POSTOPERATIVE ROENTGEN THERAPY FOR CANCER OF THE BREAST. A REPORT OF 103 CONSECUTIVE CASES

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Carcinoma of the breast has always been looked upon as primarily a surgical problem. Within recent years the analysis of the results which are obtained by surgical procedures, together with our thorough understanding of the clinical course of the disease, would seem to give rise to the question as to whether or not operation alone is the final and satisfactory treatment of this disease.

Surgical extirpation of any malignant process in any location, by any technic, will completely eradicate every neoplasm if it is so localized that it has not extended beyond the area which can be excised. Unfortunately such a favorable condition is seldom encountered and it is very uncommon to discover a case of cancer of the breast in which foci have not developed throughout the gland and extended into neighboring tissues, or in which the cancer has not metastasized to the adjacent lymph nodes or more distant areas. This fact is well demonstrated by examination of massive cross sections of the entire breast in which numerous nests of neoplastic cells are found scattered throughout and involving most of the structures in a majority of specimens. Also it is well known from the reports of competent pathologists that the axillary nodes are involved in 95 per cent of specimens which are examined. It is very questionable that malignant disease can be completely eliminated when the axilla is involved, even by the most skillfully performed operation, and it is probable that neoplastic cells remain after operation in a majority of instances. The axillary lymphatics drain directly into the supraclavicular nodes which are seldom removed because of the lack of clinical evidence of involvement. However, these supraclavicular nodes must be involved more frequently than is realized. The peristernal lymph nodes which are likewise inaccessible often are diseased.

The above facts indicate that in the majority of cases, cancer of the breast is a much more extensive process than is usually appreciated and therefore the most radical operation by any technic can seldom eliminate all of the neoplastic cells which may be present beyond the comparatively limited fields which are accessible to the surgeon. It is equally certain that operation is of little value

to the patient as far as cure is concerned when neoplastic cells remain. That it is usually difficult to remove all neoplastic cells is exemplified by the well known fact that metastatic and local recurrences are more likely to develop in obese individuals following operation more rapidly than in the case of the less robust individual. There are some who think that this is due to some inherent lack of resistance in obese persons but it is much more likely that the surgeon does not extract sufficient pounds of flesh from a large enough area because of the subsequent difficulty in covering the widely denuded area, and therefore neoplastic cells remain in the fat interspaces and in the skin where they develop very quickly and without restraint.

In most of the statistical reports of the results of operation it is assumed that if a patient who has been operated upon for cancer of the breast has survived for from three to five years without evidence of the disease the operation has effected some degree of benefit. However, if we study the clinical course of this disease in a large group of cases, we will be impressed by the fact that some individuals harbor neoplastic cells or even well-developed malignant tissue for several years without detriment to their well-being, and also that with or without operation, neoplastic cells may remain dormant for a long time before manifesting activity. For example, I treated a woman for vertebral metastases of a few months duration, having developed from a fairly small proven cancer of the breast which undoubtedly, at least from clinical evidences, began 27 years previously. It is not unusual to observe locally recurrent cancer long after operation, the longest period in my experience being 22 years.

We must also remember that cancer of the breast per se does not destroy life, but becomes fatal only when it has destroyed the function of vital organs. The process is a comparatively localized one lasting for varying periods of time during which none of the affected structures are essential to life and may be more or less destroyed by cancer without affecting the health of the host. Therefore, we may not assume that the cancer which may involve these structures will immediately cause the death of the patient, nor that we have materially benefited or cured her by removing some of them by operation.

A review of a multitude of reports of statistical studies of the results which are obtained by operation for cancer of the breast shows that an average of approximately 40 per cent of patients are free from manifestations of the disease for a period of three years, and about 30 per cent for five years. Also a number of reports

show that the average natural duration of life of patients with cancer of the breast is approximately three years. If an average of only 40 per cent of cases that are operable survive for three years after operation which is the natural duration of life, we may very well question just how much is usually accomplished by radical operation for cancer of the breast, and there must be some doubt that surgery alone is an entirely satisfactory solution of the problem of the treatment.

The question, when is a cancer of the breast operable from the standpoint of curability, is very pertinent. Since 1897, when the radical operation was first advocated by Halstead, about 10 per cent more patients survive for five years after operation than was formerly the case. However, with this radical operation the surgeon has reached the ultimate limit of the amount of tissue which he is justified in removing by any technic and beyond which cancer frequently exists. Therefore, it must be apparent that some means must be devised whereby we may replace this radical surgery by a more or equally effective method, or that some beneficial procedure must be instituted to carry on as an adjunct because of the known limitations of operation.

It is about 30 years since roentgen rays and radium were first employed as therapeutic agents. It was soon found that some degree of benefit was derived when they were applied in the treatment of neoplastic diseases, even with the comparatively inefficient and limited technic which was then employed. It is only during the past 10 years that we have known enough about the biological and physical properties of these agents to take them out of empirical therapy and establish them upon a scientific basis. The radiation therapy of even fifteen years ago may be compared to that dark era in surgery of three thousand years before Christ when, as the papyrus of Ebers tells us, it was recognized that axillary involvement is associated with cancer of the breast, and attempts were made to treat the disease by cautery, a method not unlike some of those which are in vogue in this present age of scientific enlightenment.

It is interesting to note that there are some individuals who still deny the possibility that radiation therapy may be of value in the treatment of cancer of the breast but they will admit having observed benefit in some hopelessly advanced cases or after recurrences or metastases have developed. It would seem to be a logical deduction that if radiation is of benefit in some of these cases which are hopeless from a surgical standpoint, others with earlier or less extensive involvment might also be benefited by radia-

tion. Usually this skepticism is due to ignorance of the clinical course of the disease, badly correlated statistical studies, lack of understanding of the methods of applying radiation and of its effects, or to the observation of only inefficiently applied treatment, and not infrequently to the fact that the cases which are referred for treatment are the least favorable. There are also some who are so poorly informed that they believe that radiation may stimulate a malignant process, in spite of numerous clinical and experimental reports and evidences to the contrary. The very fact that recurrences do appear after thorough postoperative roentgen therapy for cancer of the breast at once indicates that resistant neoplastic cells have remained after operation for which the surgeon must assume the entire responsibility, because radiation has not the magic power to spontaneously germinate seeds of cancer in a field where none have previously existed.

Radiologists and others can not reasonably expect favorable results in every instance. Unfortunately, there are many patients who might be benefited by radiation who are still denied even this possibility. However, I know of no basis on which we can determine which cases will be benefited without trial in each case.

Radiation therapy, as it is understood today, consists of the application of radium and roentgen rays in accurately measured and predetermined dosage in the proper location according to the individual indications. There can be no routine inelastic procedure. It is not only desirable, but essential, that each patient in whom a malignant disease is present should have the benefit of consultation and cooperation between the surgeon and the radiologist, each of whom is familiar with the technical details and the results of the other's method of treatment, as well as the limitations of his own. Thus, it must be decided whether the patient should be operated upon, whether preoperative or postoperative roentgen therapy, or both, should be utilized, or if radium should be applied, and when and how, or whether radium should be combined with roentgen ray.

This discussion is limited to postoperative roentgen therapy and therefore other therapeutic procedures are not considered. A report is presented of a series of 103 consecutive cases of patients who were operated upon and received roentgen therapy immediately postoperatively, during the years from 1922 to 1925, inclusive. I have not included those cases which were referred during this period for roentgen treatment of recurrences or metastases or those which were considered to be too far advanced to be operated upon, nor those treated by other procedures. Each case has had microscopic confirmation of the diagnosis although in a few instances the type of

TABLE I

Summary of 103 Consecutive Cases of Breast Cancer Treated by Postoperative Roentgen Therapy

Group		No. cases	Skin invol.	Tumor fixed	Clin. axil. nodes	Clin. supracl. nodes	Recur-rences	Metas-tases	No trace	Died: Not ca.	Died: Of ca.	Alive 5 Years: With ca.	Alive 5 Years: No ca.	Alive 5 Years: With or Without ca.
I	No.	3 Bilat. 2	3	0	2	0	0	2 2 Bilat?	0	1	0	2 Bilat. 0/2	6	7
	%		33.3	0	22.2	0	0	0	0	1.1	0	2.2	66.6	77.8
II	No.	64 Bilat. 2	35	21	40	0	13	17	6	8	17	2 Bilat. 7/2	35	39
	%		54.8	32.8	62.5	0	20.3	26.6	19.4	12.5	26.6	10.9	56.3	61.0
III	No.	32	30	23	31	10	14	27	2	1	27	1	2	6
	%		93.7	72.0	96.9	31.3	43.7	84.4	6.3	3.1	84.4	3.1	6.2	18.7
All cases	No.	103 Bilat. 4	69	44	73	10	27	44	8	10	44	8/5d	44	52
	%		67.0	42.7	71.8	9.7	26.2	42.7	7.8	9.7	42.7	7.8	42.7	50.0

cancer could not be classified accurately. The final outcome is not known in eight cases but these are listed as dead at the time of last observation. (See Chart I.)

It will be noted that in four cases in the series bilateral carcinomata of the breast were present. In these cases it can not be determined whether or not the disease in the second breast was a metastatic or new cancer. Since these patients were free from the disease for over five years they may be given credit for the period during which they were free; however, in classifying them I have included the individual tumors in all but the mortality statistics.

Ten patients in this series died of diseases which were proven not to be cancer. If they lived for five or more years, and were free from evidence of malignant disease, they are given the benefit of their period of life without cancer. I believe this to be a fair method, especially since the untraced patients are included among the dead.

The cases were grouped according to the extent of involvement. In Group I the patients were free from involvement of the axilla as reported by the pathologist. In Group II there was axillary involvement, minimum skin involvement and the tumors were movable. In Group III the cases were more advanced but still were considered by the surgeon to be operable. It is shown that of the patients in Group I 77.8 per cent are now free from cancer. Of those in Group II 61 per cent lived for five or more years and 56.3 are free from the disease. However, of those in Group III 84.4 per cent died of cancer and only 18.7 per cent lived for five years.

When all of the cases are included as one group it is found that 50.5 per cent lived for five or more years and 42.7 per cent are free from disease for five or more years.

The numerous reports in the literature regarding the results of operation alone for cancer of the breast indicate that not more than an average of thirty per cent of cases so treated are free from the disease after five years. If we compare the results in the series of cases which I am reporting here in which almost 43 per cent are free from the disease after roentgen therapy as an adjunct to operation we must appreciate that fact that there is a decided advantage to be gained by the procedure.