

37. Sunderland, D. A.: The Significance of Vein Invasion by Cancer of the Rectum and Sigmoid: A Microscopic Study of 210 Cases. *Cancer*, 2:429, 1949.
38. Taylor, G. W. and R. H. Wallace: Carcinoma of the Breast. *New Engl. J. Med.*, 237:475, 1947.
39. Vernick, J., G. Garside and E. Hoppe: The Lack of Growth of Intravenously Inoculated Tumor Cells in Peripheral Wounds. *Cancer Res.*, 24:1507, 1964.
40. Vernick, J. J., J. Magell and E. T. Hoppe: Alkylating Agents and Iodophor Compounds for the Prevention of Local Recurrence of Cancer, *Surg. Forum*, 15:336, 1964.
41. Warren, S. and O. Gates: The Fate of Intravenously Injected Tumor Cells. *Amer. J. Cancer*, 27:485, 1936.
42. White, W. C.: Problems of Local Recurrence After Radical Mastectomy for Carcinoma. *Surgery*, 19:149, 1946.
43. Wilkins, S. A. and W. R. Vogler: Cancer of the Gingiva. *Surg. Gynec. & Obstet.*, 105:145, 1959.
44. Wood, S.: Pathogenesis of Metastasis Formation Observed in The Rabbit Ear Chamber. *Arch. Path.*, 66:550, 1958.
45. Willis, R. A.: *The Pathology of Tumors*, 3rd ed. London, Butterworth & Co., 1960.
46. Zeidman, I., M. McCutcheon and D. R. Coman: Factors Affecting the Number of Tumor Metastases. *Cancer Res.*, 10:357, 1950.

DISCUSSION

DR. BENJAMIN F. BYRD, JR. (Nashville): Dr. Cole let me see his complete manuscript on this fascinating continuation of his work on iatrogenic carcinoma. I think the clinical application of this continued interest of his is something for which we are all indebted to Dr. Cole. Certainly the use of irrigating agents for the topical effect of the drug has been beautifully demonstrated in this work which he has shown us here this morning. Of course, it is especially interesting that everything that kills cancer cells in the test tube does not necessarily kill it in the abdominal cavity, this fact being shown with the diminished effectiveness, the actual deleterious effects of the halogenated agents as an irrigating solution as over against the systematically effective Thiotepea.

I cannot help but believe that the work which Dr. Cole is doing will eventually bring us to a really fruitful solution to the management of metastatic cancer. We are right now beginning to see follow-up periods on our basic experimental work which carries for us individually something that we can use in the management of our cancer patients. We all stand to gain from experimental study whenever we are having local recurrences in cancer of the breast which may be affected favorably by the use of systemic cancerocidal drugs, and whenever we are having 25 to 30% local recurrences in cancers of the head and neck after radical neck dissections, which we can alter favorably by the use of one of these drugs.

I would like to speak again for one moment concerning Dr. Ochsner's paper. He mentioned in his presentation one of the possible uses of mammography. I certainly did not get up here to tell a bunch of surgeons that mammograms are satisfactory substitutes for microscopic examination, but I do want to show two instances in which pre-operative mammograms might have favorably altered the patients' course.

(Slide) This is a mammogram and here is a tumor lying deep within the breast. This patient

was very generously equipped with breast tissue and had in her axilla a mass which was removed. There was no palpable breast mass. The axillary mass was removed, proved to be adenocarcinoma, and then mammograms were done and the tumor found lying deep within the breast tissue. The breast was removed with radical mastectomy in a second procedure.

(Slide) This patient was an older woman in her sixties, who had an axillary mass, again with no palpable breast abnormality. This section, on microscopic examination, was diagnosed as malignant melanoma by the pathologist and by surgical pathologist as possibly carcinoma but probably a melanotic metastasis. We got a mammogram the following day (slide) which showed this tumor right here, which was not palpable. We took her back to the operating room, did a radical mastectomy. She had a carcinoma of the breast, and this, I think, really demonstrates one of the principal uses of mammography, in the evaluation of axillary masses where there is no palpable abnormality in the breast itself.

We can get something from this and probably the wealth of material which is being built up by the radiologists serves to increase their diagnostic acumen.

DR. WALTER J. BURDETTE (Salt Lake City): I would like to discuss Dr. Ochsner's paper. We have been interested in the possible usefulness of mammography at the University of Utah for several years as well; and Drs. William Christiansen and Carlisle Smith of the Department of Radiology have become very expert at reading mammograms. A few illustrations from the 90 cases having mammography and excision of the lesion with histologic study may be of interest to the group.

(Slide) This is an example of normal breast, this (slide) of a breast during lactation, and this (slide) is an example of gynecomastia, a lesion which is puzzling at times. This roentgen study (slide) shows chronic cystic disease in this area,

and this (slide) is chronic cystic disease with an adenofibroma. This (slide) demonstrates a larger fibroadenoma; and a cancer of the breast appears here (slide). Finally, this case (slide) exhibits cancer with metastatic lymph nodes.

Twenty per cent, or 18 of the lesions in the 90 cases, proved to be malignant. The radiologic diagnosis was cancer in three cases in which no malignant disease was found, and false-negative diagnoses were encountered in two cases of the series. However, four tumors were diagnosed when no tumor was palpable clinically, and for this reason mammography is proving useful in those patients whose breasts are suspected of having disease without any discrete tumor being palpable. On the other hand, the procedure is too expensive and uncertain for routine use, and it should never be substituted for biopsy and microscopic study.

We are particularly interested in pursuing the possibilities of detecting spread of cancer to lymph nodes, particularly in the axilla, supraclavicular area, and mediastinum and the usefulness of concomitant injection of air. Combined with thermography, mammography may become a very useful means for localizing and identifying the presence of lesions in the breast that otherwise may be obscure and to prepare the surgeon and patient in advance for the type of lesion that will be encountered at operation. I would be particularly interested in Dr. Ochsner's comments on his experience with identification of lymph nodes to which cancer has spread.

DR. ISIDORE COHN, JR. (New Orleans): I would like to comment on Dr. Ochsner's paper, a subject which has been of interest to us. The radiologists at Charity Hospital have recently reported their experience in 431 mammographic studies, with an accuracy index of over 90% (South. Med. J. 57: 1168, 1964). This is fine and highly commendable, if these results can be confirmed and duplicated. The feature that disturbs us most of all is that radiologists, many physicians, and even more lay people, are beginning to accept mammography as the best means of diagnosing a lump in the breast, and we believe that a number of patients are having a diagnostic biopsy bypassed in favor of mammography.

In an effort to find out what had happened to our own patients who were studied by exactly the same radiologist in the same institution, we have gone back and looked over the charts of the last 82 patients on our service who have been subjected to radical mastectomy for carcinoma of the breast. Of these 82 patients, 20 had mammograms. The results on these 20 patients are as follows: The radiologist diagnosed carcinoma in nine cases. In eight they said there was no carcinoma, and in three they gave a questionable diagnosis. This means that their accuracy rate in those patients where a diagnosis is most important is less than 50%, and I think most of us could do that well by flipping a coin before we ever examined the patient. I think it is dangerous to base our entire

diagnosis on this kind of test if the test is no more accurate than this.

DR. S. W. MOORE (New York): I too, would like to discuss Dr. Ochsner's paper and give a word of caution. I do not think we can ever rule out carcinoma of the breast, no matter what we do. We have a series of 125 patients with intraductal papilloma of the breast whom we have followed up to 20 years. Of these patients who had been diagnosed clinically and pathologically benign, we found eight who developed carcinoma and three who died of carcinoma of the breast.

We had the original sections reviewed by Drs. John Pearce, Fred Stewart and Arthur Purdy Stout. There was disagreement regarding diagnosis in some sections, and, in seven of the eight patients who developed carcinoma, they said there was cancer present in the original sections which had been missed.

The other situation which causes trouble is lobular carcinoma *in situ*. This is a condition which we don't know a great deal about and, again, there is a difference of opinion. Dr. Cushman Haagensen very clearly states he does not know what to do in this situation.

Mammography in the hands of experienced men and well controlled is, I think, excellent. In Dr. Ochsner's paper there was the very significant statement that three benign lesions were read on the mammogram as cancer.

We have found this most helpful where we have no mass and we suspect carcinoma. Frequently roentgen ray can help us with the diagnosis.

I have seen several recent articles on mammograms in which the radiologist or the internist would say, "On mammogram, carcinoma has been ruled out."

The female has a very healthy respect for cancer. However, she does not want a scar or an operation. The internist and family physician very frequently would prefer for the surgeon not to see this patient for fear she may have to have an operation, and I am very much upset to see the articles in the literature in which, on the basis of roentgen ray, they say that carcinoma of the breast is ruled out.

DR. MURRAY M. COPELAND (Houston): One is constrained to believe that studies advocating conservative removal of the breast for cancer points up at least the desirability to sort out the primary breast cancers without metastasis and to treat them with simple mastectomy. This separation currently is not possible except as an educated guess.

From the facts at hand, approximately 55% of all cases with breast cancer are not controlled by any form of surgery; approximately 20% of all cases are freed of their disease by surgery due to biological variation in growth potential, bringing about an apparent paradox of slow growth of tumor as a local process; and in only 25% of all cases of breast cancer does prognosis depend upon

duration of the disease before treatment, and where cure is predicated upon early effective treatment.

Biological factors more profoundly influence prognosis in certain individuals than do the measurable factors with which we are all familiar. The biologic traits of cancer, the tumor-host relationship, and the hereditary influence on tumor growth and spread are significant but imponderable in estimating their effect on survival. Perhaps the key to successful and complete ablation of the disease is wrapped up in further research in these areas.

Nonetheless, it is true that following radical mastectomy, some patients who have had varying degrees of axillary involvement, are living and apparently free of disease 5 to 10 years later. It is interesting to contemplate whether these patients would have lived had they been subjected to more conservative surgery.

Believing that radical mastectomy was a major factor in their survival, and that early diagnosis often leads to a better chance for *cure*, I can readily subscribe to a diagnostic test which alerts the surgeon to a clinically unobservable early lesion in the breast. We at the M. D. Anderson Hospital and Tumor Institute at Houston have just completed an evaluation study in conjunction with 25 other clinics and known private radiologists in the country and in cooperation with the Cancer Control Program, USPHS. From this study we believe that—with the *Egan* technic—films of acceptable quality can be produced and that educated interpretations provide information useful in the clinical management of breast cancer. The limitations found indicate that the use of mammography for screening is some years away. The radiologist is adjunctive to the care of the patient. The surgeon must be responsible for the decision as to treatment.

DR. ALTON OCHSNER, JR (closing): Dr. Copeland pretty well summed up, I think, the attitudes of all of us, that the surgeon remains in charge.

Dr. Cohn asked me yesterday if I were going to damn or praise this procedure, and now I can see what he was after. I do not know if I damned or praised it. I have given it faint praise and faint damn—a little bit of each, I think.

Actually, it is no substitute for surgical consultation and biopsy, if the surgeon thinks that is necessary, but there certainly are very definite individual situations where it has proved of value.

In relation to Dr. Burdette's comment about axillary nodes, I cannot give the exact number right off hand in which the examination was done because of axillary nodes. I do not know, in our series, of any case in which there were axillary nodes and the x-ray diagnosis led to finding a tumor in the breast. I do know of one specific case where there was a large axillary mass which was believed to be carcinoma of the breast with metastasis but the radiologists said they could find no tumor in the breast so the attack was made not on the breast but on the axilla first. This was Hodgkin's disease.

There was another specific case in which the clinician said this was carcinoma of the breast without axillary metastasis and the radiologist, in reading it, said there was axillary metastasis in addition to carcinoma of the breast, and at the time of radical mastectomy, two of 50 nodes were involved with tumor.

Dr. Moore stated there were only three cases in which the x-ray had been wrong. Actually, there were 19 false-positive diagnoses by the radiologists, but as I pointed out, in perhaps only two or three cases did this force the surgeon into doing a biopsy he might not have done otherwise.

It was disturbing to me that there were three cases in which both the clinician and the radiologist thought the breast was benign, but it turned out to have cancer.