

Breast Cancer Detection Today: An Opinion

Philip R. Karsell, MD, John J. Gisvold, MD, and David F. Reese, MD
Rochester, Minnesota

The family physician, more than most other physicians, is faced with rapidly increasing demands for breast cancer screening. The old standby, physical examination, is now accompanied by mammography, xeromammography, and, more recently, thermography. In this paper, we present our opinion, based on the collective experience at the Mayo Clinic, regarding the use and effectiveness of the several modalities, including mammography, xeromammography, and thermography, available for detection of breast cancer today.

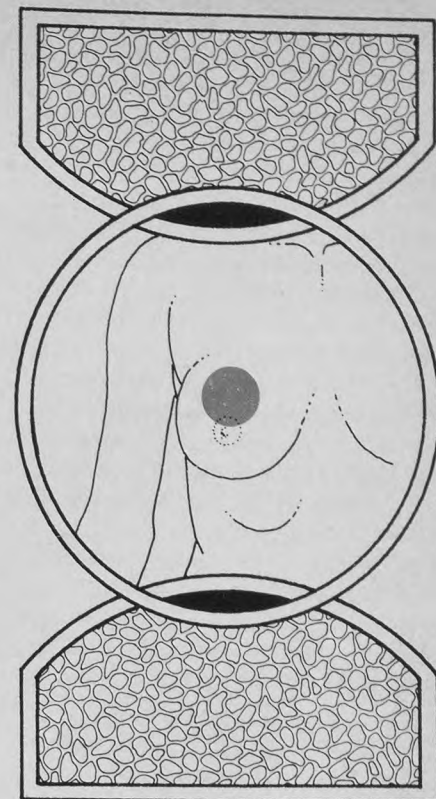
Never before has awareness of breast cancer been so great. The number of women specifically seeking breast evaluation at the Mayo Clinic, and undoubtedly elsewhere around the country as well, has almost doubled since the end of 1974. This surge in public interest was at least punctuated, if not prompted, by the fact that the wives of our president and vice-president both underwent mastectomies within weeks of each other.

Carcinoma of the breast is the major cause of death from malignant disease among women in the United States today. The fact that the death rate from this disease has remained essentially unchanged over the past

several decades in spite of a steady decline in the general death rate over the same period¹ suggests that the varied therapeutic approaches over the years have failed to provide the key to cure.

Strax and his associates²⁻⁴ started a carefully controlled breast-screening program in 1963. Their program basically involved two groups of women, one a control group that received regular care and the other a study group that underwent periodic physical examinations and mammography. The early results in these study groups are the first ever to demonstrate a decreased mortality rate for breast cancer, which certainly is an exciting turn of events in light of past experience with this disease.

The family physician, more than any other member of the health care team, is faced daily with the task of breast evaluation. Many times this will take place during the course of a



routine physical examination, and usually there will be no abnormal findings. Increasingly often, he will be asked to evaluate an abnormality detected by the patient during self-examination. Occasionally, an abnormality will be discovered during the course of mammography or thermography in an asymptomatic and otherwise healthy patient.

A Reasonable Approach

What is a reasonable approach to detection of breast cancer? Which patients should be seen often, and which ones can possibly be seen less frequently? How helpful are mammography and thermography?

Self-examination by the patient has been and remains the most frequent detector of breast cancer. Three of four breast cancers seen at the Mayo Clinic in 1972, and even a greater percentage in some series, were initially detected as abnormalities by the

From the Department of Diagnostic Roentgenology, Mayo Clinic, Rochester, Minnesota. Requests for reprints should be addressed to Dr. Philip R. Karsell, Department of Diagnostic Roentgenology, Mayo Clinic, Rochester, Minn 55901.

patient. Obviously, in concert with the American Cancer Society, we as a profession should continue to promote regular breast self-examination.

Periodic examination by a physician — most often a family physician — is also important. One cancer in six in our 1972 series was detected by the initial examining physician and was previously unknown to the patient. There are many opportunities for professional breast examination during the course of a family physician's day. Advantage should be taken of these occasions to detect early breast cancer.

Mammography was first performed in 1913, by Salomon, on a series of mastectomy specimens. Its use waxed and waned over the first half of the century until Egan,⁵ in 1960, introduced a clinically useful technique, reporting a 99 percent accuracy in the diagnosis of carcinoma. Since that time, and increasingly so today, mammography has been an accepted procedure in the diagnosis of breast disease.

One of the major drawbacks with mammography has been its lack of widespread availability. More radiologists are now performing mammography, so it should soon be generally available in most areas. It provides the physician with an additional method of evaluating both the symptomatic and the asymptomatic breast. Mammography is a difficult technique that needs the constant attention of a radiologist. Accuracy of detection of carcinoma by means of mammography averages about 85 percent in reported series, and about ten percent of cancers found at mammography will have been clinically occult.⁶

Frequently, malignancies found at mammography will be smaller than those discovered by physical examination. As with other cancers, smaller lesions have a lower incidence of regional metastases, and the rate of survival is improved. At the present time, patients with carcinoma of the breast without axillary nodal metastases at the time of mastectomy⁷ have the best chance of survival.

We believe that mammography is the best technique available today for diagnosing breast cancer at a curable stage. In our practice it is used in studying both symptomatic and asymptomatic women. All forms of mammography require roentgenograms and there is an ongoing concern

about the associated radiation dosage. The radiation concern is for the breast tissue itself, and not the gonads, because with carefully performed mammography, there should be little or no radiation to the body except for the breasts. The exact long-term significance of repeated small exposures to roentgen rays is unknown but a cautious approach is indicated. In our practice we are using the techniques that require the least radiation exposure but still give meaningful results.

Who Should Have a Mammogram?

Mammography is not indicated as a routine screening measure in women less than 40 years of age. Women in this age group have a low incidence of breast cancer. They also have significantly more dense breast tissue, as a rule, than older women; and mammography is less accurate in this group because of this dense parenchyma.⁶

In women older than 40, routine screening by mammography, in addition to physical examination, is good medical practice, even when they are asymptomatic. Currently, we recommend such screening on an annual basis. The whole problem of breast screening is being studied extensively, and it may be that in the near future we will recommend less frequent examination, especially in certain categories of women. Different frequency patterns may be indicated for different categories of women. Regular study of certain groups of women at higher risk and only occasional mammography in others may prove to be as effective as attempting to screen all women every year. Routine annual screening of all women over the age of 40 is impossible at this time owing to the tremendous number of patients to be examined.

High-Risk Patients

So-called high-risk factors for breast cancer are continually sought. A few areas of general agreement prevail. There are patients, generally thought to be at higher risk, for whom we recommend mammography at regular intervals, generally once a year.

We believe any patient who is to undergo surgical breast biopsy should undergo mammography. This not only will evaluate more fully the suspicious breast but also will survey the opposite

breast for significant abnormality. Carcinoma of the breast is bilateral in seven to eight percent of cases and simultaneously bilateral in about two percent of cases. The clinically suspicious lesion may be only one of several abnormalities in the breasts and, indeed, may be benign when a clinically occult malignancy also is present.

Patients who have undergone mastectomy are at high risk and should have routine mammography, at least annually. Some physicians believe such examinations may be indicated even more frequently.

The significance of a positive family history of breast cancer has been widely studied and debated. We currently believe sufficient evidence is available to make this a high-risk factor, especially when a primary relative, namely, a mother, sister, or daughter, is involved. Annual mammography is indicated in such patients.

Patients with large or lumpy, so-called fibrocystic, breasts or both are not necessarily at high risk, but their breasts are often difficult to examine. Mammography is a valuable adjunctive procedure to physical examination in these patients.

Finally, the worried patient should be allowed access to routine examination. It is always surprising — and a bit disturbing — to note how often patients sense the presence of an abnormality in the face of a negative clinical evaluation.

We believe mammography is primarily an examination for cancer. The major goal of the study is to find malignancy that is not suspected clinically. An attempt is made to identify and evaluate all significant breast lesions. Some of these will be obviously malignant; some will be highly suspicious but not definitely malignant; and some will be indeterminate. We attempt to classify each such lesion as malignant, probably malignant, indeterminate, probably benign, and benign and to convey our impression to the referring physician in a concise, straightforward report.

Whenever possible, new studies should be compared with previous examinations. We often suggest a follow-up study in a few months for more complete evaluation of a process that may not be biopsied at the time.

Mammography is most accurate in the fat-replaced breast, usually in women who have borne children, and

especially when they reach postmenopausal age. In totally fat-replaced breasts, mammography should be virtually 100 percent correct in the diagnosis of carcinoma. Accuracy in detection is less in the dense parenchymal breast, most commonly seen in premenopausal women. This type of architecture also is seen more often in nulliparous women of all ages.

Two Important Points

Two very important points need to be stressed: (1) mammography can demonstrate breast cancer that is not clinically detectable and (2) a nondiagnostic mammogram should never deter one from biopsy of a breast that is clinically suspected of containing a cancer.

Xeromammography is a technical modification of the conventional technique in which a charged plate is exposed in place of x-ray film. Electrically charged blue powder is then dusted over this plate, and the resulting image is transferred onto plasticized paper by a combination of pressure and heat. Because of the physical properties of this system, the imaging capabilities are slightly different from those of film. Xeromammography has been acclaimed superior to film techniques by many mammographers. Unequivocal scientific evidence for this is not available. Both film mammography and xeromammography are acceptable techniques when done properly. We use both techniques at present, with xeromammography being used in about two thirds of our cases.

What About Thermography?

Thermography has received much publicity in recent years. It is based on the finding that blood leaving an active process is warmer than blood leaving surrounding tissue and that the veins draining such a process will be noticeably warmer thermographically. Its appeal lies in the fact that no irradiation of the breast is required. Infrared emissions from the patient are detected and recorded. Thus we get an idea of the amount of heat present on the surface of the breasts.

Thermography only detects heat emissions and records temperature differences, however. It cannot differentiate between types of lesions. Any process causing increased metabolic

activity — inflammation, abscess, benign or malignant neoplasm — may result in an abnormal thermogram. On the other hand, if the abnormally warm blood drains into deep veins only, there may be no detectable thermographic abnormality.

Thermography is reported to be 61 to 80 percent effective in the detection of breast cancer.^{8,9} Isard and associates⁸ suggest that even though an average 70 percent detection rate may not equal the percentage detected by physical examination or by mammography (82 percent and 85 percent, respectively, according to the same article), thermography still has a place in breast screening. They stated, for example, that routine screening with thermography followed by sending all patients with suspected malignancy on to mammography will increase the cancer discovery rate at mammography threefold. Such an approach would certainly decrease the radiation exposure to women and would make mammography much more available to problem patients.

Thermography is still a new examination modality in our practice. We have not used it long enough to offer a valid conclusion regarding its usefulness in breast screening. Our initial impression is not as favorable as that of some thermographers. At this clinic we do both thermography and mammography on all patients sent to us for breast evaluation. We do not feel justified in using thermography alone as an initial screening tool since we have a large mammographic capability. Where such a capability does not exist and where thermography is available, its use in conjunction with physical examination should be better than physical examination alone. Such usage, however, will result in a large number of women with positive thermograms, and facilities must be available to do mammography on such patients. The place of thermography in the early detection of breast cancer has not been established in our opinion. Until it is, we will continue to offer it to our patients as an additional approach to early detection of cancer.

In spite of the fact that physical examination, mammography, and perhaps thermography are effective ways to evaluate a breast abnormality, it must be reemphasized that surgical biopsy is the only definitive diagnostic procedure. Between 25 and 30 percent

of all diagnostic breast biopsies done at the Mayo Clinic result in a diagnosis of carcinoma.

Conclusions

What then is a reasonable approach to detection of breast cancer? We suggest the following:

1. Promotion and encouragement of regular self-examination of breasts for all patients.
2. Periodic breast examination of all patients by a physician.
3. Annual mammography for high-risk patients.
4. Routine screening mammography for as many asymptomatic patients over 40 years of age as can be accommodated (on an annual basis until the whole concept is replaced by a better one).
5. Thermography, where available, used in conjunction with mammography at each examination.
6. Expedient biopsy of any suspicious lesion.

Hopefully, in the near future, a safe and highly effective mass screening method will be determined for early detection of breast cancer. At the moment, however, we physicians must make optimal use of the techniques currently available to evaluate the breast, reassuring those patients with benign disease and bringing to earlier, more effective treatment those with a malignancy.

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