Original Article

Cohort study comparing volume replacement oncoplastic breast surgery with standard wide local excision for breast cancer

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Background: Volume replacement oncoplastic breast surgery (VR-OPS) allows breast conservation for women who would otherwise undergo mastectomy or compromise cosmetic outcomes with wide local excision (WLE). VR-OPS remains understudied in the literature. The aim of this study was to compare 7-year outcomes of VR-OPS *vs.* WLE.

Methods: This is a single-centre retrospective chart review compared VR-OPS (2012–2016) to WLE (2013–2014), analysing clinicopathological, treatment, surgical, and follow-up data.

Results: Eighty patients underwent WLE and 79 VR-OPS. No differences in smoking status, cancer type, or grade were observed between the groups. Women in the VR-OPS group were significantly younger, more likely to be node positive, and had larger tumours. Consequently, they received more neo-adjuvant chemotherapy and axillary surgery. VR-OPS resulted in significantly more clear margins [relative risk (RR) =0.3638; 95% confidence interval (CI): 0.1621 to 0.8162; P=0.01], translating to a decreased need for mastectomy (RR =0.2250; 95% CI: 0.0502 to 1.0089; P=0.06). There was also a significant decrease in the need for further breast surgery for symmetrisation after VR-OPS (RR =0.1266; 95% CI: 0.0162 to 0.9887; P=0.04). Although VR-OPS had slightly more post-op complications (RR =1.8228; 95% CI: 0.8982 to 3.6993; P=0.09), this was not statistically significant. Importantly there was no difference in long-term oncological outcomes specifically local-recurrence (RR =0.7949; 95% CI: 0.1152 to 5.484; P=0.81) and overall-survival (RR =0.6551; 95% CI: 0.2633 to 1.6302; P=0.36).

Conclusions: This study observed no significant differences in long-term local recurrence and survival between the VR-OPS and WLE groups. VR-OPS represents an oncologically safe surgical option especially for larger tumours.

Keywords: Oncoplastic; breast surgery; volume-replacement

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Introduction

Over the past two decades, the field of breast surgery has undergone significant transformation. The safety of breast-conserving surgery (BCS), has been established through evidence demonstrating its equivalence to mastectomy in terms of oncological outcomes (1,2). Cosmetic outcomes have become an increasingly important factor in decision making, as they have been linked to significant improvements in patient satisfaction and quality of life (3,4). For women with large tumours or a large tumour to breast size ratio, a simple wide local excision (WLE) is unlikely to achieve a satisfactory cosmetic outcome due to resulting breast distortion. These women are offered the option of mastectomy with or without reconstruction or undergoing WLE and accepting poor cosmetic outcomes.

Oncoplastic surgery combines oncological resection with the conservation of some breast tissue while incorporating plastic surgery techniques for remodelling or partial breast reconstruction. This allows for a larger proportion of breast tissue to be removed while maintaining good cosmetic results. Oncoplastic procedures can be broadly categorized into two techniques: (I) volume displacement oncoplastic breast surgery (VD-OPS), through therapeutic mammoplasty, and (II) volume replacement oncoplastic breast surgery (VR-OPS), where autologous tissue is used to reconstruct the defect. VR-OPS involves the option of pedicled flaps rotated from the abdomen (5-7), chest wall (8,9) and back (10) as well as free flaps (11). The choice of flap is determined by tumour location, patient preference, and surgeon experience. In our unit, lateral chest wall perforator flaps (CWPFs) for partial volume replacement are used in the majority of cases requiring partial breast reconstruction (12). These are pedicled fascio-cutaneous flaps based on the lateral thoracic artery perforator (LTAP) flap or lateral intercostal artery perforator (LICAP) flap that spare muscle function thus eliminating the morbidity associated with traditional latissimus dorsi flap (13). The use of perforator flaps is gaining popularity due to this advantage, which facilitated rapid recovery and reduces the need for hospital resources (14).

Most of the evidence regarding the safety and outcomes of oncoplastic techniques is dominated by studies that combine volume displacement and volume replacement techniques or solely study mammaplasty alone (15,16). These studies often have relatively smaller numbers in the volume replacement group. Additionally, studies solely examining VR-OPS are largely limited to case series, revealing a noticeable lack of comparative research (15,16). Existing studies comparing VR-OPS to BCS often focus on latissimus dorsi flaps (17-19) or a combination of techniques (20,21). Only one study specifically compared mastectomy, BCS and lateral CWPFs (22). The recent multicentre cohort PartBreCon (23) study showed the feasibility and safety of CWPFs across a broad patient population, highlighting their potential for reducing deformity while maintaining oncological safety. However, the long-term outcomes of such techniques remain underexplored, especially in comparison to standard WLE.

The literature reveals an evidence gap, particularly regarding the long-term outcomes of volume-replacement techniques involving CWPFs and comparative data with BCS and/or mastectomy. The aim of this study is to compare the reliability and long-term safety of lateral CWPFs in partial breast reconstruction to WLE—the standard technique for BCS. Our objectives were to primarily see if there were any differences in oncological outcomes with a 7-year follow-up [local recurrence (LR) of the malignancy in the same breast, distant recurrence, and overall survival (OS)] as well as the need for further breast surgery due to inadequate cancer resection, such as re-excision for margin resection or completion mastectomy. We also examined surgical complications and the need

Highlight box

Key findings

- Patient selection: volume replacement oncoplastic breast surgery (VR-OPS) was more commonly performed in younger patients with larger tumors and greater node involvement compared to wide local excision (WLE).
- Surgical outcomes: VR-OPS achieved clearer margins and reduced the need for re-excisions or mastectomies.
- Oncological safety: both VR-OPS and WLE had similar rates of local recurrence and overall survival.

What is known and what is new?

- WLE is a standard breast-conserving surgery but may require additional surgeries for clear margins.
- VR-OPS offers a better margin clearance and fewer additional surgeries without compromising survival or recurrence rates.

What is the implication, and what should change now?

- Clinical practice: VR-OPS should be considered for younger patients with larger tumors due to its better surgical outcomes.
- Training & research: surgical training should include VR-OPS, and further studies should confirm these findings in larger populations.

for further surgery to address the cosmetic symmetry of the breasts. We present this article in accordance with the STROBE reporting checklist (available at https://gs.amegroups.com/article/view/10.21037/gs-24-385/rc).

Methods

A retrospective chart review was conducted and included all patients who underwent VR-OPS in 2012–2016 or WLE by the same surgeon in 2013–2014 at the Breast Surgery Department of Oxford University Hospitals. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). Local audit permissions were obtained from Oxford University Hospitals Trust (audit No. 4371). Informed consent was not required as this was a retrospective study with anonymised data.

VR-OPS was defined as any operation in which an autologous flap was used to fill a defect. In our study, this included LICAP flaps and LTAP flaps. WLE was defined as standard BCS without reconstruction, involving the removal of a portion of the breast tissue. The longer time periods were chosen for the VR-OPS group as significantly more WLE are performed per year. Patients who underwent mastectomy or volume displacement techniques as their initial operation for breast cancer were excluded from the study.

Clinicopathological, demographic, and treatment data were collected by authors H.A. and A.C. using an anonymised Excel template on Windows 10. Any queries were resolved by A.N. and P.G.R. Treatment decisions were made after discussion in the local multi-disciplinary team (MDT) meeting. The departmental policy set the adequacy of the radial margin distance at 2 mm. If margins were close or involved, further surgical treatment was recommended.

Women were followed up with radiological examinations annually for 5 years, and then every 3 years through the breast screening program. The evaluated outcomes included margins, re-excisions, complications, LR, regional and distal recurrence, OS, and breast cancer-specific deaths. Follow-up time was reported as the time from surgery to the last clinical encounter (recurrence/last radiological examination/clinic appointment) and the data extraction date.

Statistical analysis

Statistical analysis was performed using XLSTAT 2020.2.1. Categorical variables in a 2×2 comparison were assessed using Fisher's exact test, and for variables with more categories, the Chi-squared test was used. Continuous variables were compared using the student's *t*-test (two-sided). These are presented in the tables. The relative risk (RR) ratio with 95% confidence intervals (CIs) was also calculated for outcome variables and is reported in the text. Significance was set at $P \leq 0.05$.

Results

During the study periods, 80 patients underwent WLE and 79 patients in the VR-OPS group, of which 35 were based predominantly on LICAP flaps and 44 on LTAP flaps, 55 (70%) were undertaken as one stage flaps and 24 (30%) as two-stage. Around a quarter of patients underwent a two-stage approach to ensure adequate oncological resection (usually for larger tumour to breast ratios) prior to reconstruction. This involves a first stage to excise the cancer and fill the cavity with saline and then a second stage to raise and inset the flap, usually 3–4 weeks later once the pathology results are back.

There were no significant differences observed in terms of smoking status, cancer type, grade, lympho-vascular invasion, or multifocality between the two groups (*Table 1*). Patients in the VR-OPS group were significantly younger, more likely to be lymph node positive and had larger tumours on pre-operative imaging. Full details of clinicopathological factors are shown in *Table 1*. Treatment differences between the groups are displayed in *Table 2*. Significantly more patients in the VR-OPS group received neo-adjuvant chemotherapy and less adjuvant radiotherapy.

In the VR-OPS group, 5 women did not have radiotherapy—2 did not have clear margins and underwent completion mastectomy, 1 declined further treatment [she was offered mastectomy for involved margins for ductal carcinoma in situ (DCIS) or radiotherapy], and 2 were considered to have minimal benefit based on the disease profile [1 had oestrogen receptor $(ER)^+$/progesterone receptor $(PR)^+$/human epidermal growth factor receptor 2 $(HER2)^-$ G1 invasive ductal carcinoma (IDC) and was over 60 years old, 1 had ER^+ DCIS]. The patient who declined further treatment experienced recurrence 5 years after the initial diagnosis and underwent a mastectomy.

In the WLE group, 14 women did not receive radiotherapy: 7 had involved margins and therefore underwent completion mastectomy, 2 declined radiation therapy, and 5 were considered to have a small benefit

Table 1 Clinicopathological factors of VR-OPS and WLE

Characteristics	VR-OPS (n=79)	WLE (n=80)	P
Age (years)	51.63±8.83	58.18±10.87	P<0.001*
Smoking			0.33
Y	7	11	
N	72	69	
Tumour size on imaging (mm)	34.9±12.95	20.1±10.73	P<0.001*
Cancer type			0.77
Invasive ductal	56	62	
Invasive lobular	13	9	
Other invasive	5	5	
DCIS only	5	4	
DCIS			0.85
Y	46	46	
N	33	34	
Grade			0.053
1	11	24	
2	32	27	
3	31	25	
Quadrant			–
Upper outer	49	37	
Upper inner	1	18	
Lower outer	10	6	
Lower inner	0	7	
Outer	15	–	
Central	4	12	
Solitary/multifocal			0.46
Solitary	72	70	
Multifocal	7	10	
Presence of LV invasion			0.82
Y	23	22	
N	56	58	
Nodal status			0.08 at diagnosis
Positive at diagnosis	13	6	
Positive on SLNB	22	20	
Negative	39	50	
DCIS	5	4	

Data are presented as n or mean ± SD. *, P<0.05. VR-OPS, volume-replacement oncoplastic breast surgery; WLE, wide local excision; Y, yes; N, no; DCIS, ductal carcinoma in situ; LV, lympho-vascular; SLNB, sentinel lymph node biopsy; SD, standard deviation.

Table 2 Breast cancer treatments

Characteristics	VR-OPS (n=79)	WLE (n=80)	P
NAC			0.02*
Y	15	5	
N	64	75	
Adjuvant RT			0.03*
Y	74	66	
N	5	14	
CT			0.17
Y	45	54	
N	34	26	
ET			0.17
Y	58	66	
N	21	14	
Sample weight (g)	91.99±45.95	66.47±69.57	0.007*
Tumour size (mm)	31.04±20.56	24.44±16.83	0.03*
Axillary surgery			0.04*
SLNB	62	74	
Initial ANC	12	2	
ANC after SLNB	9	9	
Nil	5	4	

Data are presented as n or mean ± SD. *, P<0.05. VR-OPS, volume-replacement oncoplastic breast surgery; WLE, wide local excision; NAC, neo-adjuvant chemotherapy; Y, yes; N, no; RT, radiotherapy; CT, chemotherapy; ET, endocrine therapy; SLNB, sentinel lymph node biopsy; ANC, axillary node clearance; SD, standard deviation.

from radiotherapy (1 had DCIS, 4 had G1/2 small, solitary $ER^+/PR^+/HER2^-$ lymph node $(LN)^-$ women over 60 years old, with an average age of 77 years old). Out of these 14 women, there was 1 recurrence in a patient who initially declined radiotherapy and subsequently died from breast cancer.

In terms of axillary surgery, a higher number of women in the VR-OPS group underwent axillary node clearance (ANC) during the initial surgery, primarily due to a larger proportion of them being diagnosed with nodal positivity upon presentation. However, comparable numbers of women from both groups underwent ANC after undergoing sentinel lymph node biopsy (SLNB). It is worth noting that 30% of the VR-OPS group had high-risk cancers such as triple negative breast cancer (TNBC) or HER2 + ve, in contrast to only 17% in the standard group. However, it is

Table 3 Breakdown of cancer types per surgery type: VR-OPS or WLE

Hormone receptor status	VR-OPS	WLE
Triple positive	6	6
ER + ve, PR + ve, HER2 – ve	43	56
ER + ve, PR – ve, HER2 + ve	2	0
ER + ve, PR – ve, HER2 – ve	6	6
ER – ve, PR + ve, HER2 + ve	0	1
ER – ve, PR + ve, HER2 – ve	2	0
ER – ve, PR – ve, HER2 + ve	5	1
Triple negative	10	6
DCIS	5	4

Data are presented as n. VR-OPS, volume replacement oncoplastic breast surgery; WLE, wide local excision; ER, oestrogen receptor; PR, progesterone receptor; HER2, human epidermal growth factor receptor 2; DCIS, ductal carcinoma in situ.

Table 4 Short-term follow-up outcomes for VR-OPS and WLE

Outcomes	VR-OPS (n=79)	WLE (n=80)	P
Clear margins	72	59	0.009*
Re-excision/ mastectomy			0.06 for mastectomy
Re-excision	5	4	
Mastectomy	2	9	
Surgical complications	18 in 16 women	10 in 9 women (2 in symmetry surgery)	0.15
Surgery for aesthetic outcome			0.02*
Intervention breast	1	0	
Opposite breast	0	8	

Data are presented as n. *, P<0.05. VR-OPS, volume replacement oncoplastic breast surgery; WLE, wide local excision.

important to acknowledge that this difference did not reach statistical significance, likely due to the limited sample size (refer to *Table 3* for further details).

The short-term follow-up outcomes are presented in *Table 4*. Patients who underwent VR-OPS had a significantly higher likelihood of achieving clear margins (RR =0.3638; 95% CI: 0.1621 to 0.8162; P=0.01) and a lower likelihood of requiring a mastectomy (RR =0.2250; 95% CI: 0.0502 to 1.0089; P=0.06).

Although more complications were observed in women

Table 5 Breakdown of complications for VR-OPS or WLE

Complications	VR-OPS (n=79)	WLE (n=80)
Lymphoedema	2 (in breast)	5
Haematoma	1	0
Seroma	3	1
Wound infection/breakdown	4	3
Skin necrosis	1	1
Fat necrosis	4	0
Pain	1	0
Glue allergy	1	0
Pancreatitis post-op	1	0
Return to theatre within 30 days post-op	0	2
Total	18	10

Data are presented as n. VR-OPS, volume replacement oncoplastic breast surgery; WLE, wide local excision.

who underwent VR-OPS (RR =1.8228; 95% CI: 0.8982 to 3.6993; P=0.09), this difference was not statistically significant. The breakdown of complications is presented in *Table 5*, with symptomatic fat necrosis being more likely to occur after this surgery. These were clinically diagnosed or self-reported complications. Regarding 30-day return to theatre for complications, only 2 women in the WLE group required this. One had an infection that necessitated drainage, while the other needed excision of the infected wound in the symmetrized breast. No women in the VR-OPS group required a return to theatre. Additionally, more women in the WLE group needed surgery on the opposite breast to achieve symmetry (*Table 4*). VR-OPS women were less likely to require further surgery for symmetry (RR =0.1266; 95% CI: 0.0162 to 0.9887; P=0.04).

Long term oncological follow-up is shown in *Table 6*. Clinical endpoint is when women had their last follow-up mammogram or clinical appointment and the below is the months from surgery to data extraction. We found no significant difference in LR (RR =0.7949; 95% CI: 0.1152 to 5.484; P=0.81) or OS (RR =0.6551; 95% CI: 0.2633 to 1.6302; P=0.36) between the groups.

Discussion

The existing literature on VR-OPS lacks comparative studies, with most of the available evidence stemming from case series, thus hindering comprehensive conclusions in

Table 6 Long-term follow-up outcomes for VR-OPS and WLE

Outcomes	VR-OPS (n=78)	WLE (n=73)	P
Median follow-up time (months)			–
To clinical endpoint	60	60	
To data extraction	89.5	87	
Loss to follow up	1 (1.27)	7 (8.75)	–
Local recurrence (excluded those with eventual mastectomies)			0.87
Y	2[†]	2[†]	
N	74	60	
Regional and or distal recurrence			0.91
Y	6	6	
N	72	67	
Death			0.45
Breast cancer specific cause	3	4	
Any cause	4	6	

Data are presented as n or n (%). [†], local recurrence with simultaneous distant metastases. VR-OPS, volume replacement oncoplastic breast surgery; WLE, wide local excision; Y, yes; N, no.

this regard (24).

Our study contributes significantly to this limited body of comparative research (24) and, to the best of our knowledge, is the only long-term comparative study in the UK that focuses on the oncological safety of lateral CWPFs versus WLE.

Clinicopathological factors

Our data found that those who underwent VR-OPS in our study were significantly younger than the WLE group, which aligns with the findings of three other studies (22,25,26). However, other studies (19,27-29) found no significant age difference, potentially attributable to varying unit policies or patient choices in different countries.

According to our data, the primary factor determining the indication for oncoplastic breast surgery is the tumour size (relative to breast size) observed through imaging, regardless of tumour biology (16). This finding is consistent with other published studies (20,22,25,28,29), although one paper found this difference to be nonsignificant (27). Given that VR-OPS would be offered to patients who would have been predicted a poor cosmetic outcome with WLE, it follows logically that the tumour size (perhaps in ratio to breast size) is the determining factor. However, neither our study nor any other article, to our knowledge, has reported breast size to tumour ratio.

We did not examine co-morbidities or body mass index (BMI), although one study found that BMI may influence the choice of surgery (18) whereas three studies revealed no difference in BMI between the two groups (28-30). A large Danish cohort database study identified lower Charlson comorbidity indices among BCS patients relative to those undergoing VR-OPS (26).

In our VR-OPS cohort, there was a tendency towards worse disease biology, characterized by younger patients, larger tumours, and more positive axillary nodes. Nearly 30% of the cancers in the VR-OPS group were high-risk TNBC or HER2-positive, although this finding did not reach statistical significance due to small subgroup sizes. This trend of greater disease burden is further supported by the higher frequency of neoadjuvant chemotherapy administration among VR-OPS patients, which aligns with the findings of two other studies (20,22).

Oncological outcomes

Despite the observed higher disease burden, our long-term follow-up (median of 87 months) revealed no significant difference in oncological outcomes [LR, disease-free survival (DFS), and OS] between the VR-OPS and WLE groups, providing evidence of safety for the VR-OPS approach to treat breast cancer.

More VR-OPS surgeries occurred in 2016 (23) compared to earlier years (11–16 annually), reflecting the growing adoption of the technique. This trend reflects the growing adoption and familiarity with the technique. While later patients had slightly shorter follow ups, all completed 5 years, and the overall median of 87 months provides robust data for long term follow up.

Other studies have also found similar equivalence in terms of LR, although only two have sufficient follow-up (22,28). One study (28) focused on the latissimus dorsi (LD) technique with few numbers in each arm, while the other study (22) focused on the lateral CWPFs and had a 10-year follow-up. Another UK retrospective cohort study PartBreCon (23) found similar reassuring findings in terms of oncological outcomes but did not have as long follow-up.

Given that oncological control is primarily achieved through surgical intervention, specifically through the complete removal of cancerous tissue, a crucial aspect

to consider is the presence of positive margins and the subsequent need for further re-excisions or mastectomies. Our study revealed a significant reduction in the need for margin re-excisions and completion mastectomies in the VR-OPS group, even in cases with larger tumour sizes. Other studies have similarly highlighted a clear benefit in using VR-OPS to achieve clear margins (19,20,26).

This finding holds great clinical and economic significance, as it underscores the potential impact on the psycho-social well-being of patients and the logistical challenges within the cancer care pathway.

Complications

In our dataset, we have observed a greater number of complications in the VR-OPS group compared to the WLE group; however, it is worth noting that this difference did not achieve statistical significance. It is important to consider that the VR-OPS group received annual follow-ups outside of the routine hospital protocol, which could potentially account for the higher reported rate of complications.

Furthermore, the assessment of breast and/or arm lymphoedema in our study presents challenges as it was not the primary focus, and the reported figures are based on subjective patient reports. Lymphoedema is also influenced by other factors such as the extent of axillary surgery and radiotherapy, making it difficult to attribute solely to breast surgery (31).

Most complications encountered in our study were minor and did not necessitate hospital readmission or return to theatre. The observed differences in complication rates between the two groups did not achieve statistical significance, despite the potential for underreporting of minor complications in the WLE group. Other studies comparing VR-OPS to WLE have also found a slight increase in minor wound related complications or fat necrosis (21,25) in the VR-OPS group.

We have previously published regarding recall rates (27). There is no difference with regards to surveillance imaging and biopsies needed after either VR-OPS or WLE (19,27).

Cosmesis

We assessed and compared the need for symmetrisation surgery in the two groups, this has not been reported before. After a median follow-up of 87 months, a significantly higher proportion of women in the WLE group required contralateral breast surgery (*Table 6*). This emphasises the need for additional procedures needed to attain satisfactory symmetry after WLE, thus incurring further costs and risks to the healthcare and the patient.

We would like to acknowledge that the data on cosmetic outcomes and patient-reported outcome measures (PROMs) is lacking in our study. One comparative study has investigated PROMs, utilizing a self-designed questionnaire and the disabilities of the arm, shoulder and hand (DASH) score to assess shoulder disability (29). To our knowledge, no published studies have directly compared patient and clinician-reported outcomes, cosmetic evaluation, or the necessity for additional cosmetic procedures.

Conclusions

The existing evidence, including our findings, demonstrates that VR-OPS is an oncological and surgical safe option for breast cancer treatment. Despite our study being one of the largest comparative studies published, it is still limited by the fact it is retrospective, single-centred and its size. Post-hoc power calculations on overall recurrence revealed a power score of 3.3% thus indicating statistical uncertainty with the results.

There is a compelling argument for a large, well-controlled multicentre cohort study studying oncological outcomes, adverse events, cosmetic evaluation, financial impact, impact on hospital logistics, evaluation of radiotherapy workload and PROMs.

One such study on PROMS (32) compared OPS patients to WLE and found that the OPS group had similar outcomes in the Breast-Q for breast satisfaction. They had a pre-operative lower psychosocial well-being score potentially due to higher disease burden but post-surgery at 5-year these differences were no longer present. This makes a compelling case for integrating PROMs into future studies.

This study also demonstrated why there is a debate around the choice of a comparator for VR-OPS, with some advocating for mastectomy over WLE due to histopathological similarities (33). This is especially important considering the recent work on the use of ‘extreme oncoplasty’ for larger tumours that would have previously undergone mastectomy (34).

Thus, any future study could consider comparing VR-OPS to mastectomy with or without reconstruction.

Such studies looking at oncological outcomes compared to mastectomy (35) have so far reassuringly found no significant difference here also among cancers of a similar profile though larger long-term work is needed.

We also advocate for greater attention to volume replacement oncoplastic techniques in surgical training programs to empower the next generation of surgeons with a broader array of options to offer to their patients.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at https://gs.amegroups.com/article/view/10.21037/gs-24-385/rc

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References

1. Fisher B, Anderson S, Bryant J, et al. Twenty-year follow-up of a randomized trial comparing total mastectomy, lumpectomy, and lumpectomy plus irradiation for the treatment of invasive breast cancer. N Engl J Med 2002;347:1233-41.
2. Early Breast Cancer Trialists' Collaborative Group. Effects of radiotherapy and surgery in early breast cancer. An overview of the randomized trials. N Engl J Med 1995;333:1444-55. Erratum in: N Engl J Med 1996;334:1003.
3. Kim MK, Kim T, Moon HG, et al. Effect of cosmetic outcome on quality of life after breast cancer surgery. Eur J Surg Oncol 2015;41:426-32.
4. Waljee JF, Hu ES, Ubel PA, et al. Effect of esthetic outcome after breast-conserving surgery on psychosocial functioning and quality of life. J Clin Oncol 2008;26:3331-7.
5. Kijima Y, Yoshinaka H, Hirata M, et al. Oncoplastic surgery combining partial mastectomy and immediate volume replacement using a thoracodorsal adipofascial cutaneous flap with a crescent-shaped dermis. Surg Today 2014;44:2098-105.
6. Ogawa T, Hanamura N, Yamashita M, et al. Usefulness of breast-volume replacement using an inframammary adipofascial flap after breast-conservation therapy. Am J Surg 2007;193:514-8.
7. Hamdi M, Craggs B, Stoel AM, et al. Superior epigastric artery perforator flap: anatomy, clinical applications, and review of literature. J Reconstr Microsurg 2014;30:475-82.
8. Takeda M, Ishida T, Ohnuki K, et al. Breast conserving surgery with primary volume replacement using a lateral tissue flap. Breast Cancer 2005;12:16-20.
9. Hamdi M, Van Landuyt K, de Frene B, et al. The versatility of the inter-costal artery perforator (ICAP) flaps. J Plast Reconstr Aesthet Surg 2006;59:644-52.
10. Raja MA, Straker VF, Rainsbury RM. Extending the role of breast-conserving surgery by immediate volume replacement. Br J Surg 1997;84:101-5.
11. McCulley SJ, Macmillan RD, Rasheed T. Transverse Upper Gracilis (TUG) flap for volume replacement in

breast conserving surgery for medial breast tumours in small to medium sized breasts. J Plast Reconstr Aesthet Surg 2011;64:1056-60.
12. Hu J, Tenovici A, Parulekar V, et al. The impact of partial breast reconstruction with lateral chest wall perforator flaps on post-operative cancer surveillance. Ann Breast Surg 2018;2:10.
13. Orabi A, Youssef MMG, Manie TM, et al. Lateral chest wall perforator flaps in partial breast reconstruction. J Egypt Natl Canc Inst 2022;34:2.
14. Chartier C, Safran T, Alhalabi B, et al. "Locoregional perforator flaps in breast reconstruction: An anatomic review & quadrant algorithm". J Plast Reconstr Aesthet Surg 2022;75:1328-41.
15. Nanda A, Hu J, Hodgkinson S, et al. Oncoplastic breast-conserving surgery for women with primary breast cancer. Cochrane Database Syst Rev 2021;10:CD013658.
16. Hu J, Rainsbury RM, Segaran A, et al. Objective assessment of clinical, oncological and cosmetic outcomes following volume replacement in patients undergoing oncoplastic breast-conserving surgery: protocol for a systematic review. BMJ Open 2018;8:e020859.
17. Hashimoto Y, Ishitobi M, Okuno J, et al. Comparison of oncological outcomes in breast-conserving surgery with immediate latissimus dorsi flap reconstruction versus breast-conserving surgery alone. The Breast 2019;44:S108.
18. Ozmen V, Ilgun S, Celet Ozden B, et al. Comparison of breast cancer patients who underwent partial mastectomy (PM) with mini latissimus dorsi flap (MLDF) and subcutaneous mastectomy with implant (M + I) regarding quality of life (QOL), cosmetic outcome and survival rates. World J Surg Oncol 2020;18:87.
19. Fan KL, Yang S, Park S, et al. Postoperative Cancer Surveillance Following Oncoplastic Surgery with Latissimus Dorsi Flap: a Matched Case-Control Study. Ann Surg Oncol 2019;26:4681-91.
20. Bali R, Kankam HKN, Borkar N, et al. Wide Local Excision Versus Oncoplastic Breast Surgery: Differences in Surgical Outcome for an Assumed Margin (0, 1, or 2 mm) Distance. Clin Breast Cancer 2018;18:e1053-7.
21. Nakada H, Inoue M, Furuya K, et al. Fat necrosis after breast-conserving oncoplastic surgery. Breast Cancer 2019;26:125-30.
22. Nakagomi H, Inoue M, Nakada H, et al. Lateral thoracoaxillar dermal-fat flap for breast conserving surgery: the changes of the indication and long-term results. Breast Cancer 2019;26:595-601.
23. Agrawal A, Romics L, Thekkinkattil D, et al. 'PartBreCon' study. A UK multicentre retrospective cohort study to assess outcomes following PARTial BREast reCONstruction with chest wall perforator flaps. Breast 2023;71:82-8.
24. Nanda A, Ali S, Hu J, et al. Systematic review comparing volume replacement oncoplastic surgery to all other surgical techniques. European Journal of Surgical Oncology 2023;49:E224.
25. Ozmen V, Sarsenov D, Ozmen T, et al. Abstract P2-12-17: Mini latissimus dorsi flap increases breast conserving surgery rate in early stage breast cancer patients. Cancer Res 2016;76:abstr P2-12-17.
26. Heeg E, Jensen MB, Hölmich LR, et al. Rates of re-excision and conversion to mastectomy after breast-conserving surgery with or without oncoplastic surgery: a nationwide population-based study. Br J Surg 2020;107:1762-72.
27. Hu J, Cuffolo G, Parulekar V, et al. The Results of Surveillance Imaging After Breast Conservation Surgery and Partial Breast Reconstruction With Chest Wall Perforator Flaps; A Qualitative Analysis Compared With Standard Breast-Conserving Surgery for Breast Cancer. Clin Breast Cancer 2019;19:e422-7.
28. Lee J, Jung JH, Kim WW, et al. Comparison of 5-year oncological outcomes of breast cancer based on surgery type. ANZ J Surg 2018;88:E395-9.
29. Zhou L, Wang Y, Cai R, et al. Pedicled descending branch latissimus dorsi mini-flap in repairing partial mastectomy defect: Shoulder functional and esthetic outcomes. J Surg Oncol 2019;120:518-26.
30. Nian H, Fan C, Zheng C, et al. Impact of evidence-based care together with extended care on the psychological status of breast cancer patients. Int J Clin Exp Med 2018;11:13689-96.
31. Fleissig A, Fallowfield LJ, Langridge CI, et al. Post-operative arm morbidity and quality of life. Results of the ALMANAC randomised trial comparing sentinel node biopsy with standard axillary treatment in the management of patients with early breast cancer. Breast Cancer Res Treat 2006;95:279-93.
32. Pak LM, Matar-Ujvary R, Verdial FC, et al. Long-Term Patient-Reported Outcomes Comparing Oncoplastic Breast Surgery and Conventional Breast-Conserving Surgery: A Propensity Score-Matched Analysis. Ann Surg Oncol 2023;30:7091-8.
33. Mansell J, Weiler-Mithoff E, Martin J, et al. How to

compare the oncological safety of oncoplastic breast conservation surgery - To wide local excision or mastectomy? Breast 2015;24:497-501.
34. Hossino D, Silverstein MJ, Savalia N, et al. Extreme Oncoplasty: Oncologically Safe When Compared with Mastectomy. Ann Surg Oncol 2024;31:7284-8.
35. De Lorenzi F, Borelli F, Pagan E, et al. Oncoplastic Breast-Conserving Surgery for Synchronous Multicentric and Multifocal Tumors: Is It Oncologically Safe? A Retrospective Matched-Cohort Analysis. Ann Surg Oncol 2022;29:427-36.

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