Critical Evaluation of Mammography in the Management of Breast Disease *

ALTON OCHSNER, JR., M.D., WILLIAM E. GRIFFITH, M.D.

From the Ochsner Clinic, New Orleans, Louisiana

Mammography (soft tissue roentgenography) has apparently been perfected [2] to a degree which may enable earlier detection of cancer of the breast. Use of additional laboratory procedures can be justified, however, only if it can be demonstrated that they improve our diagnostic acumen. Unless mammography is truly helpful in the management of a patient with disease of the breast, the additional expense is not warranted.

This study was designed to determine the role of mammography in the clinical evaluation of patients with disease of the breast, and particularly its role in recognition of malignant tumors of the breast.

Review of 322 Patients

The clinical records of 322 patients who had mammography at the Ochsner Clinic and Ochsner Foundation Hospital were reviewed. A total of 354 mammograms were made. Mammography was performed more than once on 22 patients, three times on seven patients, and four times on one patient. The diagnostic impressions of the clinicians and radiologists concerning the nature of the existing disease were compared with what was believed to be the true diagnosis in each patient based on histologic examination of tissue obtained at biopsy, study of aspirated material or results of clinical follow-up examinations. About one-third (112) of the patients had biopsies; 5 per cent (15) had aspiration diagnosis, and the "true" diagnosis in the other patients was based on results of repeated clinical, and sometimes roentgenologic, examinations. Only those clinical opinions expressed before mammography were considered in this study.

As one might expect, the clinical records contained a wide variation in nomenclature. Since our primary interest was to classify the cases into malignant and nonmalignant conditions, we believed that the different opinions could be conveniently grouped as shown in Table 1.

Since this is a small series and follow-up examinations in some of the patients were no longer than a few months the results must be accepted with some caution, although there probably would not be much change if each patient had had a tissue diagnosis.

The consistency with which clinicians and radiologists diagnosed malignant and benign lesions of the breast is shown in Table 2. Clinicians made the correct diagnosis in 88 per cent of the cases and radiologists in 89 per cent. This level of consistency is comparable to that reported by others which vary from 80 per cent [6] to 98 per cent,[5] depending on whether or not equivocal reports are counted as errors in diagnosis. The greatest diagnostic acumen was in evaluation of diffuse breast disease: the correct diagnoses obtained by 96 per cent of clinicians and 97 per cent of radiologists. The accuracy of diagnosis of localized disease of the breast was consid-

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TABLE 1. *Types of Clinical Mammographic Evaluation*

Clinical Diagnosis	
Cancer	Definite
	Suspected
Benign Disease	Diffuse
	Localized
Radiological Diagnosis	
Cancer	Definite
	Suspected
Benign Disease	Definite
	Probable

TABLE 2. *Clinical-Mammographic Evaluation: Correct Diagnoses by Clinicians and Radiologists*

	Total %	Localized Dis. %	Diffuse Dis. %
All Clinicians	88	79	96
All Radiologists	89	87	97
Surgeons	87	78	99
Radiologists	87	80	98
Gynecologists	90	77	94
Radiologists	94	84	97
Internists	88	92	83
Radiologists	96	100	93

erably less but radiologists seemed to be significantly better than clinicians (87% and 79%, respectively).

The comparative diagnostic acumen of different specialists is of interest (Table 2). General surgeons were as accurate as radiologists in diagnosing disease of the breast. The clinical diagnoses of gynecologists, and particularly internists, were significantly less accurate than diagnosis by the radiologist in the same cases. Actually it is difficult to classify the diagnosis of most internists because although they may describe a "breast mass," they frequently fail to venture a specific diagnosis. One might expect a difference in the diagnostic acumen of different surgeons. According to the data in Table 3 this appears to be true, but closer examination reveals a similar variation in diagnostic accuracy among radiologists. When a surgeon seemed to exhibit a high degree of diagnostic acumen so did the radiologist, and conversely, when the surgeon seemed to be less accurate in his diagnostic ability, the radiologist was also less accurate. This would indicate that the difference between diagnostic accuracy of different surgeons is related to case selection rather than technic or ability.

In 12 cases (4% of the entire series) both the clinician and radiologist erred in making the diagnosis. In 9 instances, the clinician and radiologist thought the patient had cancer when she really had a benign condition of the breast; in one the pathologic diagnosis was sclerosing adenosis with intraductal hyperplasia and papillomatosis and even the pathologist required the entire breast before he could be certain that the condition was not malignant. It is disturbing that in three patients both the

TABLE 3. *Clinical-Mammographic Evaluation: Correct Diagnoses by Individuals*

	Clinical Diagnosis		X-ray Diagnosis	
Surgeon	%	Cases	%	Cases
A	95	40/42	95	40/42
B	75	9/12	67	8/12
C	88	35/40	83	33/40
D	93	13/14	86	12/14
E	82	27/33	91	30/33
F	94	31/33	94	31/33
G	83	10/12	100	12/12
H	80	41/51	80	41/51

clinician and radiologist thought that there was benign disease when actually cancer existed: in one the preoperative diagnosis was fibroadenoma; in another the lesion was thought to be a cyst with surrounding inflammation; in the third an indefinite lesion in the breast was initially believed to be benign but within a few months it became more discrete and biopsy revealed the true malignant nature.

In 36 cases (11% of entire series) the clinician and radiologist gave different opinions of the nature of the disease. The presenting problem was one of localized disease of the breast in 34 of these patients. This represented a difference of opinion in 20 per cent of all localized disease of the breast. Among all cases in which the clinician and radiologist differed in their diagnostic opinion, the radiologists were most frequently correct. The radiologist made the correct diagnosis in 20 cases and the clinician in 16. However among the 10 cases of cancer of the breast in which there was a difference in diagnosis, the clinicians were more accurate (6 cases) than the radiologists.

Among the 33 cases of cancer of the breast in this series, a preoperative diagnosis of cancer was made by both clinicians and radiologists in 23 patients, but not always the same cases. This means that both clinicians and radiologists were equally accurate (70%) in the recognition of cancer of the breast. General surgeons accurately diagnosed 75 per cent of the cases of cancer of the breast. This diagnostic acumen might be expected of surgeons [4, 5] but is considerably less than that reported by radiologists.[1, 3, 4, 8, 9] There were many instances, however, in which the radiologist reported the mammary lesion as "probably benign" but recommended biopsy, just as there were many instances in which the surgeon made the diagnosis of a benign condition but did not hesitate to perform a biopsy. These observations indicate that 30 per cent of cases of cancer of the breast would not be recognized if reliance is placed solely on mammography or clinical impression without performing a biopsy of lesions which were considered to be benign. However, since only three patients had cancer which was not diagnosed by the clinician and radiologist, reliance on both mammography and clinical impression would have led to a correct diagnosis in 91 per cent of these cases.

If the role of mammography in the management of disease of the breast is to be elucidated, it is desirable to determine whether mammography will provide information which will enable positive diagnosis that otherwise would not have been obtained and whether it leads to performance of unnecessary operations. Among 42 patients in whom the radiologist made a diagnosis of cancer, 14 were considered "definitely" to have cancer. In 13 the diagnosis of cancer was proved by biopsy. Biopsy was strongly recommended in the fourteenth patient but her own physician decided against this and the fate of this patient has not yet been determined. In four of the 14 patients a clinical diagnosis of cancer had not been made before mammography. Two of these patients have been examined by internists and two by general surgeons. It is believed that at least one, and possibly two, would not have had a biopsy had it not been for the mammographic report. The roentgenologist suspected cancer in 28 patients, of whom 9 actually had malignant disease. The clinical diagnosis of cancer had not been made in two of these nine patients, but it seems that these patients would have had a biopsy even without the mammographic report. Of the 33 cases of cancer, therefore, one and possibly two were diagnosed only because of the information provided in the mammogram. In 19 instances mammography led to a false positive diagnosis. These reports seemed to have influenced the surgeon to perform a biopsy in only two or possibly three cases. The other patients would have

certainly had biopsies regardless of the result of mammography.

In 58 patients mammography was done on breasts with no palpable abnormalities. Thirty-nine of these patients had clinically "normal" breasts; 14 had "nipple discharge"; four had eczema or questionable Paget's disease; and one had nipple retraction without associated mass. In none of these patients did the radiologist make a diagnosis of cancer, although one patient did have Paget's disease. In one, however, a clinically unsuspected cancer was found by mammography in the opposite breast of a patient with a clinically recognized breast cancer.

Discussion

Although mammography yields a high degree of diagnostic accuracy and in many individual instances has proved its merit, it is no substitute for general surgical consultation in the evaluation of disease of the breast. In patients with mammary cancer in whom the clinical impression and roentgenologic diagnosis differ, the clinical impression was more often correct. Admittedly, cases of cancer of the breast have been diagnosed by the radiologist and not by the clinician, although biopsy would have been performed in most of these cases if mammography had not been done. In fact, results of this study would indicate that the decision to perform a biopsy should not be changed if the mammogram does not suggest malignant disease. On the other hand, it is well to biopsy a clinically benign lesion if the mammogram indicates malignant disease, and perhaps it is imperative to do so if the radiologist is definite about the diagnosis of cancer.

The practical role of mammography in the evaluation of mammary disease would seem to vary with the presenting complaint. In the breast with no palpable abnormalities, although there may be pain, nipple discharge or retraction, mammography will be of limited value. It might be of some help in 1) evaluation of extremely large breasts which are difficult to palpate, 2) in search for a primary cancer when the patient is known to have metastatic adenocarcinoma or an osteolytic lesion, 3) in evaluation of the opposite breast of a patient with cancer of one breast and 4) in the presence of an axillary mass to determine whether the biopsy should be directed to the breast or the axilla. In one patient in this series the clinical diagnosis was cancer of the breast with metastasis to the axilla but the mammogram indicated no disease of the breast and a biopsy of the axilla revealed Hodgkin's disease.

Mammography is probably not justified as a "cancer screen." Surveys [8, 9] suggest that no more than two to four cases of cancer of the breast will be found in a thousand mammographic examinations. This will require an expenditure of about 1,000 man-hours to take, process and interpret the films and cost $25,000. This expense would be justified only if a long-term study would indicate that cancer recognized in this manner leads to greater long-term survival than cancer of the breast recognized clinically.

In breasts with diffuse disease mammography is also of limited value since the accuracy of clinical diagnosis is so high in such cases. It may have some usefulness 1) in reassuring a patient (particularly a cancerophobe) that the condition is benign, 2) in evaluating a small cyst which is difficult to aspirate, especially in a breast with multiple surgical scars and 3) as a baseline examination for future follow up.

Mammography would seem to be of greatest value in the diagnosis of localized disease of the breast. If from his clinical examination the surgeon suspects cancer of the breast and recommends biopsy, mammography may be superfluous since the decision to operate in no way should be influenced by the radiologic report. A mammogram may be useful, however, in convincing a patient or her physician of the

need for biopsy. In one patient in this series a retracted nipple with an underlying mass led to the clinical diagnosis of cancer, but the patient insisted that this had been present without change for 30 years following drainage of a breast abscess, and her physician (a general practitioner) had been examining her periodically. The mammogram showed "definite cancer" and, although the physician was much perturbed that he had been pressured into doing a biopsy, it is only because of the mammogram that the operation was done and the patient did have cancer. In the presence of clinically diagnosed cancer, mammography may also be useful in evaluating the opposite breast before mastectomy and occasionally reveal metastatic axillary nodes which were not apparent clinically.

If the surgeon believes that the localized disease of the breast is definitely benign and does not recommend biopsy, then mammography may be helpful in confirming the diagnosis, but it should not be used as a substitute for follow-up examination.

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