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Preoperative chemotherapy for T2 breast cancer is associated with improved surgical outcome

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Abstract

Background: The aim of this study is to compare the clinical outcome in T2 breast cancer patients who underwent preoperative chemotherapy (PC) and who did not. The study also tried to define a subgroup of patients, who are more beneficial after PC in terms of lower re-excision rates, better cosmetic results and local recurrence free survival.
Materials and methods: 251 consecutive patients treated for nonmetastatic T2 invasive breast cancer were analyzed retrospectively. Of those; 141 underwent primary surgery (PS) followed by chemotherapy, whereas 110 were treated with combination of PC and surgery.
Results: The patients who were treated with PC had a significantly higher incidence of negative margins and lower rate of re-excision (5% vs. 16%, $p = 0.02$). Of all patients attempted breast conserving surgery (BCS), patients in the PC group were more likely to undergo BCS as their definitive operation compared to patients with PS group (BCS rates; PC group: 99% vs. PS group: 92%, $p = 0.05$). Multifocal disease (OR: 7, 95% Cl, 2.7–18.4, $p = 0.0001$) and PC (OR = 0.2; 95% CI, 0.06–0.72, $p = 0.01$) were factors associated with margin positivity in patients treated with BCS. There was no statistically significant difference in 5 year local-recurrence free survival rates between 2 groups.
Conclusions: Our study shows that PC significantly decreases the re-excision in patients undergoing BCS with primary T2 breast tumors. This data suggests that any patient with a tumor greater than 2 cm might be considered for PC to increase BCS success with final negative margins.
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Keywords: Preoperative chemotherapy; Breast cancer; T2 breast tumor

Introduction

According to the prospective, randomized trials conducted by the National Surgical Adjuvant Breast and Bowel Project (NSABP B18 and B27), patients undergoing preoperative chemotherapy (PC) do not exhibit significant benefit with respect to survival outcome when compared to patients undergoing adjuvant chemotherapy (AC).[1–4] However, PC treatment regimen confers multiple other advantages to the patients. Firstly, PC provides important independent prognostic information by monitoring in vivo tumor response. Previous studies demonstrated improved overall survival was associated with pathological complete response as determined by disappearance of invasive cancer in the excised breast and lymph nodes.[2,3] Furthermore, in nonresponders to initial PC regimen, a new chemotherapy regimen could be considered that could afford better results.[4] However, it is not possible to measure the tumor response in patients undergoing AC because the primary tumor and lymph nodes have been removed.

Breast conserving surgery is the preferred modality for early stage breast cancer, even though there is no significant difference in survival outcome compared to mastectomy.[5,6]

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Although achievement of negative surgical margins is the most important factor to minimize the local recurrence in breast-conserving surgery,[7] cosmetic outcome should also be considered. However, excision of a greater tissue volume to obtain negative margins might compromise cosmetic outcome.[8,9] Improved local control after breast conservation was associated with increased use of systemic therapies including chemotherapy and hormonal therapies, and age >50, but not margin width.[10,11] Therefore, breast-conserving operations should aim for excision of the smallest volume of tissue while attaining negative margins.

These findings have motivated increased study and utilization of preoperative chemotherapy. For patients with smaller breast cancers, however, uncertainty remains regarding indications for, and benefits of, preoperative systemic therapy. Because these patients were initially before PC thought to be candidates for breast-conserving therapy, the advantage associated with preoperative therapy is unclear. Furthermore, the tumor might disappear followed by PC, and there might be difficulties to localize the lesion if the tumor was not marked with a clip before starting with chemotherapy. By reducing the size of the primary tumor, preoperative chemotherapy may contribute to a decrease in the rate of re-excision after partial mastectomy; however, little data is available in the literature to support this hypothesis. It is also not clear if there is an advantage of PC in these patients with T2 breast cancer according to their tumor features. The aim of this study is to determine the effect of preoperative chemotherapy on the rate of re-excision, local recurrence and cosmetic outcomes after BCS in patients with primary T2 tumors.

Material and methods

A retrospective analysis of the medical records identified 262 consecutive patients who underwent mastectomy or breast conserving surgery for nonmetastatic T2 invasive breast cancer between December 2008 and September 2011. Of those, 11 patients were excluded from the study. The exclusion criteria were incomplete data ($n = 10$) and male gender ($n = 1$) (Fig. 1). Of the remaining 251 patients, 110 received preoperative chemotherapy (PC) followed by surgery, whereas breast conserving surgery was initially attempted according to the clinical and biological features of the tumor, axillary status, and patient or physician preferences. Patients were histopathologically diagnosed by core biopsy and were eligible if the tumor was clinically measured between 2 and 5 cm. Exclusion criteria were male gender, diagnosis with excisional biopsy or no definitive surgery. Study variables included age, histology, clinical stage, pathologic tumor size and lymph node status, menopausal status, tumor grade, estrogen receptor (ER), progesterone receptor (PgR) and HER-2 status, lymphovascular invasion (LVI), necrosis, type of chemotherapy, pathological response in the breast and axillary lymph nodes, surgical details, microscopic evaluation of surgical margins, re-excision rates, and information regarding recurrence-free survival. This study was approved by the Institutional Review Board of the Institute of Oncology, University of Istanbul.

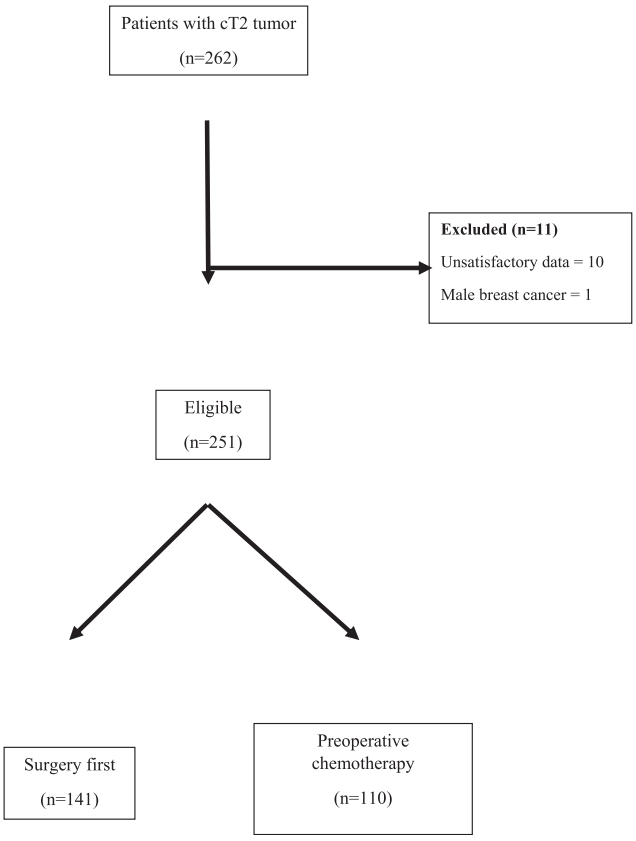

Figure 1. Diagram of the study.

Evaluation and treatment modalities

Our multidisciplinary team coordinated patient care and reviews clinical presentation, imaging studies, and histopathologic data before determining the appropriate course of treatment. Patient age, tumor features, clinical stage, and patient or physician preference were used to individualize treatment. Tumors were evaluated by appearance on clinical examination, mammography, ultrasound and magnetic resonance imaging (MRI). Ultrasonography was used to evaluate tumor size for all patients. Patients in primary chemotherapy group were evaluated with MRI both before and after chemotherapy. All radiological evaluation was performed by the same radiologist at our institute. Preoperative chemotherapy was considered for patients with invasive tumors according to the clinical and biological features of the tumor, axillary status, and patient or physician preferences. Patients who received preoperative chemotherapy underwent metallic marker placement at the center of the primary tumor, as we have previously described.[12]

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