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The feasibility of a second lumpectomy and breast brachytherapy for localized cancer in a breast previously treated with lumpectomy and radiation therapy for breast cancer

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ABSTRACT

PURPOSE: With accumulating evidence supporting partial-breast irradiation, we conducted a Phase I/II study to evaluate the role of a second conservative surgery and brachytherapy for patients presenting with a local recurrence/new primary in a breast who has previously undergone a lumpectomy and external radiation therapy for breast cancer.

METHODS AND MATERIALS: Fifteen patients with a localized lesion in the breast have undergone a second lumpectomy and received low-dose-rate brachytherapy on protocol. The first 6 patients received a dose of 30 Gy. With no unacceptable acute toxicity observed, the brachytherapy dose was increased to 45 Gy. Three patients received adjuvant chemotherapy and 8 patients are on antiestrogen therapy.

RESULTS: The median time interval between the primary breast cancer diagnosis and the second cancer event in the ipsilateral breast is 94 months (range, 28–211). With a median followup of 36 months after brachytherapy, the 3-year Kaplan–Meier overall survival, local disease-free survival and mastectomy-free survival are 100% and 89%, respectively. There was no Grade 3/4 fibrosis or necrosis observed. All patients had baseline asymmetry due to the breast volume deficit from the second lumpectomy. With breast asymmetry as a given, the cosmetic result observed in all patients has been good to excellent.

CONCLUSIONS: Early results suggest low-complication rates, high rate of local control and freedom from mastectomy. Additional studies are needed to establish whether a second lumpectomy and breast brachytherapy are an acceptable alternative to mastectomy for patients presenting with a localized cancer in a previously irradiated breast.

Keywords: Recurrent breast cancer; Second lumpectomy; Partial-breast brachytherapy; Accelerated irradiation; Breast-conserving therapy

Introduction

Most women presenting with a local recurrence after breast cancer treated with lumpectomy and external radiation therapy (ERT) are advised mastectomy. Among patients with a local recurrence who do not consent for mastectomy, the relapse rate with surgical excision alone is in the range of 19–50% (1–5). Since the late 1990s, there is accumulating evidence that partial-breast brachytherapy (PBB) is safe and effective after lumpectomy for selected early-stage breast cancer (6–11). There is, however, very little clinical experience regarding the feasibility of administering PBB in previously irradiated breast.

In this article, we report the initial results of a second breast conservative treatment in patients who develop a localized relapse or a new primary cancer in the breast previously treated for breast cancer with lumpectomy and ERT. The objectives of the study were to assess the technical feasibility, cosmetic results, complication rates, local control rate, and freedom from mastectomy when treating a localized cancer in the breast with a second lumpectomy and PBB.

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Methods and materials

We conducted an institutional review board approved, Phase I/II study to evaluate the role of a second conservative surgery and PBB among patients presenting with a local recurrence/new primary in a breast who had previously received a therapeutic dose of ERT for breast cancer. Patient eligibility required a localized lesion in the breast and included all histologic subtypes. After multidisciplinary evaluation, patients must have signed an informed consent refusing the recommended mastectomy. The protocol design included a dose-escalation regimen: the first 6 patients received 30 Gy. After a minimum followup period of 12 months, which confirmed that there was no unacceptable acute toxicity in the treated breast, the total brachytherapy dose was increased to 45 Gy. Systemic therapy, when recommended started after a minimum of 2 weeks after removal of brachytherapy catheters.

In consideration of the prior history of radiation therapy (RT), and the lack of established safety of retreatment, the protocol only permitted ^{192}Ir multicatheter interstitial low-dose-rate (LDR) brachytherapy. This technique was selected for the protocol because it has the longest clinical track record. Other breast brachytherapy techniques, that is, high-dose-rate (HDR) and Mammosite brachytherapy were introduced during the course of this study; however, the brachytherapy technique in the protocol was not changed so as to avoid confounding variables in assessing the safety of this treatment approach.

All patients underwent a lumpectomy ± lymphadenectomy. The surgical margins were microscopically assessed to be negative before performing the brachytherapy procedure. All patients were noted to have a breast volume deficit as a result of the second lumpectomy performed before brachytherapy. This factor influenced the number of catheters placed at the lumpectomy site. For catheter placement, standard free-hand insertion technique with image guidance was used. In cases where catheters were placed during the lumpectomy procedure, the catheter placement was guided by direct vision. Orthogonal (Fig. 1a), ultrasound (Fig. 1b), and/or CT scans (Fig. 1c) were used to further define the adequacy of catheter placement in relation to the target volume (TV).

The TV was the lumpectomy cavity identified by clips plus 1 to 2 cm margin. Orthogonal X-rays were used for dosimetry. The prescription isodose was the dose encompassing the TV. In addition, point-dose calculations at the clips within

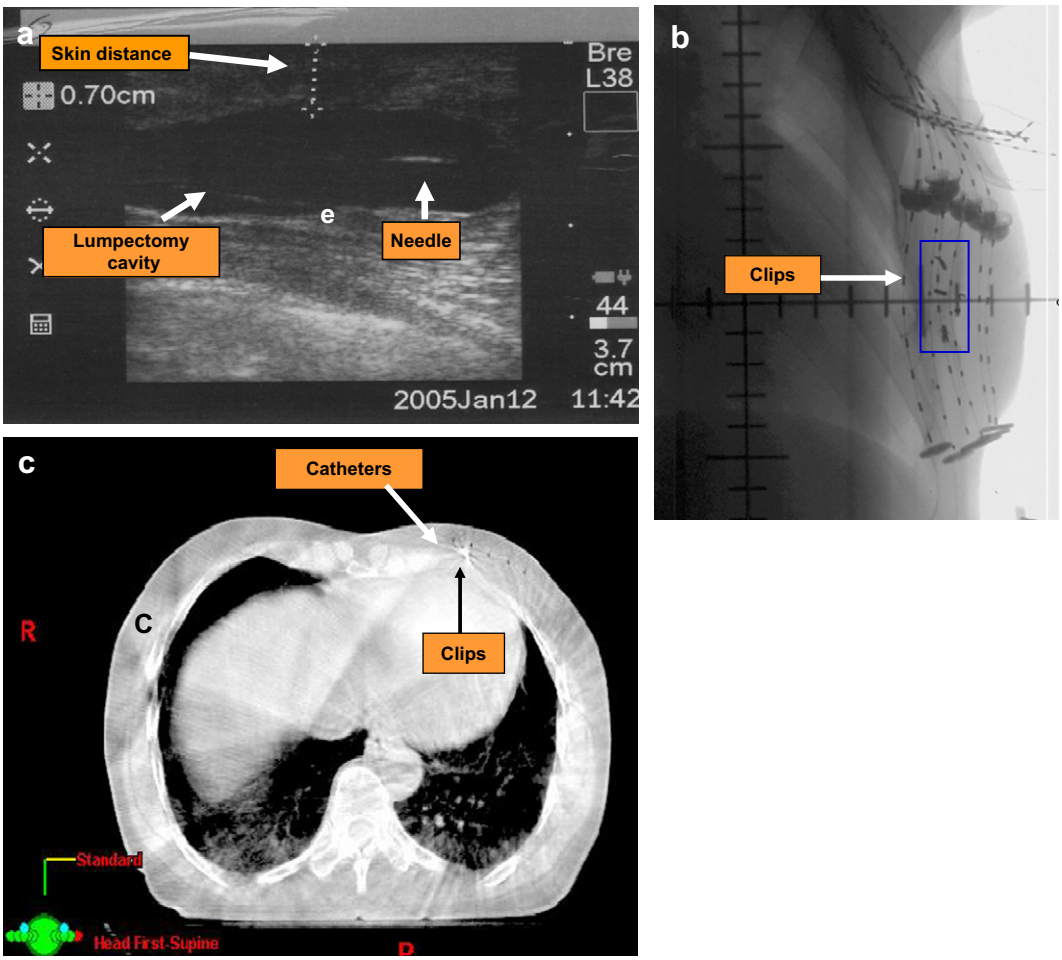

Fig. 1. Evaluation of appropriateness of catheter placement by (a) intraoperative ultrasound; (b) orthogonal X-rays; and (c) computed axial tomography scan.