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Editorial

Outcome of mammography screening in Taiwan

Breast cancer is the most common malignancy occurring in women worldwide. An increasing number of investigators are focusing on the prevention, diagnosis, treatment, and post-treatment care of patients with breast cancer to improve their longevity and quality of life. In addition to the genetic studies contributing to advances in breast cancer prevention and the progress of molecular biochemistry that has facilitated the selection of systemic treatment, substantial efforts in recent decades have led to the development of many effective diagnostic modalities, especially in the early detection of breast cancer.

A randomized trial using mammography-based screening for the prevention of breast cancer was conducted in the 1960s and was believed to be associated with a reduction in mortality.[1] The first nationwide population-based screening program started in Finland in 1987.[2] This program grouped patients aged between 50 years and 59 years into cohorts born in odd and even years and obtained the ratio of the detection rate among those women invited to mammographic screening with the rate among those women not invited. This ratio was 1:6. It was further observed that the prevalence of breast cancer detected was 0.4%.[2] Since then, a growing number of studies have reported benefits of reduced mortality from early detection with screening mammograms ranging from 21% to 32%.[3,4] In these studies, the age of the invited group had a greater range, including populations of women aged 45–50 years and 69–74 years.[5] However, considerable discussion and debate has challenged the long-term benefits of screening mammograms in reducing mortality and, moreover, the extent to which routine screening mammograms could foster over-diagnosis and the unnecessary examination of patients.[6]

The incidence of breast cancer in Taiwan has increased rapidly and it has become the most frequently diagnosed cancer in women based on a report by the Health Promotion Administration in the Ministry of Health and Welfare. In 2011, the incidence rate was 64.3 per 100,000 after adjustment for age (the median age was 53 years). The mortality rate is 15.99/100,000, which represents 8.7% of all cancer deaths, with a total of 10,056 patients diagnosed with invasive cancer (the 4th highest percentage of all cancer deaths; the median age is 57 years). A total of 1852 women died from breast cancer. Among these patients, the highest incidence of breast cancer was in the group aged 40–49 years and 2157 women aged <45 years 20.6 % were diagnosed with breast cancer. In the USA, statistical data from the National Cancer Institute shows that the median age of diagnosis is 61 years (most common between aged 55 years and 64 years) with a stable trend of incidence over the years 2002–2011 (about 12–14%); mortality has fallen at an average of 1.9% each year. Therefore it appears that breast cancer in Taiwan is typically encountered at a younger age, with a higher and gradually increasing incidence. The major mammographic screening trials in Western populations have indicated a significant reduction in breast cancer mortality from detecting tumors in an earlier, less aggressive state. However, data on mammographic screening among Asian women are limited. In Taiwan, breast cancer screening has evolved in three stages from 1995 to 2004: two-stage breast cancer screening with a risk factor questionnaire and mammography for those deemed at moderate to high risk has the most favorable results. Thus to promote breast cancer prevention, free mammographic screening every 2 years for women aged 50–69 years has been provided in Taiwan since 2004; it was extended to the 45–69 year age group in 2009 and extended further to the 40–44 year age group for women at high risk since 2010.

We are pleased to see that a paper in this issue of the *Journal of the Chinese Medical Association* has reported the current status of mammographic screening in Taiwan.[7] Although there has been a significant increase in the workload of both the women being screened and those performing the screening, the quality of the screening is unaffected. It appears that the indicators of recall rate, positive predictive values (PPV1), cancer detection rate, incidence rate, and specificity reach the recommended American College of Radiology levels, except for a slightly lower sensitivity. However, with regard to the paper's noted trend of an increased cancer detection rate and cancer incidence rate after 2009 when younger women (45–49 years old) were enrolled, some variables should be discussed. These variables cannot be explained by the simple proposition that mammographic screening was continuing to improve because younger patients (who allegedly may be developing breast cancer at an increased rate in Taiwan) were being screened. In contrast with findings in the USA, the cancer incidence rates in two age groups in Taiwan are both gradually increasing, especially in the past 10 years. In addition, the sensitivity in 2009 (79.6%) is lower than the average; whether this is a factor influencing the change in cancer detection rate between 2009 and 2010 has not yet been determined.[7] Furthermore, digital

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mammography has rapidly replaced film mammography in most areas of Taiwan. With the popularity of the digital radiography mammogram system in the screening institutes, this may help improve the cancer detection rate with better resolution and improved interpretation. Younger women are more likely than older women to have dense breasts, so screening in the younger age group may be accompanied by more false positive results and unnecessary biopsy samples as a result of a lower screening specificity.[8−10] The use of a risk-based screening approach may be a pragmatic solution to this problem and may facilitate the balancing of both the benefits and the harms of mammographic screening, as suggested by the Health Promotion Administration in the Ministry of Health and Welfare. However, clinicians have the responsibility in their practices of discussing with their female patients between the ages of 40 years and 49 years the benefits, limitations, and even the potential harm of undergoing screening mammography.

In this issue of the *Journal of the Chinese Medical Association*, in the paper entitled "The outcome of a quality-controlled mammography screening program: experience from a population-based study in Taiwan", the authors should provide a more extensive explanation as to why mammography is beneficial for cancer detection in younger women with an even higher breast density.[7]

In Taiwan, nationwide free mammographic screening for women between the ages of 40 years and 69 years is beneficial in the early detection of breast cancer. This paper provides us with more recent information about the effectiveness of screening mammography in breast cancer detection. Although it is a fact that younger women have a higher incidence of breast cancer in Taiwan compared with comparably aged women in Western countries, results from randomized trials of population-based breast screening using mammography have not shown a statistically significant benefit of breast screening in women younger than 50 years of age. More information needs to be collected about the trend of breast cancers after 2009 when the younger age group was enrolled in the breast screening program. The result of this population-based mammographic breast screening program could provide guidance for a systematic approach to breast cancer detection in Taiwan. Furthermore, the results of a pilot study of breast cancer screening by sonography in women aged 40−69 years may more effectively determine the most appropriate nationwide breast cancer screening program in Taiwan.

Conflicts of interest

The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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