Immediate autologous fat grafting after breast-conserving surgery: evaluation of oncologic safety and cosmetic outcome

Mohamed F. Asal[a], Hassan M. Kholosy[a], Mahmoud O. Shalaby[b], Mohamed M. ElShafei[c], Tarek A. Elfayoumi[a]

Departments of, [a]General Surgery, Faculty of Medicine, Alexandria University, Alexandria, Egypt, [b]General Surgery, Faculty of Medicine, Arab Academy for Science, Technology and Maritime Transport, El Alamein, Egypt, Departments of, [c]Radiodiagnosis and Intervention, Faculty of Medicine, Alexandria University, Alexandria, Egypt

Correspondence to Mahmoud O.S. Elsayed, MSC, Department of General Surgery, Faculty of Medicine, Alexandria University, Alexandria 21523, Egypt
Tel: +20 106 566 3023;
e-mail: mahmoud.chalaby@gmail.com

Received: 20 May 2022
Revised: 19 June 2022
Accepted: 26 June 2022
Published: 05 April 2023

The Egyptian Journal of Surgery 2023, 41:940–946

Background
In breast reconstruction, lipofilling has evolved as a novel and promising method.
Objective
To evaluate fat graft viability, the oncological outcome of the whole procedure, and cosmetic outcomes in view of physician and patient satisfaction in patients with breast carcinoma receiving breast conservative surgery (BCS) and immediate lipofilling.
Patients and methods
This study was conducted on 20 female patients who were diagnosed with early breast cancer (stages I and II) amenable to BCS. A new technique of immediate autologous fat grafting in BCS was performed for all patients.
Results
In this study, regarding the esthetic outcome according to surgeons, three (15%) patients showed excellent results, 13 (65%) patients showed very good results, and four (20%) patients showed good results. Regarding the esthetic outcomes according to the patients using the esthetic numeric analog score, four (20%) patients gave a score of 9/10, nine (45%) patients gave a score of 8/10, six (30%) patients gave a score of 7/10, and one (5%) patient gave a score of 6/10. No local or systemic recurrence was encountered during the follow-up period.
Conclusion
Immediate fat grafting is a promising technique for immediate volume replacement after BCS. It can reduce the performance of major flaps, thus preventing donor site morbidity and scarring, and also it can reduce a delayed procedure for symmetrization.

Keywords:
breast cancer, fat grafting, lipofilling

Egyptian J Surgery 2023, 41:940–946

1110-1121

Introduction

Although there are several patients who achieve good, primary esthetic results with breast conservative surgery (BCS), there is new literature on the principle of oncoplastic breast conservative operation for cases with inferior esthetic outcomes [1–4].

Two factors predict inferior esthetic outcome after BCS: volume of excised tissue and the mass location [5,6], with evident risk of deformity if more than 20% of the breast volume is resected [7,8].

Oncoplastic conservative breast surgery evolved from the BCS by broadening its general indication to achieve wider excision margins without compromising on the cosmetic outcomes [9]. In general, oncoplastic surgeries are related to volume displacement or replacement techniques on the basis of breast size and cancer size/location [10].

Lipofilling has emerged as a new and promising technique to obtain better esthetic results in breast reconstruction. It has been investigated in patients who were subjected to either radical or conservative breast cancer surgery as an option for late breast reconstruction [11]. In contrast, the use of autologous fat grafting (AFG) in immediate reconstruction has been restricted to a few series of patients [12–16].

Breast lipofilling is associated with ultrasound (US) changes that should be acknowledged by the radiologist as such to avoid unnecessary studies or interventions. These changes include acute and subacute changes such as acute hematoma, which is usually hyperechogenic, subacute hematoma present as complex collections with septae and echogenic debris, and seromas are usually as anechoic collections with fine septations. Chronic changes (within 1 year) are seen in ~13% of the patients. More than 50% are oily cysts [17].

The aim of this study was to evaluate fat graft viability, the oncological outcome of the whole procedure, and cosmetic outcome in view of physician and patient satisfaction in patients with breast carcinoma receiving BCS and immediate lipofilling.

Patients and methods

This study was conducted on 20 female patients who presented to the Surgical Oncology Unit in the Alexandria Main University Hospital with a diagnosis of early mammary carcinoma (stages I and II) amenable to BCS in the period from December 2019 to January 2021.

We excluded patients with stage III or IV breast cancer, patients who refused BCS or lipofilling, and patients who had any contraindications for BCS. Besides, pregnant women or women who had collagen vascular disease were ruled out from the study.

Medical sheets were filled with patients' data, including the following details: date of admission, personal data, patients' complaint, general and local examination, presurgical diagnostic and interventional workup, and postsurgical radiological procedures (Doppler US assessment 48 h after the operation as a baseline and then at 3- and 6-month follow-up), neoadjuvant therapy if received, and standardized photographs were acquired immediately postoperatively and then at 3- and 6-month intervals.

In our study, we used several types of oncoplastic techniques, which were specified according to the size of the gland as well as the defect, including round block, lateral sulcus incision, Grisotti flap, and lateral mammoplasty. After performing the oncoplastic technique and the recommended axillary management either sentinel lymph node biopsy or axillary clearance, and then obtaining the results of frozen section, confirming free safety margins, a tumescent solution (formed of 500 ml Ringer solution with 1-mg epinephrine) (1: 500 000) was infiltrated in the subcutaneous tissue of the abdomen from where the fat was harvested using a 3–4-mm liposuction cannula and collected in 20-ml or Tommy syringes, then processed by decantation or by washing but none with centrifugation. Then, it was injected using 20-, 10-, 5-, and 3-ml syringes through a 1.5-mm injection cannula in the subcutaneous tissue, breast parenchyma, and occasionally in the pectoralis muscle. The hospital stay was one night for all the patients. After surgery, photographs were taken a few days after surgery. US breast was done as a baseline, and complications were recorded. The formal pathology report was recorded, and accordingly, all patients received or were to receive postoperative radiotherapy; however, adjuvant chemotherapy was prescribed if indicated.

Patients were examined every 2 weeks after discharge and then the cosmetic outcome was assessed at 3 and then 6 months postoperatively using the Harvard scale (four-point Likert scale) [18].

Patient satisfaction was assessed regarding cosmetic outcome using items from breast *Q* score [19], including size, shape, appearance of scar, symmetry, cleavage, appearance of nipple/areola complex, body wholeness/harmony, proportionate, and feel to touch. They were finally assessed using the esthetic numeric analog scale [20]. The patient's score ranged from 6 to 9. All patients were followed up for a mean of 9.5 months (range, 6–13 months) for possible complications and esthetic outcomes.

All patients were assessed using Doppler US initially for acute changes such as seroma or hematoma, and after 3 and 6 months for chronic changes such as fat necrosis, oil cysts, and scarring.

Statistical analysis

All patients who underwent immediate lipofilling after breast conservation were statistically assessed. Statistical analysis was done using Statistical Package for the Social Sciences (SPSS, IBM, USA), version 20. Data were tested for normality using Kolmogorov–Smirnov test. After data collection, the results were tabulated as frequency distribution for different qualitative values. For the quantitative assessment, mean and SDs were used. Qualitative data were evaluated using χ^2 test.

Ethics approval and consent to participate

Local ethical committee of Alexandria University approved the current work. An informed consent was taken from all patients involved in the study.

Results

The mean age of the studied patients was 49.35 years, ranging from 27 to 70 years old. Most of the patients were more than 50 years old (55%). A total of 19 (95%) patients were married and had children, whereas only one (5%) patient was single. Seven (35%) patients gave a history of using oral contraceptive pills. Family history was positive in only three (15%) patients. Only nine patients had chronic diseases, including diabetes mellitus (25%), hypertension (10%), cardiac disease (5%), and asthma (5%).

All patients presented with a painless lump of the breast (100%); one of them was associated with bleeding per nipple. All patients had no metastasis.

Preoperative assessment is demonstrated in Table 1. Nine patients received neoadjuvant chemotherapy, which included all patients diagnosed as having

Table 1 Preoperative assessment

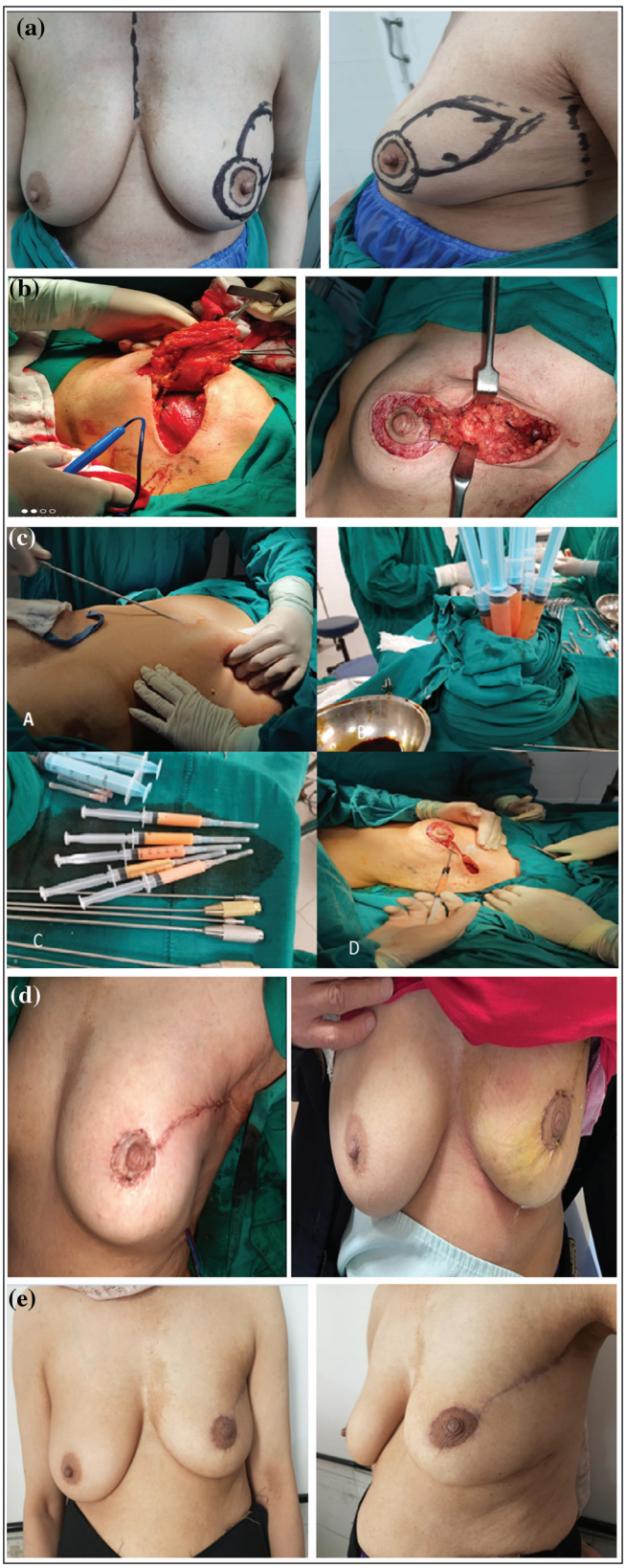
Examination	*n* (%)
General examination	
Unremarkable	20 (100.0)
Local examination	
Lump	20 (100.0)
Site (*N*=20)	
Central	2 (10.0)
UOQ	12 (60.0)
UIQ	4 (20.0)
LOQ	1 (5.0)
LIQ	1 (5.0)
Size (*N*=20)	
Minimum–maximum	1.50–4.0
Mean±SD	2.42±0.87
Median (IQR)	2.0 (1.5–3.0)
LNs	
Palpable	6 (30.0)
Unremarkable	14 (70.0)
Sonomammography	
Lump size (cm) (*N*=20)	
Minimum–maximum	1.0–4.0
Mean±SD	2.34±0.90
Median (IQR)	2.1 (1.5–3.1)
Microcalcification	
Absent	13 (65.0)
Present	7 (35.0)
LNs clinical and radiological	
Nonsuspicious	11 (55.0)
Suspicious	8 (40.0)
Borderline	1 (5.0)
Preoperative biopsy	
Type of biopsy	
Tru-cut	17 (85.0)
FNA	3 (15.0)
Histological type	
Positive for malignant cells (FNAC)	3 (15.0)
IDC	14 (70.0)
ILC	3 (15.0)
LNs	
Not done	16 (80.0)
Positive	2 (10.0)
Negative	2 (10.0)

FNA, fine needle aspiration; FNAC, fine needle aspiration cytology; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; IQR, interquartile range; LIQ, lower inner quadrant; LN, lymph node; LOQ, lower outer quadrant; UIQ, upper inner quadrant; UOQ, upper outer quadrant.

Her2neu-enriched (two patients) or triple-negative breast cancer (four patients) along with (three out of 14) luminal patient (ER and/or PR positive) for downsizing.

Regarding the operative data, the mean frozen section time was 50±11.81 min (40–90 min). The mean total operative time was 3.4±0.55 h (2.5–4 h). The oncoplastic technique used was lateral mammoplasty in five patients (Fig. 1), lateral sulcus in three patients (Fig. 2), Grisotti flap in two patients, and round

Figure 1



Lateral mammoplasty technique (a), skin marking (b). lumpectomy (c). A, infiltration of tumescent solution; B, decantation; C, fat graft ready for injection; and D, fat injection. (d) 1 week postoperatively, (e) 4 months postoperatively.

block technique in one patient, and the rest of the patients underwent conventional BCS. The weight of the resected specimen ranged from 65 to 160 g

with a mean of 94.75 ± 30.141 g. The volume of fat injection ranged from 90.0 to 150.0 cm^3 with a mean of 118.0 ± 19.08 cm^3, and all were harvested from the abdomen. Regarding frozen section, 15 (75.0%) patients were free on the first time, whereas four (20.0%) patients needed extramargin once and one (5%) patient needed twice.

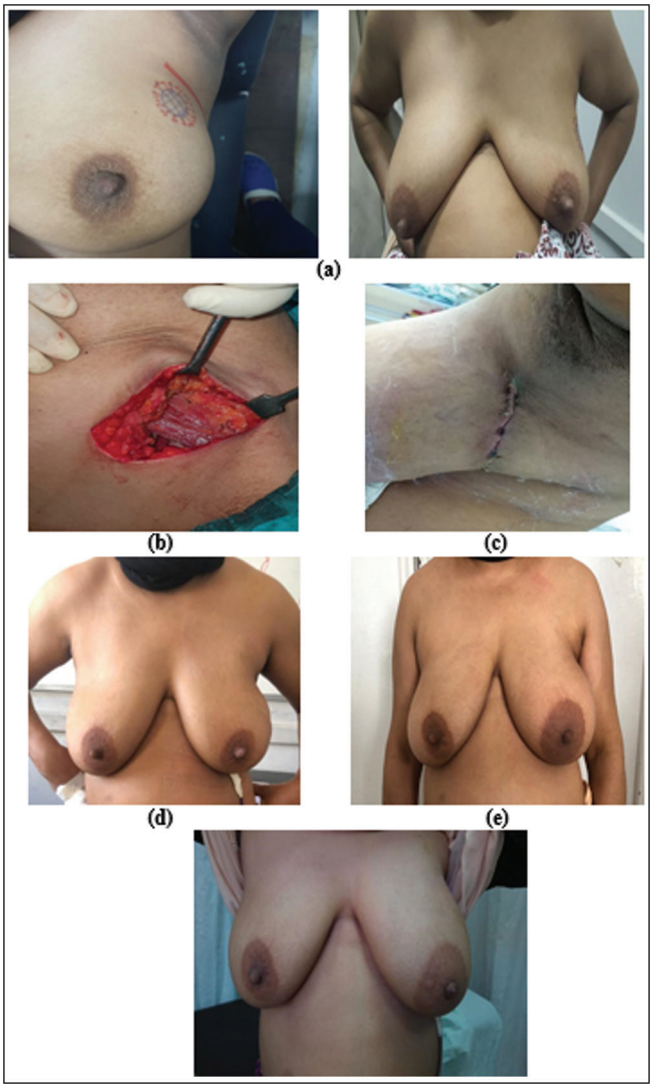
The complication included painless fat necrosis in three patients, most of them in the lower quadrants, minor seroma in two patients, one patients developed hematoma, and 14 (70%) patients with no complications at all (Table 2).

Early Doppler US findings revealed two patients with seroma and one patient developed minor hematoma. Late Doppler US findings revealed three patients with fat necrosis (Fig. 3, Table 2).

According to three surgeons other than the one who performed the surgery, using the Harvard scale (four-point Likert scale), three (15.0%) patients showed excellent cosmetic results, 14 (65%) patients showed good results, and three (15%) patients showed fair results.

Assessment of patient satisfaction regarding cosmetic outcome is simplified in Table 3. According to the patients using esthetic numeric analog score, four (20%) patients gave a score of 9/10, nine (45%) patients gave a score of 8/10, six (30%) patients gave a score of 7/10, and one (5%) patient gave a score of 6/10. No local or systemic recurrence was encountered during the follow-up period.

Figure 2



Lateral sulcus technique. (a) Preoperative AP and lateral view, (b) Lumpectomy bed, (c) final scare, (d) initial outcome, (e) 3-months postoperatively, (f) 6 months postoperatively.

Discussion

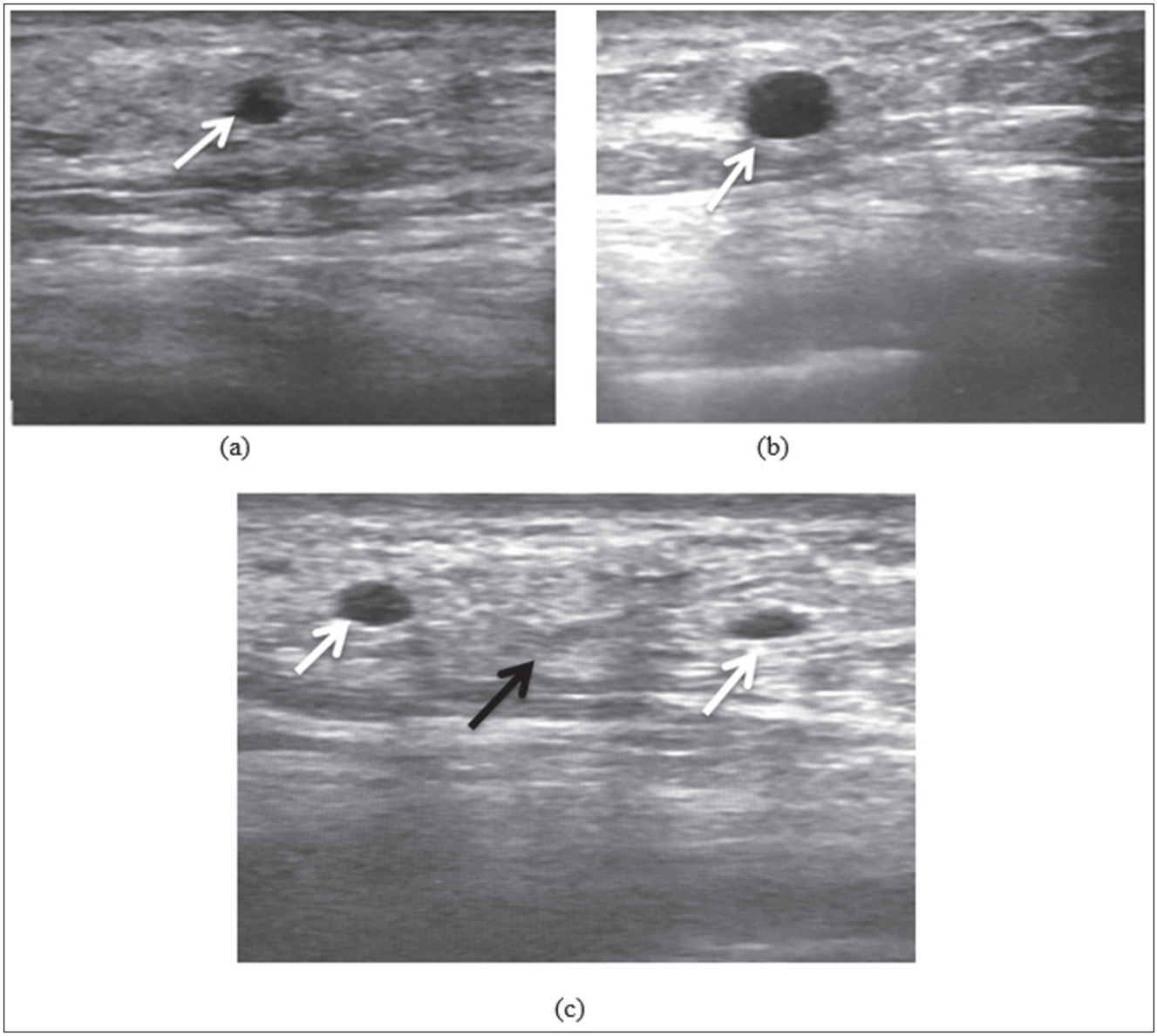
As we use a new technique of immediate AFG in breast-conserving surgery, we tried to evaluate fat graft viability, the oncological outcome of the whole procedure, and cosmetic outcome in view of physician and patient satisfaction in patients with breast carcinoma receiving BCS and immediate lipofilling.

Regarding clinical data, the study by Biazus *et al*. [12] assessed the technical viability of the graft, where the mean age of the patients was 55.4 years (range, 33–69 years) and the median tumor size was 21.5 mm. Eight cases had armpit lymph node metastasis. Seven had the tumor located in the inner quadrants and the junction of the upper quadrants of the breast. One of the patients underwent neoadjuvant chemotherapy. Stumpf *et al*. [14] conducted a cohort study from 2004 to 2011 comparing 167 cases receiving BCS with 27 cases undergoing BCS followed by immediate fat grafting. The mean age of patients was 53.6 ± 10.9 years in the lipofillled cases and 56.4 ± 12.0 years in the BCS cases. The mean lump size was 24.3 ± 10.5 mm in the lipofilling cases and 20.6 ± 12.0 in the BCS cases. In the BCS group, 26 (15.6%) cases received neoadjuvant chemotherapy, compared with only one (3.7%) among

Table 2 Initial and delayed ultrasound findings

	Hematoma [*n* (%)]	Seroma [*n* (%)]	Fat necrosis [*n* (%)]	Reactive inflammation [*n* (%)]
Initial	1 (5)	2 (10)	–	1
3 months	–	–	2 (10)	–
6 months	–	–	1 (5)	–

Figure 3



Doppler US findings (a and b) two patients showing cystic type of fat necrosis (white arrow). (c) Another patient showing hardly defined solid nodular pattern of fat necrosis (black arrow) in between two small cysts (white arrows((mixed).

Table 3 Distribution of the studied cases according to patient satisfaction (*N*=20)

Patient satisfaction	*n* (%)
9	4 (20)
8	9 (45)
7	6 (30)
6	1 (5)
Items	
Size	19 (95)
Shape	18 (90)
Appearance of scar	18 (90)
Symmetry	13 (65)
Cleavage	15 (75)
Appearance of nipple/areolar complex	17 (85)
Proportionate	13 (65)
Feel to touch	18 (90)

the lipofilling cases. García *et al*. [15] published their early results of 37 immediate reconstructions using AFG after BCS; they involved both malignant and benign tumors and the mean age of patients was 55 years. Khan *et al*. [16] mailed questionnaires to 35 women who had BCS with immediate lipofilling, and 32 finished them. The outcome was compared with those from a contemporary series of 39 cases that had BCS alone. The median age of the lipofilled group was 49 years in the lipofilled cases compared with 54 years in the other group. Biazus *et al*. [13] in a later study consisting of 65 cases receiving BCS and AFG from January 2010 to January 2017 reported that the mean age was 51.61 years and the median amount of fat graft used was 128.2 ml (45–320 ml), being 2.7 times

larger than median resected volume (46.6 ml). Only three patients received neoadjuvant chemotherapy, and 27 patients underwent lymphadenectomy, among whom 24 patients had positive lymph nodes. Our study was conducted on 20 patients who underwent BCS and immediate fat grafting with a mean age of 49.35 ± 11.26 years from December 2019 to January 2021 with a follow-up period from 6 to 13 months. The mean lump size was 22.42 ± 11.22 mm; tumor location was upper outer quadrant in 12 patients, upper inner quadrant in four patients, central in two patients, lower outer quadrant in one patient, and lower inner quadrant in another patient. Regarding the size, 12 (60%) patients had breast size cup B, four (20%) patients had breast size A, and four (20%) patients had breast size C. Twelve cases had undergone axillary lymph nodes metastasis. Only seven patients received neoadjuvant chemotherapy. Our mean follow-up period was 9.5 months (6–13 months).

Regarding surgical data, in the study by Biazus *et al.* [12], the average amount of fat graft injected was 121 ml per breast and it was 2.1 times larger than the resected volume. The follow-up period after the completion of radiotherapy ranged from 13 to 29 months. In their later study (2018), the median amount of fat graft used was 128.2 ml (45–320 ml), being 2.7 times larger than the median resected volume (46.6 ml) [13]. In the study by Stumpf *et al.* [14], the average amount of fat infiltration was 65 ± 19.30 cm^2. In the study by García *et al.* [15], the mean fat infiltration volume was 50 ml. In our study, an oncoplastic technique was used in 11 patients, whereas the other nine patients underwent conventional BCS with direct incision. Our mean volume of fat graft injected was 118.0 ± 19.08 ml.

Regarding complications, Biazus *et al*. [12] reported six complications including four postoperative seroma, one infection at the surgery site, treated with oral antibiotic therapy, and one fat necrosis, whereas in their later study (2018), seven (10.8%) patients developed surgical complications, one patient had a mild wound infection, easily resolved with antibiotics, and six patients had either fat necrosis or an oil cyst, detected by routine follow-up examination [13]. In our study, complications were minor and self-limited which included fat necrosis in three patients, seroma in two patients, and hematoma with wound dehiscence in one patient.

Regarding Doppler US findings, Kim *et al*. [21] demonstrated in their study that the complications including fat necrosis and cyst formation occurred in 18 (17.6%) of the 102 patients. The presence of a complication was related to the amount of fat injected. The mean total amount of fat injected into the glands was 67.5 ml for those cases that developed complications, whereas the fat volume was 45.2 ml for those without complications. Of the 18 cases with complications, 10 had fat necrosis, whereas eight had cystic lesions. Groen *et al*. [22] in a review of 33 studies indicated 461 complications in a total of 5502 cases. The reported overall complication rate was 8.4% involving nodules/masses (11.5%), cyst formation (6.9%), hematoma (6.3%), calcifications (5.2%), fat/lipo-necrosis (4%), granulomas (3.6%), infections/cellulitis (0.8%), seroma (0.8%), donor site infections (0.7%), abscess (0.6%), pneumothorax (0.2%), and delayed wound healing (0.1%). In our study, initial Doppler US assessment revealed one case of hematoma and two cases of small anechoic collections denoting seroma, and delayed Doppler US revealed three cases of fat necrosis, where two of them showed small cystic lesions, and one was hyperechoic solid nodule. Doppler revealed only one case of mildly increased tissue vascularity reflecting mild inflammatory changes without phlegmon or abscess formation.

Regarding oncological outcome, Biazus *et al*. [12] had no occurrence of local recurrence in the follow-up period (13–29 months). In their later study (2018), 10 (15.4%) patients developed cancer recurrence in a mean follow-up of 40.8 months. The median time for recurrence was 58.9 months. Only two cases showed locoregional recurrence (3.07%). Five (7.69%) cases had systemic recurrence and three (4.61%) had both locoregional recurrence and systemic [13]. In the study by Stumpf *et al*. [14], systemic recurrence was identified in one (3.7%) case in the lipofilling cases and in seven (4.2%) in the BCS cases. Local recurrence was diagnosed in four (2.4%) cases in the BCS group and none in the lipofilling cases during follow-up period of 36 months. In the study by Khan *et al*. [16], there was no evidence of tumor recurrence during the follow-up period (36 months). In the study by García and colleagues, there was no recurrence during the follow-up period (1 year). In our study as well, there was no local or systemic recurrence observed during the follow-up period (6–13 months).

Regarding esthetic outcome, in Biazus *et al*. [12], the average score given by patients was 9.45 and the average score given by doctors was 8.78. In the study by Khan *et al*. [16], esthetic outcomes in the cosmetic appearance showed a statistically remarkable shift toward the lipofilled group. In the study by García *et al*. [15], the breast symmetry reached was significant for both the surgeon and the patient. The satisfaction survey is highly rated as more than 90% of patients have given

the highest score (very satisfied). In our study, based on the final evaluation of all esthetic scores, the mean score given by patients was 7.8 and the average score given by doctors was very good. No local or distant recurrence occurred during our follow-up period.

Conclusions

Immediate fat grafting is a promising technique for immediate volume replacement after BCS. It can reduce the performance of major flaps, thus preventing donor site morbidity and scarring, and also it can reduce a delayed procedure for symmetrization.

It is associated with a significant amount of patient and physician satisfaction. It is a good alternative for reconstruction in small-sized and medium-sized breasts, for which the standard BCS cannot produce good cosmetic outcomes. Furthermore, it enables the reconstruction of gaps in difficult areas, especially in the upper inner quadrant. It does not seem to have any effect on local or systemic recurrence. Initial, 3-, and 6-month follow-ups both clinically and by Doppler US are the cornerstone for a thorough assessment of the technical success of the procedure.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1 Song HM, Styblo TM, Carlson GW, Losken A. The use of oncoplastic reduction techniques to reconstruct partial mastectomy defects in women with ductal carcinoma in situ. Breast J 2010; 16:141–146.

2 Silverstein MJ. How I do it: oncoplastic breast-conservation surgery. Ann Surg Oncol 2010; 17:242–244.

3 Meretoja TJ, Svarvar C, Jahkola TA. Outcome of oncoplastic breast surgery in 90 prospective patients. Am J Surg 2010; 200:224–228.

4 Patani N, Carpenter R. Oncological and aesthetic considerations of conservational surgery for multifocal/multicentric breast cancer. Breast J 2010; 16:222–232.

5 Berrino P, Campora E, Santi P. Postquadrantectomy breast deformities: classification and techniques of surgical correction. Plast Reconstr Surg 1987; 79:567–572.

6 Rainsbury RM. Surgery insight: oncoplastic breast-conserving reconstruction—indications, benefits, choices and outcomes. Nat Clin Pract Oncol 2007; 4:657–664.

7 Clough K, Nos C, Salmon R, Soussaline M, Durand J. Conservative treatment of breast cancers by mammaplasty and irradiation: a new approach to lower quadrant tumors. Plast Reconstr Surg 1995; 96:363–370.

8 Clough KB, Kaufman GJ, Nos C, Buccimazza I, Sarfati IM. Improving breast cancer surgery: a classification and quadrant per quadrant atlas for oncoplastic surgery. Ann Surg Oncol 2010; 17:1375–1391.

9 Bertozzi N, Pesce M, Santi PL, Raposio E. Oncoplastic breast surgery: comprehensive review. Eur Rev Med Pharmacol Sci 2017; 21:2572–2585.

10 Noguchi M, Yokoi-Noguchi M, Ohno Y, Morioka E, Nakano Y, Kosaka T, *et al.* Oncoplastic breast conserving surgery: volume replacement vs. volume displacement. Eur J Surg Oncol 2016; 42:926–934.

11 Petit JY, Maisonneuve P, Rotmensz N, Bertolini F, Rietjens M. Fat grafting after invasive breast cancer: a matched case-control study. Plast Reconstr Surg 2017; 139:1292–1296.

12 Biazus JV, Falcão CC, Parizotto AC, Stumpf CC, Cavalheiro JAC, Schuh F, *et al.* Immediate reconstruction with autologous fat transfer following breast-conserving surgery. Breast J 2015; 21:268–275.

13 Biazus JV, Stumpf CC, Melo MP, Zucatto AE, Cericatto R, Cavalheiro JA, *et al.* Breast-conserving surgery with immediate autologous fat grafting reconstruction: oncologic outcomes. Aesthetic Plast Surg 2018; 42:1195–1201.

14 Stumpf CC, Biazús JV, Zucatto FSÂE, Cericatto R, Cavalheiro JAC, Damin APS, *et al.* Immediate reconstruction with autologous fat grafting: influence in loco regional recurrence in breast cancer. Rev Col Brasil Cirurg 2017; 44:179–186.

15 García RM, Alonso VG, Doménech MEV. Fat grafting in immediate breast reconstruction. Avoiding breast sequelae. Breast Cancer 2016; 23:134–140.

16 Khan L, Raine C, Dixon J. Immediate lipofilling in breast conserving surgery. Eur J Surg Oncol 2017; 43:1402–1408.

17 Mysler D, Kohan A, Amat M, Farache F, Veronica F, Garcia-Monaco R. Scary images: lipofilling appearances during breast cancer follow-up ultrasound. Conference paper, Researchgate. December 2014.

18 Bulstrode N, Shrotria S. Prediction of cosmetic outcome following conservative breast surgery using breast volume measurements. Breast 2001; 10:124–126.

19 Pusic AL, Klassen AF, Scott AM, Klok JA, Cordeiro PG, Cano SJ. Development of a new patient-reported outcome measure for breast surgery: the BREAST-Q. Plast Reconstr Surg 2009; 124:345–353.

20 Funk W, Podmelle F, Guiol C, Metelmann HR. Aesthetic satisfaction scoring–introducing an aesthetic numeric analogue scale (ANA-scale). J Cranio-Maxillofac Surg 2012; 40:439–442.

21 Kim HY, Jung BK, Lew DH, Lee DW. Autologous fat graft in the reconstructed breast: fat absorption rate and safety based on sonographic identification. Arch Plast Surg 2014; 41:740.

22 Groen JW, Negenborn V, Twisk D, Rizopoulos D, Ket J, Smit J, *et al.* Autologous fat grafting in onco-plastic breast reconstruction: a systematic review on oncological and radiological safety, complications, volume retention and patient/surgeon satisfaction. J Plast Reconstr Aesthet Surg 2016; 69:742–764.