Current concepts on screening for breast cancer

by I. NYIRJESY

The Gynecologic Society for the Study of Breast Disease, from the Department of Obstetrics and Gynecology, Georgetown University School of Medicine, Washington, D.C. (U.S.A.)

SUMMARY. It is generally accepted that detection of early breast cancer improves survival. Major controversies remain, however, about the best approach to early detection. Mammography seems to be the single, most efficient method; but because of the possibility of radiation-included carcinomas, its use remains somewhat limited. Thermography and clinical evaluation with selective mammography remain as another alternative approach, and good results are reported by several groups.

Key words: breast cancer, screening, thermography, mammography.

Screening, in a medical sense, is the act of separating individuals likely to have a disease from those who are probably free of that disease. The goal of screening procedures is to provide a benefit, such as increased survival and/or less dangerous or less mutilating treatment, by early diagnosis. Since screening procedures address themselves to large segments of the population, they should be rapid, simple, and harmless. Preferably, they should also be inexpensive. In contrast with definitive diagnostic studies, a screening test need not be accurate but should be sufficient to identify the majority of those who need definitive studies and to reassure those who are unlikely to have the disease.

The prototype of an ideal screening technique is the Papanicolaou cervical smear, which is simple, harmless, inexpensive, and sufficiently accurate to identify some 80% of those who have intraepithelial cervical neoplasia, a preinvasive process which can be treated simply with a virtually 100% cure rate.

Screening for breast cancer is more complex, since there is no single, inexpensive, and harmless test which can detect preinvasive cancer; and there is no generally accepted conservative treatment for such tumors. Still, it is generally accepted, at least in the United States, that detection of early breast cancer carries the benefit of increased survival. There is less agreement, however, on the means of achieving early diagnosis and of the potential risk of some screening techniques.

The techniques, benefits, and risks of screening for breast cancer were discussed in depth by a faculty of experts at the First Annual Symposium of the Gynecologic Society for the Study of Breast Disease, held in Washington, D.C., in April 1977 [2].

Strax reported his classical screening experience at the Health Insurance Plan of Greater New York (HIP Study), which studied, among many factors, survival among women screened by clinical examination and mammography (with thermography as an adjunct) and survival among women who were not screened[2]. This study revealed that such a combined screening technique resulted in an approximately one-third reduction in the mortality from breast cancer. Specifically, there were 70 deaths due to breast cancer in the study group as compared with 108 deaths from breast cancer in the control group. The

This article is a summary of discussions on screening at the First Annual Symposium of the Gynecologic Society for the Study of Breast Disease, held in Washington, D.C., in April, 1977.

statistically significant improvement in the survival was limited, however, to the women in the 50-59 year age group. Strax and his associates also attempted to define the relative value of clinical examination and of mammography. They found that 45% of the cancers would have been missed if clinical examination had been omitted and that 33% of the cancers were detected by mammography alone. Physical examination was found to be particularly important in the 40-49 year age group, in which 61% of the cancers would not have been detected by mammography alone.

Following the favorable experiences of the HIP Study, the National Cancer Institute and the American Cancer Society jointly established 27 Breast Cancer Demonstration Projects, each of which was to screen 10,000 asymptomatic women over 35 years of age. The initial reports from these projects indicate that over 90% of the cancers were detected by a combination of physical examination and mammography and that 40% of the 90% were detected by mammography alone. Approximately 75% of the detected cancers were free of axillary nodal involvement.

Based on these studies and on his own data, Wolfe expressed the view that only mammography could detect very early carcinomas and recommended that a baseline mammogram be done on all women at about age 30 [2]. He felt that current mammographic technology is more accurate than at the time the HIP Study was conducted and that most cancers could be identified by x-ray, even in young women. He further recommended the classification of xeromammograms according to breast patterns (a study of duct patterns and of radiologic dysplasia), which in his series correlates with the risk of developing cancer in the future. Depending on the breast pattern, Wolfe recommends repeat annual' xeromammographic examinations for women with P2 or DY patterns and no follow-up mammograms for patients with Nl, Pl patterns. He also recommends for women over 30 routine mammographic examinations every two-to-three years for those with pattern ODY.

Opposing routine mammographic examinations, Bailar expressed fear that repeated exposure to ionizing radiation might cause more deaths from breast cancer than it might save [2]. He cited the evidence of increased breast cancer incidence among women subjected to repeated fluoroscopic examinations, to those exposed to nuclear radiation in Hiroshima, and among those who were treated with radiation for postpartum mastitis. Bailar also contended that there is no known carcinogenic radiation threshold and that this lack of knowledge makes it difficult to determine how much radiation is safe. He also believes that while the HIP Study did demonstrate that screening resulted in improved survival, it was impossible to determine how much of the reduced mortality could be attributed to mammography and how much would have occurred in a screening examination which consisted only of the history and physical exam.

Leis deplored the fact that breast cancer screening has become synonymous with mammography in the minds of many physicians and patients [2]. He recommended that all women 25 years or older should receive instruction in self examination of the breasts and should be periodically examined by palpation by their physicians. He also recommended the use of thermography or the alcohol blush test in all, baseline mammography in women at high risk at age 35, and in all others at age 50. He further recommended semiannual breast palpation by physicians in all women over 35.

Nyirjesy stated that screening should serve a double purpose: the recognition of early cancer and the reassurance of those who do not have the disease [2]. He feels that all women should have thorough breast palpation at the time of gynecologic check-up and that self-examination instruction and a baseline thermogram should be done at about age 25. While thermography is not a specific test for breast cancer, he found excellent correlation between Amalric's thermographic classes and the probability of cancer. Patients with TH3, TH4, and TH5 thermograms should also have a mammogram, regardless of their age. He recommends annual mammograms to all over 50 and a baseline study after 35, or earlier if the thermogram is abnormal or if other risk factors or clinical findings indicate the advisiability of radiologic studies. He further recommends annual thermograms, semiannual palpations, and self-examination instructions to all over 30.

The epidemiology of breast cancer and risk factors were discussed in depth by Cole [2]. It

appeared that epidemiologic data are most useful to direct lines of research but are not accurate enough to enable those involved in screening to « screen in » or « screen out » patients based on risk factors alone. Wolfe emphasized the fact that more than a third of all breast cancers occur under the age of 50 and that 40% of all breast cancer deaths occur in women whose disease was diagnosed prior to the age of 50. He feels, consequently, that in order to be effective, screening programs should include young women. Concerning the possible carcinogenicity of ionizing radiation, Cole quoted a new and as yet unpublished study on the age of girls and young women exposed to multiple fluoroscopies and their breast cancer experience. His data indicate a definite increased risk if exposure occurs under the age of 20. After 20, the risk declines and reaches the level of controls by age 35. He concludes that after age 35 the breasts are rather resistant to radiation-induced carcinogenesis.

While there is general agreement among those involved in breast cancer screening that mammography (in the United States, most often xeromammography) is the most effective and most specific screening and diagnostic method, the routine, repeated use of mammography is not considered acceptable by many clinicians, because of the fear of carcinogenic effect and a relative inaccuracy, expecially in young women. In a recent article, Lesnick reported that among 52 patients less than 45 years of age who had breast cancer, preoperative mammograms were false negative in 63% [1].

An interesting ongoing study was reported by Shaber from Jefferson University in philadelphia, where the relative value of clinical examination, mammography, and thermography is being studied in a large mass screening project [2]. In their initial examinations, mammography detected 79.5% of the tumors, clinical examination 59% of the tumors, and thermography 44%. The thermographic detection rate rose to 64% after they acquired more experience in thermographic techniques. In their series, the combination clinical examination-thermography correctly identified 80% of the cancers, a detection rate equal to mammography alone. They also determined that 6% of the cancers would have remained undiagnosed if thermography had been omitted.

In the Gynecological Society for the Study of Breast Disease data pool, which includs 72 cancers, mammographic examinations were suspicious in 84.7% and thermographic findings in 93.1% of the patients.

Strax believes that the combination thermography-clinical examination would miss about 10% of cancers which could be diagnosed if mammography were done routinely.

To conclude, it is generally accepted that screening of healthy women for breast cancer is useful, since early diagnosis improves survival. Major questions and controversies remain on the actual methods used in screening, and while new studies and data are forthcoming, it is unlikely that a standard approach will be accepted by all clinicians in the near future.

REFERENCES

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