table 1. Age-standardized incidence rates for breast cancer by ethnic groups

Population groups	Age-standardized incidence rate (per 100,000 persons)
Japanese, L.A. (1983～1987)	72.2
Japanese, Miyagi (1983～1987)	27.8
Japanese, Osaka (1983～1987)	21.9
Chinese, L.A. (1983～1987)	48.7
Chinese, Shanghai (1983～1987)	21.2
Korean, L.A. (1983～1987)	16.9
Korean, Seoul (1991～1992)	17.0
Korean, nationwide (1988～1989)	10.9

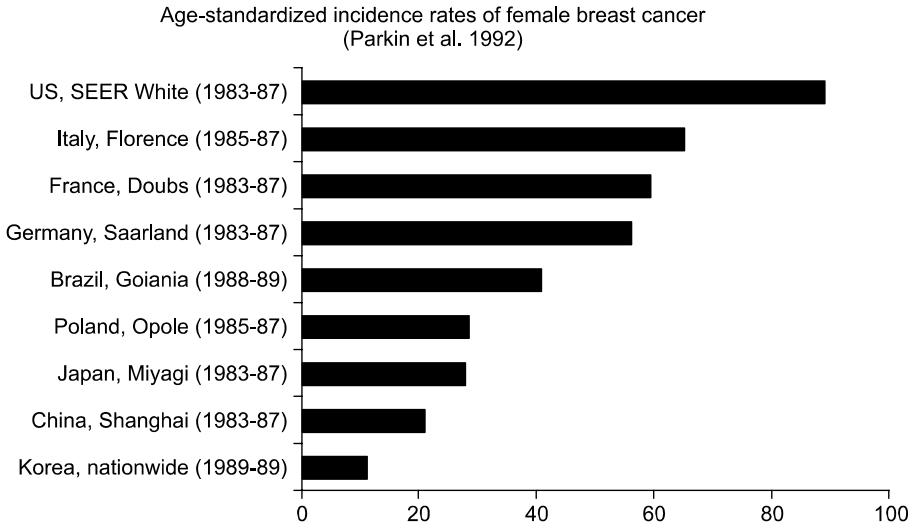

Fig. 2. International comparison of incidence rates of female breast cancer.

migrants to L.A. had slightly higher breast cancer incidence rates than women in Korea, they still maintain a relatively lower level of incidence rates of breast cancer. These facts suggest that either there is some protective factor that is in effect in their former cultures, which carries over into the second generation, or that these immigrants have successfully avoided some risk factors. The speed with which incidence rates among migrants, and their offspring, that were potentially exposed to a new environment and culture at an early age, has varied considerably from one ethnic group to another.

SEX HORMONES AND GENETIC SUSCEPTIBILITY

Some innate biological facts may be the key factors in the different risk levels of breast cancer around the world. Biological factors that can be used to explain these differences are the levels of the female sex hormones, estrogen and progesterone. A cross-sectional survey reported that estradiol levels in Korean postmenopausal women were similar to those of Japanese women, which were much lower than those found in American women (Yoo et al. 1998). These results, along with the difference in the ages at menarche, could be an important part of the explanation why Asian and American breast cancer rates differ.

The identification of the susceptibility factors that predispose individuals to cancer could possibly give further insights into both the etiology and the prevention of this malignancy when persons are exposed to particular environmental agents. Recent molecular epidemiological investigations revealed that inherited differences in the capacity to metabolize environmental carcinogens, i.e., GSTM1, glutathione S-transferase T1 and M1, N-acetyltransferase (NAT1, NAT2), and catechol-O methyltransferase, XRCC1, etc., are genotypes significantly associated with breast cancer risk in Korea (Park et al. 2000; Yim et al. 2001; Kim et al. 2002; Park et al. 2002). These results suggest that there is a novel gene-environmental interaction which plays an important role in an individual's susceptibility to breast cancer.

CONCLUDING REMARKS

Epidemiological features suggest that the breast cancer incidence rate in Korea will increase, but the age-specific curve would not change in keeping with the observations in Western countries, when the incidence rates of breast cancer reach around 50 per 100,000 in Korea. Strategies aimed at controlling breast cancer, including the screening guidelines and the identification of individual predispositions, may give us further insights into both the etiology and the prevention of breast cancer.

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