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ScienceDirect

EJSO 42 (2016) 71–77

EJSO the Journal of Cancer Surgery

www.ejso.com

Oncological results of oncoplastic breast-conserving surgery: Long term follow-up of a large series at a single institution: A matched-cohort analysis

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Accepted 10 August 2015
Available online 8 September 2015

Abstract

Purpose: Oncoplastic surgery is a well-established discipline that combines conserving treatment for breast cancer with immediate plastic reconstruction. Although widely practiced, the oncologic outcomes of this combined approach are reported only in small series. The aim of the present paper is to assess the safety of oncoplastic surgery for invasive primary breast cancer.
Methods: We compared 454 consecutive patients who underwent an oncoplastic approach between 2000 and 2008 for primary invasive breast tumors (*study group*) with twice the number of patients who received conservation alone in the same interval time (*control group*). Disease free survival and overall survival were estimated using the Kaplan–Meier method. The log-rank test was used to assess differences between groups.
Results: The median follow-up was 7.2 years. The overall survival is similar within the two groups, being 91.4% and 91.3% at 10-yr in the study group and in the control group respectively. The disease free survival is slightly lower in the oncoplastic group (69 vs.73.1% at 10-yr). The difference is not statistically significant.
Discussion.: We have compared a large series of primary breast cancer patients that have undergone oncoplastic surgery (454) with a control group (908) and they were followed for a prolonged period of time. It provides the best available evidence to suggest that oncoplastic surgery is a safe and reliable treatment option for the managing of invasive breast cancer.

Keywords: Oncoplastic surgery; Local recurrence; Invasive breast cancer; Conservative treatment

Introduction

Oncoplastic surgery (ONC), which combines conservation treatment for breast cancer[1–5] and plastic surgery techniques[6–8] is well established. It allows wide excisions and prevents breast deformities by the immediate reconstruction of large resection defects.[9–12]

The cosmetic advantages of this approach have been largely described[13,14] and include technical tips to improve cosmetic outcomes after conservation.[15] Moreover, ONC

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http://dx.doi.org/10.1016/j.ejso.2015.08.160
0748-7983/

achieves more accurate tumor resection and free resection margins than standard quadrantectomy or lumpectomy[16–19] and it might be useful in extending the indications for breast conservation.[20] In addition, a "surgical screening" of the contralateral breast may allow the diagnosis of occult cancers.[21,22] Finally, this approach allows the unique combination of conserving quadrantectomy and implant augmentation to enable simultaneous delivery of intraoperative radiotherapy.[23,24]

Although a large number of recent publications underline the widespread of ONC,[25–37] no long-term oncologic follow-up and no clear comparison with a control group has been published. Oncologic outcomes of small series are reported.[38] We first tried to assess the oncological safety of this approach in 2007[39] with a retrospective no-controlled study consisting of 148 breast conserving surgeries and concomitant bilateral mammoplasties.

In order to address the question of oncological safety of these procedures, a randomized clinical trial would be the best way forward.[40] However, this would not be feasible to allow for blind randomization since patient's desires and option and informed consent is crucial in the decision making process. Therefore comparing a consecutive series of 454 patients who have undergone ONC with 908 patients, who have undergone conservation alone (control group) over a prolonged period of time at one institution, is the best method to our knowledge to reach a consensus on the safety of ONC for invasive primary breast cancer.

Patients and methods

Between 2000 and 2008, in the European Institute of Oncology (IEO) Breast Cancer Institutional Database we identified 454 consecutive patients who underwent an oncoplastic approach (ONC) (monolateral, bilateral) for primary invasive breast tumors. This database is weekly fed and based on web data collection systems used for internal multidisciplinary meetings. Glandular reconstructions, including the all range of local and locoregional flaps and therapeutic mammaplasties, have been performed by fully trained plastic surgeons at the time of quadrantectomies. All the patients received a postoperative irradiation, consisting of 50 Gy on the whole breast, plus an additional boost dose on the tumor bed of 10 Gy. Radiation was delivered using a 6 MV energy beams regimen with tangential fields. Conventional fractionation has been used (2 Gy/day). In the series are not included patients who have received intraoperative radiotherapy with electrons (ELIOT) to the tumor bed only or as a boost.

These patients were considered in the study cohort. We also excluded those patients presenting with secondary tumors or local relapses, bilateral tumors or those who have received neoadjuvant chemotherapy to have a homogeneous population. Therefore, the patients included in the present study represent only a part of women who had benefit from oncoplastic procedures in the same time interval.

For each patient in the study cohort, we selected controls. The variables used for matching were: age (within 5 years), year of surgery (within 2 years), and tumor size (pT).

Following surgery, all cases were discussed during the weekly multidisciplinary meeting attended by surgeons, medical oncologists, radiation oncologists and pathologists. The decision for adjuvant systemic treatment was made on the basis of biological features, staging, previously received treatments and comorbidities. The same protocol of medical treatment was delivered to the two groups.

The clinical follow-up of the two groups was similar. A radiological examination of the breasts was performed every year (including bilateral ultrasound and mammogram) or more frequently in case of clinical suspicion. Liver, bone and thorax were checked every year as well as biological markers.

The endpoints evaluated were disease-free survival (DFS), overall survival (OS), cumulative incidence of local recurrence (CI-L), regional recurrence (CI-R), and distant recurrence (CI-D), all measured from the date of surgery.

DFS was defined as the time from surgery to events such as relapse (including ipsilateral breast recurrence), appearance of a second primary cancer (including contralateral breast cancer), or death, whichever occurred first.

OS was defined as the time from surgery until the date of death (from any cause).

The CI-L, CI-R and CI-D were defined as the time from the date of surgery to a local recurrence, a regional recurrence, and a distant metastasis, respectively.

Statistical methods

The DFS and OS functions were estimated using the Kaplan–Meier method. The log-rank test was used to assess differences between groups.

The CI-L, CI-R, and CI-D curves functions were estimated according to methods described by Kalbfleisch and Prentice,[41] taking into account the competing causes of recurrence. The Gray's test was used to assess cumulative incidence differences between groups.[42]

The hazard ratio (HR) of a considered endpoint comparing ONC patients (study group) and the matched control group was estimated with a Cox proportional hazards model controlled for unmatching variables that resulted differentially distributed between cohorts.

All analyses were carried out with the SAS software (SAS Institute, Cary, NC) and the R software.[43] All reported p-values are two-sided.

Results

In the cohort group, tumors were located in the superior quadrants in 225 patients (49.6%), in the central quadrant in 33 patients (7.3%), in the inferior quadrants in 186 patients (40.9%) and other locations in 10 patients (2.2%). At the side of quadrantectomies, mobilization and advancement