

ORIGINAL ARTICLE

Feasibility of oncoplastic surgery in breast cancer patients with associated *in situ* carcinoma

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Summary

Purpose: Wide surgical margins are needed in order to treat locally the *in situ* ductal carcinoma of the breast. Breast conserving surgery using oncoplastic techniques in treating *in situ* ductal carcinoma can be a good option improving cosmetic and pathological outcome.

Methods: Between January 2019 and July 2019, 76 patients with invasive carcinoma associated with *in situ* ductal carcinoma were eligible for breast conserving surgery and were admitted to Cluj-Napoca First Surgical Clinic. Patients were divided into two groups, one group with simple lumpectomy and the other group with oncoplastic procedure.

Results: 26 patients had oncoplastic surgery while 47 patients underwent simple lumpectomy. Lateral mammoplasty

was the most frequent oncoplastic procedure (41.3%). Mean tumor size was 3.19 cm (SD 0.76) in the oncoplastic cohort while in the simple lumpectomy cohort the mean tumor size was 1.20 cm (SD 0.89). Regarding tumor size, better surgical resection margins were obtained using oncoplastic procedure ($p=0.051$). No difference between groups in terms of perioperative complications was observed ($p=0.32$).

Conclusions: Breast conserving surgery with oncoplastic techniques are oncologically safe, obtaining better surgical margins in ductal carcinoma *in situ*.

Key words: DCIS, breast conserving surgery, oncoplastic surgery, oncological margins, reexcision

Introduction

Ductal carcinoma *in situ* (DCIS) constitutes 15.2% of all breast cancers [1-3]. Surgical excision followed by external irradiation currently represents the standard treatment for DCIS. However, only 70% of patients will benefit from breast conserving surgery (BCS), the remaining 30% being treated by mastectomy. Moreover, of those treated with BCS, approximately one in three will undergo re-excision [4-6].

Oncoplastic surgery allows wider resections with better cosmetic outcomes. The fact that oncoplastic surgery allows ample resections translates to a low rate of involved margins and secondary

therapeutic procedures [7,8]. Moreover, oncoplastic surgery prior to radiotherapy minimizes breast deformities as compared to simple lumpectomies. Although large series have been published on this matter regarding invasive carcinoma, the evidence for the feasibility and safety of oncoplastic procedures in DCIS is poor [9-11].

The aim of our study was to compare the outcome in terms of surgical resection characteristics (sample excision size, length of surgical margins and rate of re-excision) and complications after undergoing simple lumpectomies versus oncoplastic procedures for patients with DCIS.

Methods

Study cohort

From a consecutive cohort of 157 patients with breast conserving operations performed between January 2019 and July 2019, admitted to the First Surgical Clinic Cluj-Napoca, Romania, 76 patients were identified with biopsy-proven DCIS (either pure or associated with invasive carcinoma).

The following patient and tumor characteristics were recorded: patient age, pathological tumor size, indication for oncoplastic surgery, resection volume, technique, grade, re-excision rate, nodal treatment, postoperative radiotherapy and complications after surgery. We excluded patients presenting with secondary tumors or local relapses. No patient requiring neoadjuvant chemotherapy was included in the study.

Surgical technique

Candidates for BCS were selected according to the following criteria: ratio between tumor size and breast size, tumor location and patient's desire. BCS included simple lumpectomies, and level I or II oncoplastic operations. In this study dual-layer undermining was not included in the oncoplastic group.

Prior to surgery, impalpable lesions or microcalcifications were marked either with wire-localization or by using a ROLL (radioguided occult lesion localization) technique (Figure 1). Tumor resection was a large full-thickness glandular excision, from the skin to the pectoralis major fascia. Clips were placed into the defect for radiotherapy planning. During surgery, the specimen was orientated by surgeons in order to facilitate the histopathological evaluation and margin assessment. In case of microcalcifications, we used radiograms to identify the distance from the margins, as well as any involved margins (Figure 2).

Axillary surgery (sentinel node biopsy or axillary lymph node dissection) was performed in cases with invasive carcinoma associated with DCIS, in case of large-sized high-grade DCIS, or a radiological mass lesion with high suspicion of invasive disease. Axillary surgery was performed either through a separate incision or through the breast incision.

Histopathology

The pathology report described the characteristics of the tumor, pathological tumor size and margins. In order to calculate the resection volume we multiplied the specimen length with width and height (in cm^3). Positive margins for DCIS were defined as the presence of tumor cells within 2 mm of the cut edge of the specimen. We calculated the mean of the margins for each patient. Also, for each participant we calculated the resection ratio (RR) between resection volume and pathological tumor size.

Radiotherapy

All patients had postoperative radiotherapy to the breast (50 Gy) with a boost to the tumor bed.

Statistics

The statistical analyses were performed using IBM SPSS Statistics, 26th version for Windows. Several statistic tests were used: Student t-test, χ^2 test, Mann-Whitney U test, depending on the type and distribution of the variables. P value < 0.05 was considered as statistically significant.

Results

Study population

Seventy-six consecutive patients with DCIS were included in the study. Patients and tumor

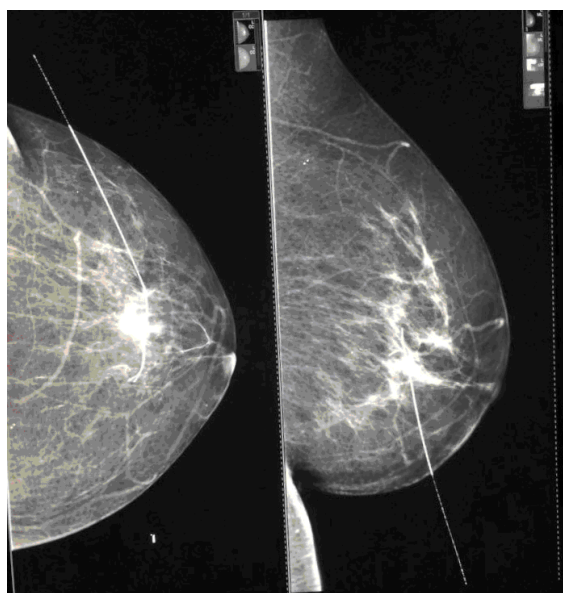


Figure 1. Wire localization of unpalpable lesion of the breast, cranio-caudal and medio-lateral exposure.

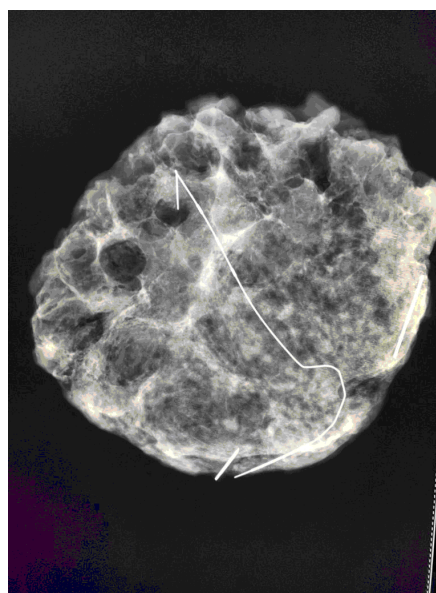


Figure 2. Mammographic control of excised specimen in order to assess margins.

Table 1. Baseline characteristics of patients included in the study

Characteristics	Simple lumpectomies (n=47)	Oncoplastic procedures (n=29)	p value
Age (mean±std)	51.35±2.52	45.12±2.19	0.04
Final histology			
Pure DCIS	12	5	0.054
DCIS + invasive	35	24	
Focality			
Unifocal	45	12	0.02
Multifocal/multicentric	2	17	
Tumor size (mean±SD)	1.20±0.89	3.19±0.76	<0.05
Specimen size (mean± SD)	3.11±0.85	4.11±0.90	0.04
RR	0.38	0.77	<0.05
Margins (mean±SD)	1.9±0.54	2.2±0.52	0.051
Re-excisions	5	0	<0.05
Axillary surgery			
SLNB	16	26	>0.05
ALND	1	0	
No surgery	30	3	

DCIS: ductal carcinoma in situ, RR: resection ratio, SLNB: sentinel lymph node biopsy, ALND: axillary lymph node dissection, SD: standard deviation

characteristics are presented in Table 1. The mean age of included patients was 48.32±1.98 years, with younger patients in the oncoplastic group (p=0.04).

Surgery

All operations were performed by the same surgical team. From all patients 61.84% underwent simple lumpectomies (Table 1). For the oncoplastic group (38.15%), the most common intervention was lateral mammoplasty (12/29 cases, 41.37%), followed by an inferior pedicle technique (4/29 cases, 13.79%; Table 2).

Although we didn't find significant statistical differences between the two groups regarding the mean of margins, in the simple lumpectomy group, 5 (10.63%) patients required re-excision for positive margins. Of the 5 patients with an involved margin, 2 cases underwent further oncoplastic operations, 1 case required a simple lumpectomy, and 2 cases were converted to mastectomies.

There was no statistical difference regarding complications (p=0.32). Seroma was the most frequent complication in the two groups (Table 3), followed by hematoma which required reintervention for hemostasis in all complicated cases (100%).

Histopathology

Only 17 patients (22.36%) had pure DCIS on final histology (Table 1). The tumors requiring simple lumpectomies were smaller and unifocal, with a mean tumor size of 1.20±0.89 cm (p<0.05).

Table 2. Oncoplastic techniques used in the study

Type of technique	Number of cases n (%)
Lateral mammoplasty	12 (41.37)
Superior pedicle	3 (10.34)
Inferior pedicle	4 (13.79)
Round block	3 (10.34)
Other	6 (20.68)

The mean specimen resection size was larger in the oncoplastic group (4.11±0.90 cm) than in the simple lumpectomy group (3.11±0.85) (p=0.04; Table 1). When comparing the resection ratio, we observed a better ratio for the oncoplastic procedures (p<0.05, Table 1).

Discussion

Oncoplastic breast surgery allows wider excisions without cosmetic compromise. With the rapid growth in the use and interest of oncoplastic techniques and the proliferation of methods available, it is important to establish correct indications and properly select cases that can benefit from these techniques.

DCIS represents an intraductal lesion of the breast characterized by increased epithelial proliferation with cellular atypia not invading the basal

Table 3. Complications after BCS in the 2 groups

	Simple lumpectomies (n=47) n (%)	Oncoplastic procedures (n=29) n (%)	p value
Seroma	3 (6.38)	2 (6.89)	
Hematoma	2 (4.25)	1 (3.44)	
Dehiscence	0	1 (3.44)	0.32
Infection	1 (2.12)	0	
Reintervention	2 (4.25)	1 (3.44)	
Total no. of complications	8 (17.02)	5 (17.24)	

membrane of the ductal lobular unit. In post-mortem studies, it was estimated that 15% of women had evidence of DCIS [13,14]. Moreover, 20-30% of DCIS will progress to invasive cancers if not treated [14,15].

There are very few studies that evaluate the feasibility of oncoplastic procedures in the treatment of DCIS, on limited samples of patients [9-11]. As oncoplastic techniques were introduced quite recently in our current practice, our aim was to evaluate the indication for these procedures in our team, and their impact on reexcision rate, complications, and excision samples size.

Indication of oncoplastic techniques in DCIS

We analyzed a sample of 76 patients with DCIS, from which 17 patients (22.36%) had pure DCIS on final histology, a rate that is comparable with those cited in the literature [16]. In our study, the rate of oncoplastic procedures was 38.15%, larger than the rate cited for invasive disease only series. This could be explained by the extensive character of DCIS lesions and the need for 2 mm clean margins, larger than “no tumor on ink” applicable for pure invasive disease [16]. Oncoplastic techniques were used on younger patients (45.12 ± 2.19 years, $p=0.04$), with larger lesions (3.19 ± 0.76 cm, $p<0.05$) or multifocal/multicentric disease ($p=0.02$). This is quite expected knowing the current indications for oncoplastic breast surgery. Without oncoplastic techniques, these patients would have otherwise required mastectomies. Beside tumor size, in our series the indications for oncoplastic surgery were inconvenient localization of the tumor (eg. inner quadrants) or unfavorable tumor size/breast size ratio.

Margins and reexcision rate

Oncoplastic techniques can expand the boundaries of breast conservation for large lesions of DCIS. The main objective is represented by clean margins, which are required for decreasing local recurrence rates. However, rates are falling due to

improved adjuvant radiotherapy and systemic therapy regimes, together with optimal surgery and assessment of margins by pathologists. Patients with larger DCIS size have a higher risk of positive margins [17].

In our study, with a mean tumor size of 2.19 ± 0.75 cm, margin involvement was only 6.57%. Although sample resection size was significantly larger in the oncoplastic group (4.11 ± 0.90 cm, $p=0.04$), there was no significant difference between the means of margins between the two groups ($p=0.051$) and all reinterventions for involved margins were for cases that underwent simple lumpectomies. Moreover, in 2 reexcision cases, oncoplastic procedures were the preferred surgical technique. Even if the sample resection size mean was larger in the oncoplastic group, it is notable that the resection ratio that was calculated for each group showed a significantly more localized excision ($p<0.05$) in the case of oncoplastic procedures (0.77), than for simple lumpectomies (0.38). These important observation warrants further study for confirmation.

Complications

We did not observe any significant difference in terms of post-surgical complications. In the studies that followed the complication rate on breast conserving surgery in general, and in oncoplastic breast surgery in particular for invasive disease, the most common complication was seroma or hematoma requiring aspiration or surgical intervention (6.7%) [18-20], comparable with the rate that we observed for the treatment of DCIS. Some authors reasonably raised concerns about a potential risk increase in fat necrosis for patients that underwent oncoplastic procedures. Unfortunately, our study design did not measure the extent of fat necrosis in the two groups. In order to address this matter more specifically, additional parameters are needed to be studied (length of intervention, hormonal status, adjuvant therapies), issues that were beyond the scope of this article.

Study limitations

The results of this study are limited by the small number of patients included. However, reported series of DCIS surgically treated by oncoplastic techniques are low [9-12]. The long-term follow-up for local recurrences is still in progress.

Moreover, we focused on measurable outcomes of oncoplastic surgery like margin involvement, sample excision size, complication rate, number of reexcisions, but we didn't assess cosmesis or patient satisfaction.

Conclusions

The current study is one of the largest series that analyze the feasibility of oncoplastic breast

surgery in the treatment of DCIS, confirming that these procedures allow wide resections with clean margins even for larger lesions. Moreover, the complication rate is comparable with classical techniques of breast conserving surgery, so oncoplastic procedures are safe and need to be considered in patients otherwise treated with mastectomy.

In conclusion, this study adds to the growing body of evidence supporting the advantages of oncoplastic breast surgery for DCIS patients, but further studies on a large number of patients are required in order to confirm these results.

Conflict of interests

The authors declare no conflict of interests.

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