

EIGHT-YEAR RESULTS OF A RANDOMIZED CLINICAL TRIAL COMPARING TOTAL MASTECTOMY AND LUMPECTOMY WITH OR WITHOUT IRRADIATION IN THE TREATMENT OF BREAST CANCER

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Abstract In 1985 we presented results of a randomized trial involving 1843 women followed for five years that indicated that segmental breast resection (lumpectomy) followed by breast irradiation is appropriate therapy for patients with Stage I or II breast cancer (tumor size, ≤ 4 cm), provided that the margins of the resected specimens are free of tumor. Women with positive axillary nodes received adjuvant chemotherapy. Lumpectomy followed by irradiation resulted in a five-year survival rate of 85 percent, as compared with 76 percent for total mastectomy, a rate of survival free of distant disease of 76 percent, as compared with 72 percent, and a disease-free survival rate of 72 percent, as compared with 66 percent.

In the current study, we have extended our observations through eight years of follow-up. Ninety percent of the women treated with breast irradiation after lumpectomy remained free of ipsilateral breast tumor, as compared with 61 percent of those not treated with irradiation after lumpectomy ($P < 0.001$). Among patients with positive axillary nodes, only 6 percent of those treated with radiation

and adjuvant chemotherapy had a recurrence of tumor in the ipsilateral breast.

Lumpectomy with or without irradiation of the breast resulted in rates of disease-free survival (58 ± 2.6 percent), distant-disease-free survival (65 ± 2.6 percent), and overall survival (71 ± 2.6 percent) that were not significantly different from those observed after total mastectomy (54 ± 2.4 percent, 62 ± 2.3 percent, and 71 ± 2.4 percent, respectively). There was no significant difference in the rates of distant-disease-free survival ($P = 0.2$) or survival ($P = 0.3$) among the women who underwent lumpectomy (with or without irradiation), despite the greater incidence of recurrence of tumor in the ipsilateral breast in those who received no radiation.

We conclude that our observations through eight years are consistent with the findings at five years and that these new findings continue to support the use of lumpectomy in patients with Stage I or II breast cancer. We also conclude that irradiation reduces the probability of local recurrence of tumor in patients treated with lumpectomy. (N Engl J Med 1989; 320:822-8.)

RESULTS of a clinical trial (Protocol B-06) conducted by the National Surgical Adjuvant Breast and Bowel Project to evaluate segmental mastectomy (lumpectomy) in the treatment of Stages I and II breast cancers ≤ 4 cm in size were published in 1985.¹ Life-table estimates through five years after surgery indicated that more than 90 percent of the women who underwent segmental mastectomy with axillary-node dissection and breast irradiation remained free of cancer in the ipsilateral breast and that the rates of disease-free survival, survival free of disease at distant sites (distant-disease-free survival), and overall survival were not significantly different from those among patients who underwent total mastectomy with axillary-node dissection. Consequently, it was concluded that the combination of segmental mastectomy and breast irradiation is appropriate therapy for breast cancer, provided that the margins of the resected specimens are free of tumor on histologic examination. Since that initial report, we have replaced the term "segmental mastectomy" with "lumpectomy." This report brings the findings of the National Surgical Adjuvant Breast and Bowel Project trial up to date through eight postoperative years. The results contin-

ue to support the efficacy of breast conservation in the management of primary breast cancer.

METHODS

A detailed description of patient-eligibility requirements, study design, surgical and radiation techniques, statistical analyses, and the distribution of patients has been presented in our initial¹ and subsequent reports.² Patients with either negative or positive axillary nodes were accepted into the study if they had tumors ≤ 4 cm in the largest dimension, with no fixation to the underlying muscle or chest wall and no clinical evidence of skin involvement or distant metastases (Stages I and II; tumor, node, metastasis classifications T₁, T₂, N₀, N₁, M₀). Such patients were randomly assigned to one of three treatments: total mastectomy and axillary-node dissection, lumpectomy and axillary-node dissection followed by breast irradiation, or lumpectomy and axillary-node dissection without irradiation.

All resected specimens from patients who underwent lumpectomy were examined histologically to ensure that the margins were free of tumor. Patients with involvement of the margins underwent total mastectomy and continued in the study, remaining in the group to which they were originally randomly assigned. Those in the two lumpectomy groups who subsequently had a recurrence of tumor in the ipsilateral breast also underwent total mastectomy and remained in the group to which they had originally been assigned. The occurrence of tumor in the same breast after lumpectomy was not designated as an end-point event in determining disease-free survival, since patients who initially underwent total mastectomy were not at risk for an ipsilateral breast tumor. All patients assigned to the three groups were followed with respect to disease-free survival, distant-disease-free survival, and overall survival. Recurrences of tumor in the chest wall and the operative scar, but not in the ipsilateral breast, were classified as local treatment failures. Tumors in the internal mammary, supraclavicular, or ipsilateral axillary nodes were classified as regional treatment failures. Tumors in all other locations were considered distant treatment failures. The events considered in our analysis of disease-free survival were first

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Supported by a Public Health Service grant (NCI-U10-CA-12027) from the National Cancer Institute and by a grant (ACS-RC-13) from the American Cancer Society.