

# CARCINOMA OF THE BREAST: RESULTS OF COMBINED TREATMENT WITH SURGERY AND ROENTGEN RAYS\*

SAMUEL F. MARSHALL, M.D.,

DEPARTMENT OF SURGERY

AND

HUGH F. HARE, M.D.,

DEPARTMENT OF RADIOLOGY

THE LAHEY CLINIC

BOSTON, MASSACHUSETTS

SINCE THE INTRODUCTION of radical surgical treatment for cancer of the mammary gland by Halsted and Willy Meyer, radical mastectomy has been the method most commonly employed by the medical profession to treat patients with this type of malignancy. In spite of the fact that radical dissection has approached the acme in the thoroughness of removal of the mammary gland, with its tumor and the surrounding structures of the chest wall and axilla, yet the five-year clinical survival rate has remained relatively stationary and the reported results of treatment of breast carcinoma in the literature has shown a discouraging lack of improvement in the number of patients surviving five years after radical operation.

Carcinoma of the breast in the female, like carcinoma of the female pelvic organs, is one of the most frequent causes of death resulting from malignancy. The United States Bureau of Vital Statistics gives a death rate of 12 per 100,000, and the yearly death rate from this type of malignant disease is approximately 16,000 (Table I).

This high death rate from cancer of the breast each year is a direct challenge to the medical profession and the divergent opinions as to the best method of treating an operable cancer of the breast are evidence of the dissatisfaction with the low survival rate after various methods of treatment. Every effort to increase the salvage of these patients, whether by operation or irradiation, is worth the greatest consideration.

That our experience with postoperative results at the Lahey Clinic has been quite similar to other published results is illustrated by a review of a series of patients operated upon prior to 1936 in this Clinic. Only 38.6 per cent of all patients having radical mastectomy (the majority of this group had no irradiation treatment) survived operation five years or more. These results very closely parallel the figures on results given by Haagensen and Stout<sup>6</sup> in the treatment of patients with carcinoma of the breast at the Presbyterian Hospital, in New York, over a period of 20 years; they reported a five-year clinical cure of 36.1 per cent after radical mastectomy.

With these facts in mind and since we could apparently not hope, at least in our hands, to improve the survival rate of patients with surgical removal

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alone, no matter how radically or how skillfully the operation could be done we added to the already radical amputation of the breast, a course of intensive and thorough roentgen therapy applied after operation. Accordingly, beginning in 1935, a uniform method of treatment was outlined and employed whenever possible for all patients with breast carcinoma coming to the Lahey Clinic. This method has been used routinely by us since 1935. It is our purpose in this paper to report the results obtained in this group of patients who have thus been treated, dating from 1935 to 1941, and who have survived a minimum of five years, or longer, without recurrence of tumor. From these results we hoped to draw some conclusions relating to the value or disadvantage of this type of combined treatment. In brief, the treatment has consisted of a Halsted-type of radical amputation of the breast followed by intensive roentgen therapy given in divided doses.

During this period (1935-1941) 283 patients with carcinoma of the breast have received some type of treatment, either radical or simple mastectomy, with irradiation, or some other form of palliative treatment, and of this group, 238 patients have had the complete treatment, that is, radical operation followed by intensive irradiation. Twenty-eight patients have had simple mastectomy, many of whom also had roentgen therapy after operation. It is that group of patients (238) who received the combined method of treatment of radical surgery and irradiation, however, with which we are most concerned in this review.

Although this series of patients is relatively small (238) compared to reports of some larger series of patients, we believe this study to be of value, since these patients have all received the same type of treatment and have been carefully followed and thoroughly studied; and from these data we believe we are justified in attempting to draw some conclusions regarding the efficacy of this combined treatment.

Since 1942 a much larger group of patients has been similarly treated but these patients have been treated too recently to report five-year survival.

In this series we have not attempted to confine our treatment to a selective group of cases that would present a more favorable prognosis but have employed radical operation in all cases in which the cancer was still confined to the breast and to the corresponding axilla. In fact, subsequent pathologic examination of axillary nodes was positive for axillary extension in 62 per cent of the cases. The only contraindication to radical surgery was evidence of distant metastatic spread, involvement of the pleura, of the lungs, bones, or extension to the supraclavicular region.

In general, the radical operative procedure employed has been the method advocated by Halsted, with minor modifications. It has consisted of removal in one block of the breast with its overlying skin, together with excision of the pectoralis major and minor muscles and thorough dissection of axillary contents and fatty and fibrous tissue of the chest wall, including a considerable portion of fascia covering the rectus muscle.

Many types of incisions have been employed by various surgeons; all have

proved useful and each is probably advantageous in the hands of the particular surgeon who is accustomed to his own type of radical mastectomy. The type of incision employed depends to a large measure upon the location of the tumor in the breast. We have used the incision that Halsted later adopted instead of the incision extending out upon the arm which he first described in his earliest report on radical removal of the breast.

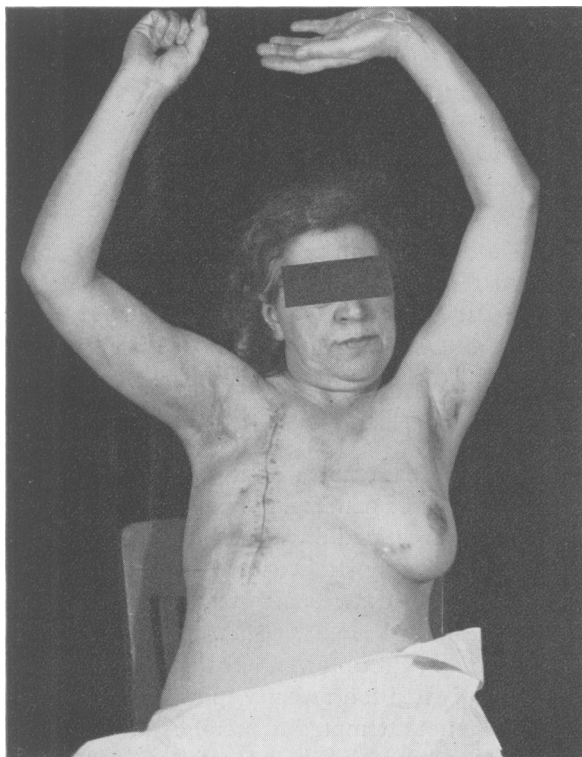


FIG. 1.—Operative wound ten days after radical mastectomy. Incision consists of encircling incision, with incision extended vertically above and below the breast. Note extent of range of motion and primary wound healing ten days after operation. Deep radiation therapy can be started immediately at this stage.

This incision consists of a circular incision about the breast with a vertical incision extending above and below the breast, which, in the majority of cases, permits complete access to the contents of the axilla and chest wall.

The extension of the incision on the arm is unnecessary for exposure of the axillary contents and is likely to result in a contracted scar in the axilla, which may greatly limit return of arm motion. Stewart's simple transverse incision is often useful, and permits sufficient exposure of axillary contents and

allows an easy plastic closure of the wound. It is particularly valuable for tumors located in the extreme lateral border of the breast. Greenough's arrow-head incision permits an excellent approach to the axilla in those tumors which arise high in an axillary extension of the breast, where it may be used most advantageously. We have intentionally limited the extent of the skin excised, removing the skin over the breast and placing the line of skin incision about 5 to 6 cm. from the border of the tumor. This has been done in an effort to obtain a primary plastic closure of skin over the chest wall in order to obtain early healing so that irradiation treatment could be started immediately after radical operation (Fig. 1). Roentgen therapy is started as early as possible, in most cases within eight or ten days after operation. We have thought that wide excision of skin would involve closure of the defect with immediate Thiersch graft, which would greatly prolong healing and seriously delay the institution of radiation therapy.

There are few cases, indeed, in which radical mastectomy cannot be done with a great margin of safety. In this group there was only one postoperative death, which resulted from a coronary occlusion. Following radical mastectomy, these patients are allowed up in a chair on the second or third day. They are encouraged to exercise the arm early and before radiation treatment is started almost all have complete range of motion.

Simple mastectomy has been employed in 28 patients, and only in those patients whose constitutional condition would not permit a radical surgical procedure; in some it was used to remove a large ulcerating lesion or as a palliative procedure in advanced malignancy. Of this group of 28 patients only three have survived five years, and this is to be expected since this operation, in main, was employed palliatively in advanced cancer. In view of the fact that a fairly large group of patients (37 per cent in this report) with axillary involvement can be salvaged by radical mastectomy, there is no logical reason to employ simple mastectomy as a method of routine treatment, as is advocated by many surgeons, and such a method of treatment is to be heartily condemned. Particularly is this true with early carcinoma of the breast, as it is at this time that carcinoma should be treated most vigorously and radical operation has the greatest opportunity to accomplish a cure.

It is unnecessary to state that employment of postoperative roentgen therapy does not represent a new method of treatment as the literature<sup>12, 13</sup> contains many reports of groups of patients treated with roentgen rays postoperatively, but with few exceptions the roentgen dosage has been small, or has been unrecorded, and seldom has there been reported a series of cases in which a uniform method of such combined treatment has been employed.

#### IRRADIATION TREATMENT

In 1935, when high voltage shock-proof roentgen-ray equipment became available, it was our opinion that the value of postoperative radiation for carcinoma of the breast was a debatable question. The seriousness of the disease in question, the need of more vigorous treatment and the frequency

of recurrence of the disease made it seem feasible to outline a course of treatment to be given as soon after operation as was possible and to run a series of cases in which operation and radiation would be on a routine basis. The surgical plan which was carried out on this series has been given. Radiation treatment was started within ten days to two weeks following the operation, when we deemed the healing of the wound was satisfactory. Treatment was delivered to the scar, axillary and supraclavicular regions. In all cases a uniform plan of treatment was carried out, using the following factors: 200 k.v.p., 1 mm. copper filtration, distance 50 cm., portal size 15 cm. round cone, daily dose 300 r. As the initial dose 300 r was given to each port treating one portal daily for three days. Following this, each portal was treated daily with 100 r, until 2,400 r had been delivered to each of three portals for an over-all dose of 7,200 r, all measurements taken in air. By giving this postoperative radiation in this manner, there was no material interference with wound healing. There was only a moderate skin reaction to the roentgen-rays, and there were no resulting pulmonary changes, such as radiation pneumonitis. The erythema and desquamation which do occur following this form of treatment are limited to the axilla and scar regions, reach a peak between 15 and 21 days, and the erythema gradually fades off until the skin is normal except for pigmentation at the end of eight weeks. No local treatment other than vaseline or boric acid ointment is necessary to control the effects of radiation dermatitis. The patient's course should be followed in three weeks after treatment to determine the degree of erythema and any complications which may have arisen from the radiation treatment, and, again, at the eight-week period for a review of the entire problem, at which time fluoroscopy of the chest should be done to rule out radiation pneumonitis.

It is apparent from a study of our results that the combined treatment was not successful in controlling recurrence of the disease in 25 per cent of the cases, even when the disease was clinically limited to the breast region. It was unsuccessful in controlling the disease in 62 per cent of those cases in which the disease had already spread to the axilla before operation. A glance at the location of the metastatic disease, however, indicates that there was very little local recurrence or persistence of the disease unless it had spread to regional lymph nodes prior to treatment.

#### COMPLICATIONS OF RADIATION TREATMENT

The most frequent complication of radiation treatment is nausea, and often this is associated with vomiting. This complication may usually be avoided by giving a high caloric diet, by delaying treatment for a day or two or by decreasing the daily dose. It was not necessary to decrease the daily dose except in a very few cases.

In all cases there was a moderate skin reaction consisting of erythema and in most cases desquamation of the skin beneath the axilla where the skin from the arm rubs against the skin of the chest wall. In no case was this a serious complication; however, it should always be explained to the patient that this

is going to occur and that proper healing will take place in eight weeks' time. One severe complication which follows radiation treatment over the chest wall is radiation pneumonitis, which has been entirely avoided in this series by treating with small daily doses; with realization that this may occur, it should be pointed out that the differential diagnosis is between true pneumonia, radiation pneumonitis, and secondary malignancy. It is further necessary to emphasize that these changes in the lung should never be treated by further radiation even though it should prove later on to be a recurrence of the disease, especially if the pulmonary changes come within 120 days following treatment.

In radiation pneumonitis, coughing is likely to be severe and may be difficult to control even with large doses of codeine, and in some instances heroin has been used to control the cough. In the cases in which we have seen radiation pneumonitis the effects of the disease gradually disappeared in about 90 days, or less, leaving a residual fibrosis and atelectasis of the lung involved, with disappearance of cough.

#### PALLIATIVE RADIATION TREATMENT

The radiation treatment for carcinoma of the breast other than for post-operative localized treatment is delivered as a palliative measure for recurrence in the skin, nodes, bone or abdomen. Lesions in the lungs are usually refractory to treatment and lesions involving the cranial vault, unless small and localized, are probably best not treated unless the patient understands that the hair is to be removed as a result of treatment.

The quantity of roentgen-rays necessary to bring about relief of pain from bone lesions is relatively small and should not be given in large enough dosage to produce roentgen sickness or complications of treatment. We use a maximum of 1800 r to each area and never treat a portal larger than a 15 cm. round cone in order to avoid radiation sickness and skin damage. It is generally recognized that if the lesion is hematogenous in type and involving bone, a cure is almost impossible, although there have been several reported cases of patients living for five years, or more.

When the spread of disease is lymphatic and localized to skin a single large dose of roentgen-rays may be used if the lesion is not larger than 2 cm. It must be recognized that spread has likely taken place through other lymphatic channels before treatment is given, and many times it has spread some distance from the first-noted lesion, but it is always advisable to include at least 1 cm. of skin in the field to be irradiated in order to block-off lymphatics, and, thereby, stop further lymphatic spread. It is our custom to shield the remaining skin with 0.5 mm. of lead and treat with a small cone. We use superficial radiation treatment, 90 k.v.p., 20 cm. distance, and give 2,400 r measured in air at one sitting. If the lesion is larger than this, we prefer to use the divided dose technic, using 1,000 r at each treatment, for three treatments. In about ten days following this type of radiation treatment there is moderate radiation reaction, with blistering and crusting of the skin, which

will persist for six to eight weeks, but, in our hands, with this type of treatment the skin usually heals well in eight weeks' time and leaves only a residual, thin, tissue paper-type of scar.

We believe that the irradiation treatment of small recurrent nodules of the skin is preferable to surgical removal, as surgery does not block surrounding lymphatics, and radiation treatment may be given without untoward reaction to the patients on numerous occasions. We have a number of patients, under observation at the present time, with scar metastases, who have been under treatment and followed for as long as three years without evidence of spread of the disease elsewhere.

#### USE OF ESTROGENIC SUBSTANCES FOR PALLIATION

Recently there has been much interest in the value of the treatment of advanced carcinoma of the breast by estrogenic substances, when these substances are given in relatively large doses.<sup>5</sup> In some cases this treatment has given remarkable relief of symptoms, such as pain, and has decreased the size of the tumor mass; occasionally, the ulceration has completely disappeared. This is contrary to our understanding of the growth of breast carcinoma, yet it is, in part, fundamentally sound because large quantities of estrogenic substances completely block pituitary secretion of follicular stimulating hormones, commonly known as FSH. Once the pituitary hormones are blocked off, healing of the tumor takes place temporarily but it is only occasionally that relief may be obtained by this method for over a year. There are some observers who feel that carcinomas of the breast become more radio-sensitive during this period that the estrogenic substances are being given.

There is another group of scientists who are giving testosterone propionate to the female in the hope of bringing about relief of symptoms. Again, this may be successful in some cases but in our hands it has not given favorable results.

About a year and a half ago a man, age 60, was admitted to the Clinic following radical mastectomy, with numerous bone metastases. He was given 30 mg. of estrogenic substances daily in the form of stilbestrol, with complete relief of pain and with gradual but complete healing of the bone lesion. Figure 2 shows the bone at the time administration of estrogenic substances was started, and Figure 3 shows the condition of the bone seven months following stilbestrol treatment. In eight months there was a gradual return of symptoms and further treatment by estrogenic substances did not give relief.

#### PALLIATION BY ROENTGEN STERILIZATION

In 1929, Dresser<sup>4</sup> reported on the value of roentgen sterilization in the treatment of bony metastases, and presented a case in which treatment had been given three years previously by radiation sterilization, with resultant healing of the bony lesions. This result lasted for a period of seven years. Since that time there have been numerous patients who have received roentgen sterilization in the younger group, who had obtained remarkable relief of pain

## CARCINOMA OF BREAST

and an increase in their number of useful years. There have been more patients treated who did not improve following sterilization than did. In these

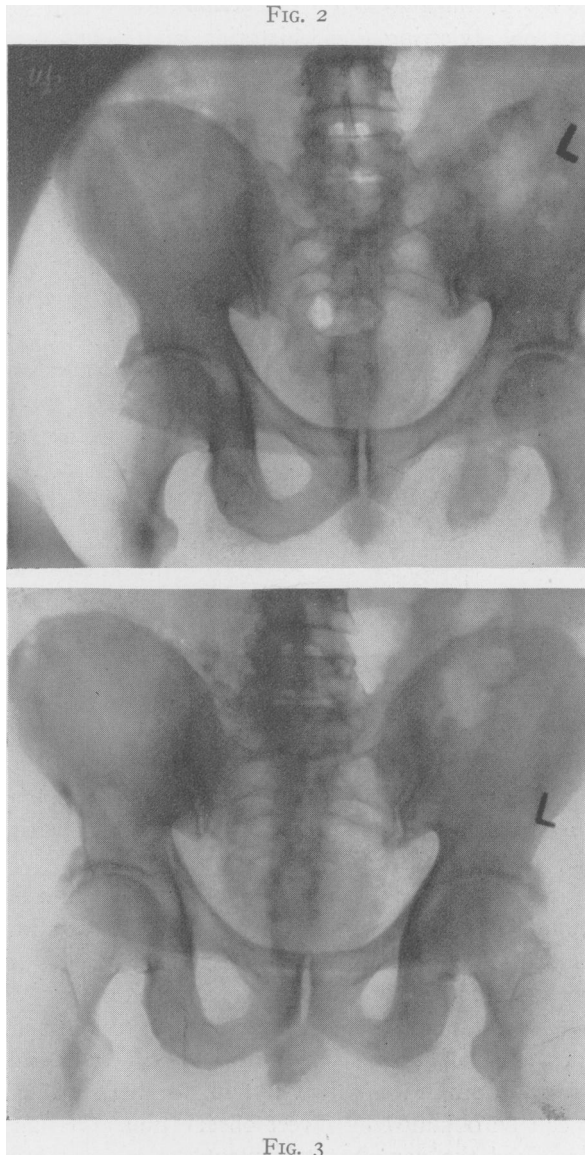


FIG. 2.—Carcinoma of breast, male. Osteolytic metastases, particularly ischium on left (April 16, 1945).

FIG. 3.—Same case as shown in Figure 2, seven months later, showing repair, with disappearance of ischial lesion.

we add another problem which the patient had to solve; namely, the menopause, which comes at a time when she is mentally upset as a result of the tumor, a complication which has been very difficult to handle in several



instances. It was, therefore, deemed necessary to attempt to analyze the histories of those who did not receive benefit from radiation sterilization, likewise, the histories of those who did receive benefit from sterilization. It became apparent on reviewing these histories, and it has been reported by Sosman,<sup>14</sup> that radiation sterilization was successful only in those cases in which the pain in the metastatic region was increased, and there was associated pain and swelling of the opposite breast at the time of the menstrual period. If these be used as fair criteria for stopping the menstrual period, then a high percentage of patients will receive fair palliation (Figs. 4 and 5).

TABLE I  
CARCINOMA OF THE BREAST—MORTALITY,  
UNITED STATES BUREAU OF VITAL STATISTICS

	No. of Deaths	Rate per 100,000
1942.....	15,954	11.9
1943.....	16,140	12.0

TABLE II  
COMBINED THERAPY, RADICAL MASTECTOMY PLUS POSTOPERATIVE ROENTGEN THERAPY  
FIVE-YEAR SURVIVAL RATE—238 PATIENTS

	Number of Patients	5-year Survivals with No Recurrent Tumor	
		Number	Per Cent
No axillary node metastases at operation.....	94	71	75
With axillary node metastases at operation.....	144	53	37
Total.....	238	124	52.1

Adair, *et al.*,<sup>2</sup> found that roentgen-rays and surgical castration gives improvement in approximately 13 to 15 per cent, and that improvement is temporary and growth is retarded for about two years.

It has been our experience in the treatment of metastatic malignancy secondary to carcinoma of the breast that the patient is usually hopeful until the very end, is remarkably coöperative, and is usually willing to try any type of treatment suggested. It is important, therefore, that we should not give these patients any type of treatment which will make them more uncomfortable.

Each one of these patients in this study has been seen and examined by one or both of the authors in this follow-up, and we believe these statistics are as accurate as can be obtained by direct observation. Of this group of 238 patients who received the complete treatment, 52.1 per cent have survived five years or longer without evidence of recurrence (Table II). When this figure of 52.1 per cent five-year survival is contrasted with our previous experience of 38.6 per cent five-year survival after operation alone, it is evident that there is considerable improvement in the results of treatment, and we believe this must be attributed in a large measure to the added effect of roentgen therapy, as there has been no attempt to select for the combined treatment a group of cases which might offer a more favorable prognosis.

## CARCINOMA OF BREAST

This is demonstrated by the fact that in this group of 238 patients, 62 per cent had metastases to axillary nodes at the time of operation (Table III).

Adair,<sup>1</sup> also, has stated that modern irradiation by the divided dose method

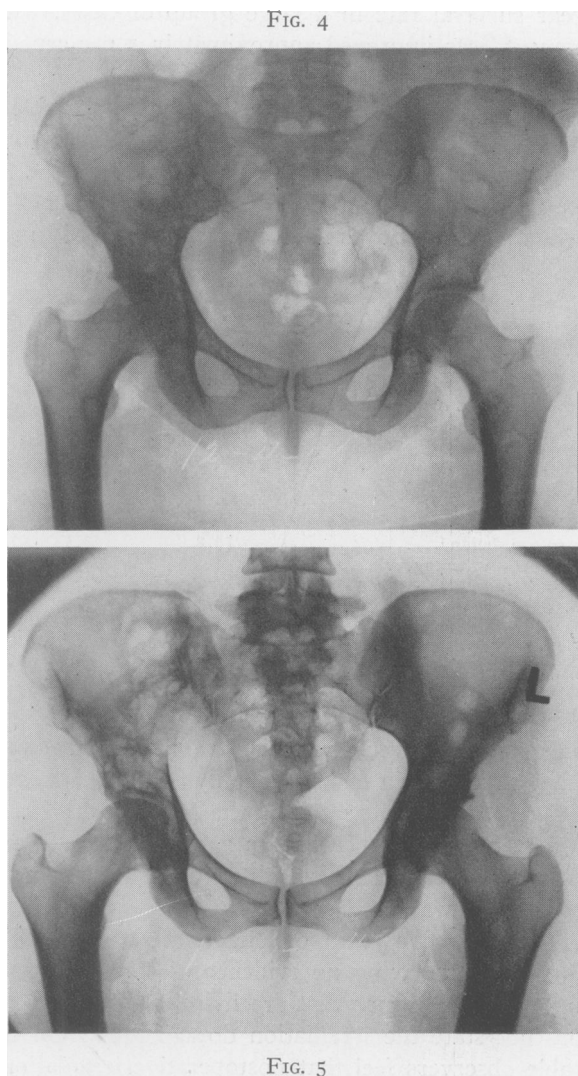


FIG. 4.—Roentgenogram taken October 6, 1944, showing multiple osteolytic metastases.

FIG. 5.—Same case as shown in Figure 4, two months later, showing healing of metastatic lesions.

after radical mastectomy has definitely increased the survival rate in his cases of cancer of the breast. His figures very closely parallel our experience in this regard; in his series, of 277 patients treated by radical mastectomy followed

by irradiation, the five-year survival rate was 76.8 per cent when lymph nodes were not involved and 41.8 per cent when axillary involvement was present (65.7 per cent of his group had axillary involvement). Adair has employed 1,800 to 2,250 r per portal. Harrington,<sup>7</sup> of the Mayo Clinic, also reported that the five-year survival rate in a large group of cases, with and without axillary involvement, was improved approximately 5 per cent by the addition of irradiation (Table III).

On the other hand, Haagensen, in reporting the results obtained in a series from the Presbyterian Hospital (640 with radical mastectomy), said that irradiation has not been of demonstrable value in his series. He reported a five-year clinical cure of 36.8 per cent after radical mastectomy alone, and 35.1 per cent when irradiation was used after operation. The roentgen dosage

TABLE III  
RADICAL OPERATION WITH POSTOPERATIVE IRRADIATION  
FIVE-YEAR SURVIVAL RATE

	Memorial Hospital Per Cent	Mayo Clinic Per Cent	Lahey Clinic Per Cent
Axilla negative:			
With roentgen therapy.....	76.8	75.4	75.0
Without roentgen therapy.....		70.2	
Axilla metastases:			
With roentgen therapy.....	41.8	29.4	37.0
Without roentgen therapy.....		24.3	

employed in this group, however, was considerably smaller than that employed by Adair, or the dosage used in our series, only 800 r per portal in three areas being used. McGraw,<sup>10</sup> in 412 cases from the Henry Ford Hospital, reported a five-year survival rate of 29.6 per cent in 251 patients with axillary involvement, and 64 per cent in 161 patients with negative axillary nodes. He stated that irradiation therapy was used in those patients with axillary metastases. Of 177 patients surviving five years, or longer, 116 were given deep radiation therapy, with 55 per cent having no evidence of recurrent tumor; of 61 not given radiation treatment, 59 per cent are living, and well, without recurrent tumor. He does not state the irradiation dosage used. On the other hand, some very capable observers feel that postoperative irradiation therapy is of doubtful value. Cantril and Buschke<sup>3</sup> believe that radiation treatment can slow up growth locally but will have no effect upon the ultimate progress of the disease. They believe that the greatest palliative accomplishment of roentgen therapy is retardation of bone metastases and alleviation of pain. This opinion seems at variance with our results since there appears to be quite definite improvement in our five-year survival rate as well as a decrease in the frequency of local recurrences.

CARCINOMA OF BREAST

LOCATION OF METASTASES

In studying our group of 238 cases which have been followed by us for over five years, it seems pertinent to analyze the cause of our failures and to study the location of the metastatic nodules, whether the recurrence took place as a result of lymphatic or hematogenous spread. It is quite apparent from our studies that the most common type of spread is through the lymphatics and, yet, once the original lymphatic area is treated by radiation, there is only small likelihood of recurrence or persistence in the area treated.

In this series a total of 114 recurrences was noted in different individuals. Their location is listed in Table IV.

TABLE IV  
LOCATION OF RECURRENT MALIGNANCY—238 PATIENTS

	Lahey Clinic		Presbyterian Hospital Per Cent
	Cases	Per Cent	
Spread to opposite breast.....	8	3.3	9.1
Spread to bone.....	23	9.7	17.8
Generalized spread to bone and lymph nodes...	25	10.5	
Recurrence in scar.....	14	5.9	
Recurrence in supraclavicular region.....	4	1.7	13.9
Recurrence in axilla.....	1	0.4	6.6
Recurrence in lung.....	24	10.0	21.6
Recurrence in abdomen and liver.....	7	2.9	9.8
Recurrence in cranium.....	8	3.3	

This shows that a total of 8 per cent of the cases had recurrence of their lesions in the scar area, supraclavicular, and axillary regions, and in this group of cases, 62 per cent showed signs of secondary malignancy to the axilla at the time of operation. This is, indeed, a small group as compared with the recurrences in this area usually noted. It seems necessary, therefore, to treat the scar, supraclavicular and axillary regions following operation especially in those cases in which there is evidence of secondary nodular disease at the time of operation.

Haagensen and Stout<sup>6</sup> report local recurrence in 22.8 per cent within five years in the operative field on the chest wall and in the homolateral axilla, whereas, with the combined treatment of surgery and radiation we found recurrent tumor in only 8 per cent, which figure includes the supraclavicular region as well. This lack of local skin recurrence appears most significant in our cases especially, in view of the fact that we have been more conservative in the removal of skin over the breast and chest area, in order, as stated before, that primary closure could be done and radiation treatment started immediately after operation. Certainly, it is evident by this conservatism that the frequency of local recurrent growths has not increased, as might be expected from other reports in which wider skin removal was thought absolutely necessary. Lewis and Rienhoff,<sup>9</sup> in a report from the Johns Hopkins

series, reported local recurrences after Thiersch graft to be 30.1 per cent; after closed plastic to be 39.7 per cent. White<sup>15</sup> is of the opinion that a chest without skin graft is preferable to one with a skin graft and that there is insufficient proof that the Halsted method of wide skin removal with Thiersch graft lowers the incidence of local recurrence as compared to the plastic skin closure of Handley.

Hoopes and McGraw<sup>8</sup> reported local recurrence to axillary and breast areas in 20 patients out of a total of 91 (22 per cent) upon whom skin graft was done, whereas, in 139 patients with plastic closure there were 22 with recurrence in these areas, an incidence of 16 per cent.

TABLE V  
RESULTS OF RADICAL MASTECTOMY AND RADIATION TREATMENT  
238 PATIENTS

	Cases	5 yr. Survival without Recurrence		Dead within 5 Years		Died within 2 Years after Operation	
		Number	Per Cent	Number	Per Cent	Number	Per Cent
Negative axilla.....	94	71	75.0	23	25.0	10	43.5
Axilla nodes positive.....	144	53	37.0	91	63.0	47	52.0
Total.....	238	124	52.1				

It is also significant to note that a large number of deaths took place within the first two years following treatment. Fifty-seven patients died in the first two years (Table V). This figure represents exactly 50 per cent of the total number dead (114) at the end of the five-year period: ten patients without axillary involvement at the time of operation and 47 patients with positive nodes were dead in the first two years. We could draw no conclusion concerning fertility relative to the combined therapy, yet it is significant, as to the occurrence of the disease at least, that cancer occurred in nulliparous women in 40 per cent of this group. Nathanson<sup>11</sup> stated that it is an accepted fact that nulliparous women have a relatively higher incidence of cancer of the breast than those who have borne children, and this high incidence of cancer in nulliparous women in this group is indicative of this fact.

The study in relation to age-groups, likewise, offered no significant data; there were only 28 patients of this group of 238 with the complete treatment who were below the age of 40, and we are unable to say whether the usually reported high early mortality after treatment is at all altered in young women by postoperative radiation or not (Table VI).

The largest group, 189 patients (80 per cent) ranged in age from 41 to 70 years. We did not hesitate to employ radical mastectomy in the older-age group, as indicated by the fact that there were 21 radical mastectomies in patients over 70, and yet in this entire group of 238 patients who had the complete treatment there was but one immediate death following treatment, an operative mortality of 0.42 per cent.

CARCINOMA OF BREAST

It is difficult in a series as small as the group reported in this paper to draw final and definite conclusions regarding this most important phase of recurrent malignant disease in breast cancer, but it does appear that immediate postoperative radiation therapy, given in adequate dosage, might well influence the occurrence of local recurrent growths, and reduce such local recurrences as well as improve the five-year survival rate. In any case, it is our opinion that there has been improvement in results of treatment of breast cancer by this method and that further information will need to be collected on a larger group of patients treated in a similar manner. We are continuing this method of treatment in the Lahey Clinic and at present have under observation a somewhat larger group of patients who have also had this type of treatment, beginning after 1942. The five-year survival rate is purely a

TABLE VI  
AGE INCIDENCE—238 CASES  
TREATMENT—RADICAL SURGERY PLUS POSTOPERATIVE IRRADIATION

Age, Years	Cases	
20-30.....	6	} 28 (11.7%)
31-40.....	22	
41-50.....	79	} 189 (80%)
51-60.....	66	
61-70.....	44	
71-80.....	21	

method of measurement of results of treatment and is not the ultimate or final result in any of these cases. What the results of a long range study may be can be estimated only after many years and perhaps after the majority of patients so treated may have died either from recurrent malignant disease or from other causes.

SUMMARY

Radical surgical removal of breast carcinoma followed by intensive irradiation treatment appears to improve statistical results in cancer of the breast and offers the best possibility for prolongation of life. In a series of 238 patients who received this type of treatment, 52 per cent were alive after five years, or longer, without evidence of recurrent tumor.

The incidence of local recurrent tumors is materially reduced, there being only 8 per cent of such recurrences noted in this series.

Radiation therapy, given in large amounts by the divided dose method, has produced no serious complications.

We believe that failure in treatment in many cases results from spread of disease to distant areas prior to institution of treatment.

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