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Standard wide local excision or bilateral reduction mammoplasty in large-breasted women with small tumours: Surgical and patient-reported outcomes

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Abstract

Introduction: Oncoplastic breast surgery is used to extend the role of breast-conserving surgery (BCS) to women with an unfavourable tumour to breast volume ratio. However, large-breasted women with a relatively small breast cancer may be offered bilateral reduction mammoplasty (BRM) despite being suitable for standard BCS as the more complex surgery may have advantages in terms of patient satisfaction and reduced adverse effects of radiotherapy.
Patient and methods: This retrospective study evaluated surgical and patient-reported outcome measures (PROMs) in large-breasted women with early (<3 cm) breast cancer, who have undergone unilateral standard BCS or BRM.
Results: This series included 157 women, 87 in the unilateral BCS group and 70 in the BRM group. Median age was 60.2 years (range: 33–83.9). Median follow-up was 36 months (range: 9.8–76). Tumour size, rates of axillary dissection, adjuvant chemotherapy and tumour bed irradiation boost were significantly greater in the BRM group ($p < 0.05$). The surgical complication rate was not significantly different (43.7% vs. 34.3%, $p = 0.253$). Re-excision rates were higher in the standard BCS group ($p < 0.05$). Time to chemotherapy was similar, but time to radiotherapy was longer after BRM surgery ($p = 0.025$). Despite worse prognostic factors, more complex surgery and more aggressive adjuvant treatment, patients report better satisfaction and physical functioning and fewer adverse effects of radiotherapy after BRM than standard unilateral BCS. This difference was not statistically different in this small study ($p > 0.05$).
Conclusion: Limitations of this study mean it can only be regarded as hypothesis-generating. Nonetheless, the trends merit a prospective study to investigate the optimal management of smaller breast cancers in larger-breasted women.

Keywords: Breast cancer; Breast conserving surgery; Wide local excision; Therapeutic mammoplasty; Breast reduction

Introduction

Oncoplastic breast-conserving surgery is used in the developed world for the treatment of early breast cancer, however practice is not currently standardised[1] as oncoplastic guidelines have tended to focus on breast reconstruction.[2] Not all patients with breast cancer are suitable for or require oncoplastic BCS. The usual indication for a reduction mammoplasty (level II oncoplastic approach) is an unfavourable tumour to breast volume ratio or a challenging tumour location, or both, such that a poor cosmetic result might be expected after standard BCS.[3,4] Previous studies have demonstrated that standard and oncoplastic BCS are equivalent in terms of loco-regional control[5,6] Large-breasted women with a relatively small breast cancer may be offered the choice between standard BCS (i.e. wide local excision/lumpectomy) and oncoplastic BCS. In these cases of favourable tumour to breast volume ratio a standard wide local excision is the simplest surgical solution but larger breast size and ptosis are associated with worse

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cosmetic outcome after BCS and radiotherapy, with an increased rate of asymmetry, fibrosis, retraction and late radiation changes.[7–10] Radiation dose distribution is heterogeneous in larger breasts, and therefore a reduction mammoplasty, while surgically more complex, may lead to improved dose distribution, a reduction in the adverse effects of radiotherapy, and better long term symmetry, cosmesis and patient satisfaction.[3,11–14] Modern Intensity Modulated Radiotherapy (IMRT) reduces the inhomogeneity, but does not eliminate the effect of "large-breastedness" on cosmetic outcome.[10] The risk of subsequent new primary breast cancer is reduced by the extent of breast tissue excised[15,16] thus there is a concomitant advantage in this respect. Furthermore, women may benefit from a bilateral reduction mammoplasty in terms of quality of life, independent of their cancer treatment.[17–19] Long-lasting benefits of reduction mammoplasty are said to include reduction in neck, shoulder, back and breast pain, together with improvement in body posture, sleep, choice of clothing, sexual relationships and ability to work.[20,21]

Conversely, bilateral reduction mammoplasty (BRM) could be considered overtreatment for a unilateral tumour; it is a longer procedure and carries the risk of complications in both breasts which may delay adjuvant treatment.[1,3,22]

At our institution bilateral reduction mammoplasty is offered to, and often sought by, suitable patients as an alternative to standard BCS. All patients considering bilateral reduction mammoplasty for smaller tumours are counselled about the specific complications and potential benefits of both this procedure and the simpler alternative, unilateral standard BCS, hence patient preference plays a large part in decision-making.

The aim of this study was to evaluate surgical outcomes and patient satisfaction in two cohorts of larger-breasted women who underwent either standard BCS or bilateral reduction mammoplasty for a unilateral breast cancer smaller than 3 cm on pre-operative imaging. We chose this cut-off assuming that a tumour of such size could be removed with clear margins from a large breast using standard BCS.

Patients and methods

Institutional Service Evaluation approval was obtained to study the outcome of patients undergoing BRM between June 2009 and November 2014. Eligible patients were sent the BCT Module of the BREAST-Q questionnaire by post and no reminder was sent to patients who did not reply. The comparison cohort of patients who underwent unilateral BCS are a subset of patients involved in an on-going study of outcomes after BCS, for which ethical approval was obtained. The study involved medical photography and completion of the BREAST-Q questionnaire face-to-face at the time of their annual visit for surveillance mammography between 1 and 6 years post-operatively.[23] The subset of patients with larger breasts were identified as women with an estimated bra cup size $\geq$D on 2D photos and breast volume >500 cm^3 on 3D surface imaging of the healthy breast using the VECTRA XT System (Canfield Scientific).

Patients who did not undergo radiotherapy, or who had bilateral or multi-centric cancer were excluded. Patients who went on to have a mastectomy for involved margins, developed distant disease or were lost to follow-up were excluded from the evaluation of patient satisfaction.

Data including patient demographics, clinico-pathological details, surgical outcomes and BREAST-Q scores were collected from a prospectively maintained database and recorded in a Microsoft Excel spreadsheet (Microsoft Corp, Redmond, Wash.).

Surgical outcome measures included complications within 30 days of surgery according to the Clavien–Dindo Classification.[24] We only considered complications occurring in the breast, excluding axillary events. Grade 1 complications include minor deviations from the normal postoperative course without the need for any treatment (e.g. seroma/haematoma not requiring drainage, minor skin necrosis, delayed wound healing). Grade 2 complications include patients requiring pharmacological treatment (e.g. antibiotics for wound infection). Grade 3 complications are divided into 3a, if an intervention under local anaesthesia is required (e.g. seroma/haematoma which was drained under ultrasound guidance, skin necrosis requiring debridement), or 3b, if general anaesthesia is needed (i.e. major skin necrosis, wound infection requiring debridement, postoperative bleeding). Margin involvement (at the time of this study) was considered negative if greater than 1 mm from invasive cancer and 2 mm from DCIS. Margin re-excision, length of hospital stay, re-admission within 30 days and delay (>6 weeks) in starting adjuvant treatment were also recorded.

Patient-reported outcome was evaluated post-operatively using a validated questionnaire (BREAST-Q BCT Module) for both cohorts.[25] A score for each of the nine domains within the questionnaire was derived and then transformed on a scale of 0–100 according to the BREAST-Q protocol with higher scores equating to higher satisfaction.

The mean and standard deviation were calculated for all parametrically distributed variables, whilst the median and the range were calculated for non-parametric ones. Fisher's exact test was applied for categorical data, Student's t-test for continuous data and the Mann–Whitney test for non-parametric data. A p value of <0.05 was considered statistically significant.

Results

In total 157 larger-breasted women were evaluated, 87 in the unilateral BCS cohort and 70 in the bilateral cohort. The median age of patients at the time of surgery was 60.2 years (range: 33–83.9), with a median BMI of 29.6 kg/m^2 (range: 20.3–46.3). The median follow-up was 36 months

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