Section: Surgery

Systematic Review Article

SURGICAL EVOLUTION IN BREAST CANCER CARE: A SYSTEMATIC REVIEW

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Received *: 10/01/2026*
Received in revised form *: 17/02/2026*
Accepted *: 04/03/2026*

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DOI: 10.70034/ijmedph.2026.1.425

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (1); 2455-2461

ABSTRACT

Background: Breast cancer surgery has evolved significantly over the past century, shifting from radical mastectomy to breast-conserving and oncoplastic approaches that prioritize oncological safety alongside cosmetic and quality-of-life outcomes. Advances in tumor biology, imaging, radiotherapy, systemic therapy, and surgical techniques have driven this transition toward less invasive and more reconstructive strategies. However, a comprehensive synthesis of evidence outlining this surgical evolution and its clinical implications remains limited. **Objectives:** This systematic review aims to evaluate the evolution of surgical management in breast cancer care and compare radical, conservative, and oncoplastic approaches in terms of oncological outcomes.

Materials and Methods: This systematic review was conducted in accordance with PRISMA guidelines. A comprehensive search of PubMed, Scopus, Web of Science, and Google Scholar was performed using keywords related to breast cancer surgery, including mastectomy, breast-conserving surgery, nipple-sparing mastectomy, skin-sparing mastectomy, oncoplastic surgery, and neoadjuvant chemotherapy. English-language studies evaluating surgical management in breast cancer were included. Eligible study designs included randomized controlled trials, cohort studies, case–control studies, and cross-sectional studies, review articles. Editorials, commentaries, conference abstracts, and studies lacking extractable data or clear outcomes were excluded. Study selection, data extraction, and quality assessment were conducted independently by two reviewers. Due to heterogeneity among studies, findings were synthesized qualitatively.

Results: A total of 25 studies were included in this review. Oncoplastic breast-conserving surgery (OBCS) demonstrated comparable or improved oncologic outcomes compared with conventional breast-conserving surgery, with lower positive margin, re-excision, and locoregional recurrence rates in pooled analyses, while maintaining similar complication profiles. Nipple-sparing and skin-sparing mastectomy showed low local and distant recurrence rates, supporting their oncologic safety in appropriately selected patients. Sentinel lymph node biopsy demonstrated high identification and accuracy rates, supporting axillary de-escalation, while axillary radiotherapy provided comparable regional control with lower lymphedema risk than axillary dissection. Emerging evidence suggests that further surgical de-escalation or omission after pathological complete response may be feasible in selected patients, though robust randomized data are still required.

Conclusion: Oncoplastic breast-conserving surgery is oncologically safe and offers improved margin control, fewer re-excisions, and better patient satisfaction compared with conventional techniques. Axillary and mastectomy approaches have also evolved toward effective yet less morbid strategies. Further surgical de-escalation after neoadjuvant therapy appears promising but requires stronger long-term evidence.

Keywords: Breast cancer care, Breast surgery, Mastectomy, Breast-conserving surgery, Nipple-sparing mastectomy, Skin-sparing mastectomy, Oncoplastic surgery, Neoadjuvant chemotherapy.

INTRODUCTION

According to global burden of cancer worldwide using the GLOBOCAN 2018, there were an estimated 18.1 million new cancer cases (17.0 million excluding nonmelanoma skin cancer) and 9.6 million deaths worldwide. Lung cancer was the most commonly diagnosed cancer (11.6%) and the leading cause of cancer mortality (18.4%). Breast, prostate, and colorectal cancers were also among the most frequently diagnosed, while colorectal, stomach, and liver cancers accounted for a substantial proportion of deaths. In men, lung cancer was the leading cancer for both incidence and mortality, whereas in women, breast cancer ranked first for both, followed by colorectal, lung, and cervical cancers (Bray F et al., 2018).[1]

With the expansion of surgical techniques to include systematic axillary dissection, clearance of the infraclavicular and frequently the supraclavicular regions, along with partial excision of the pectoralis major muscle, the concept of local recurrence evolved to encompass tumor reappearance in any of these treated areas (Halsted WS., 1894).[2]

In 1976, a randomized clinical trial was launched to compare the effectiveness of lumpectomy, with or without radiotherapy, to total mastectomy in women with invasive breast cancer (Fisher B et al., 2002).[3]

The study by Veronesi U et al., 2002, reports 20-year follow-up results from a randomized trial comparing radical (Halsted) mastectomy with breast-conserving surgery in women with early-stage breast cancer. Between 1973 and 1980, 701 patients with tumors ≤2 cm were randomly assigned to either radical mastectomy (349 women) or quadrantectomy followed by radiotherapy (352 women). From 1976 onward, patients in both groups with positive axillary lymph nodes also received adjuvant chemotherapy using cyclophosphamide, methotrexate, and fluorouracil.[4]

Study by Giuliano AE et al., 1994, assessed the feasibility and accuracy of sentinel lymph node biopsy in breast cancer as a less invasive alternative to axillary lymph node dissection (ALND). Since limited dissection may miss metastases and ALND can cause lymphedema, intraoperative lymphatic mapping was performed in 174 cases using a vital dye injected at the tumor site to identify and remove the first draining (sentinel) node before ALND.[5]

The SENTINA trial was a prospective multicentre study evaluating the optimal timing of sentinel lymph node biopsy (SLNB) in breast cancer patients undergoing neoadjuvant chemotherapy. Patients were managed based on nodal status before and after treatment, with SLNB performed either before chemotherapy, after conversion from node-positive to node-negative status, or omitted in persistently node-positive cases. The primary aim was to determine the false-negative rate of SLNB after chemotherapy in patients who converted to node-negative disease, along with assessment of detection and accuracy rates (Kuehn T et al., 2013).[6]

Since axillary lymph node involvement is a key prognostic factor in breast cancer, this retrospective study examined whether sentinel lymph node biopsy (SLNB) is necessary in patients initially diagnosed with ductal carcinoma in situ (DCIS). The analysis included 78 patients treated between 2002 and 2010 who underwent SLNB or axillary dissection during primary surgery. The study evaluated the frequency of nodal metastasis and the rate at which invasive cancer was underestimated at initial diagnosis (Son BK et al., 2011).[7]

Objectives: This systematic review aims to assess the evolution of surgical management in breast cancer care and to compare radical, conservative, and oncoplastic approaches with respect to oncological outcomes.

MATERIALS AND METHODS

The review conducted in accordance with the PRISMA guidelines. A comprehensive literature search was performed using databases including PubMed, Scopus, Web of Science, and Google Scholar using key words Breast cancer care, Breast surgery, Mastectomy, Breast-conserving surgery, Nipple-sparing mastectomy, Skin-sparing mastectomy, Oncoplastic surgery, Neoadjuvant chemotherapy. Studies published in English evaluating the use of POCUS in the initial assessment of trauma patients in the emergency department were included. Eligible study designs included randomized controlled trials, cohort studies, case–control studies, and cross-sectional studies, review articles. Non-English papers without extractable data, lacked clear outcome measures or evaluable results, editorials, commentaries, conference abstracts, were excluded.

Titles, abstracts, and full texts were independently screened by two reviewers, with disagreements resolved through discussion. Data extraction and quality assessment were performed independently using standardized tools appropriate to study design. Due to heterogeneity among studies, a qualitative synthesis was conducted.

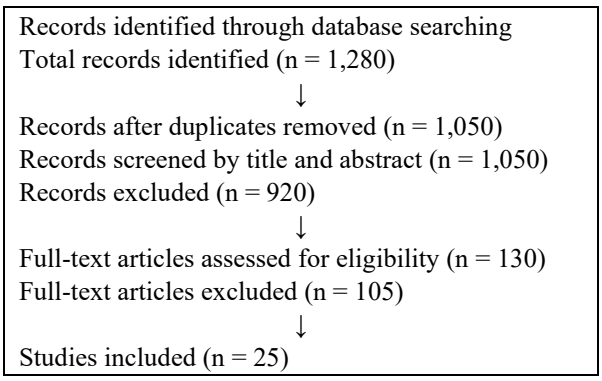

Figure 1: PRISMA flow diagram of study selection process

RESULTS AND DISCUSSION

Breast-conserving surgery vs mastectomy

A meta-analysis by Hasan MT et al., 2023, found that oncoplastic breast-conserving surgery (OPBCS) significantly outperformed conventional surgery (CBCS) in reducing re-excision rates (RR 0.49, P < 0.00001). While safety outcomes and risks for local recurrence or subsequent mastectomy were largely comparable, sensitivity analysis showed a significant advantage for OPBCS in lowering local recurrence.[8]

Thirty-one studies including 115,011 patients (11,978 OBCS and 103,033 Breast-conserving surgery [BCS]) were analyzed. Compared with BCS, OBCS was associated with lower rates of positive margins (OR [odds ratio] 0.76, P = 0.05), re-excision (OR 0.72, P = 0.02), and locoregional recurrence (OR 0.62, P = 0.03). Postoperative complication rates were similar between the two groups (Mohamedahmed AYY et al., 2022).[9]

Among 82 patients (43 BCS, 39 oncoplastic surgery [OPS]), age was similar between groups. OPS patients had larger tumors and higher complication rates (7.6% vs 0%), while positive margins were more common in BCS (9.3% vs 2.5%). Tumor type and immunohistochemistry were comparable between groups (Azhar RY et al., 2025).[10]

Advances in neoadjuvant systemic therapy have significantly improved pathological complete response (pCR) rates in breast cancer, leading to debate about whether surgery can be safely omitted in selected patients after neoadjuvant chemotherapy (NAC). As surgical approaches to the breast and axilla have become less extensive over time, and minimally invasive methods for predicting pCR have improved, omission of surgery may be feasible in carefully chosen cases. However, accurately identifying true pCR remains challenging, and high-quality randomized trials are needed to confirm the safety of this strategy (Feng K et al.,2022).[11]

Oncoplastic breast-conserving surgery was performed in patients with larger, multifocal, and biologically aggressive tumors, yet reoperation and local recurrence rates were comparable to conventional breast-conserving surgery. These findings indicate that oncoplastic techniques are oncologically safe and expand the option of breast conservation to patients who might otherwise require mastectomy (Niinikoski L et al., 2019).[12]

Nipple-sparing and skin-sparing mastectomy

In a systemic review by Zaborowski AM et al., 2023, 17 retrospective studies involving 7107 patients were included. Nipple-sparing mastectomy was performed primarily for invasive cancer in 85.4% of patients (n=6069) and for in situ disease in 14.6% (n=1038). The median follow-up period was 48 months (range 25–94 months). The pooled mean rates of local recurrence and recurrence involving the nipple–areola complex (NAC) were 5.4% (0.9–11.9) and 1.3% (0–4.9), respectively, while the mean distant recurrence rate was 4.8% (1.5–23.0). These findings suggest that therapeutic nipple-sparing mastectomy is oncologically safe in appropriately selected breast cancer patients.[13]

A comparative study by Frey JD et al., 2016, From 2006–2014, 319 patients (555 breasts) underwent nipple-sparing mastectomy, with long-term follow-up available for 141 patients. The mean age was 47.8 years and mean BMI was 24.6; 84% had surgery for therapeutic indications. The average tumor size was 1.5 cm, most commonly invasive ductal carcinoma (62.7%) followed by Ductal Carcinoma In Situ (DCIS) (23.7%). At a mean follow-up of 30.7 months, ipsilateral chest-wall recurrence occurred in 0.8% of patients, with a complication rate of 0.37 per patient.[14]

A total of 721 nipple-sparing mastectomies were performed in 413 patients, with 10.9% for risk reduction and 89.1% for breast cancer treatment. Among cancer cases, 29.8% had ductal carcinoma in situ and 70.2% had invasive disease. Over a mean follow-up of 32 months, the 3-year recurrence-free survival rate was 93.6% (95% CI, 89.9–96.0%). Locoregional recurrence occurred in 2.2% of patients, distant recurrence in 2.4%, and 1.6% experienced both (Moo TA et al., 2016).[15]

Axillary management — sentinel node era and de-escalation

Sentinel nodes were successfully identified in 65.5% of procedures and accurately reflected axillary status in 95.6% of cases. A clear learning curve was observed, with all false negatives occurring early in the study; in the final 87 procedures, accuracy reached 100%. In 38% of clinically negative but pathologically positive cases, the sentinel node was the only involved node. Evaluation of recent cases also showed that some metastases were confined to level II nodes, which might have been missed with limited axillary dissection (Giuliano AE et al., 1994).[5]

Between 2001 and 2010, 4,806 eligible patients from 34 European centers were randomized to axillary lymph node dissection (ALND; n=2402) or axillary radiotherapy (ART; n=2404). Among 1,425 patients with a positive sentinel node (744 ALND, 681 ART; median follow-up 6.1 years), additional positive nodes were found in 33% of those undergoing

ALND. Axillary recurrence was rare: 0.43% after ALND versus 1.19% after ART at 5 years. The non-inferiority analysis was underpowered due to few events. Ipsilateral arm lymphedema occurred significantly more often after ALND at 1, 3, and 5 years (Donker M et al., 2014).[16]

Sentinel lymph node surgery after neoadjuvant chemotherapy

In Boughey JC et al., 2013, a total of 756 patients were enrolled from 136 institutions. Among 663 patients with cN1disease, 649 underwent chemotherapy followed by both Sentinel lymph node (SLN) surgery and axillary lymph node dissection (ALND). SLNs were not identified in 7.1% of patients, and only one SLN was removed in 12%. Of the 525 patients with two or more SLNs excised, 41% achieved nodal pathological complete response (95% CI: 36.7%–45.3%). However, 39 patients had negative SLNs but positive nodes on ALND, resulting in a false-negative rate of 12.6% (90% Bayesian credible interval: 9.85%–16.05%).[17]

In patients with biopsy-confirmed node-positive breast cancer treated with neoadjuvant chemotherapy, sentinel node biopsy demonstrated a low false-negative rate of 8.4% when immunohistochemistry (IHC) was routinely used. Metastases of any size in sentinel nodes should be considered clinically significant. The identification rate was 87.6%, and axillary dissection remains necessary in cases of mapping failure. Further research is needed before incorporating routine IHC assessment into future guidelines for SLNB after neoadjuvant therapy (Boileau JF et al., 2015).[18]

Reconstruction: timing and techniques

A total of 146 patients (43%) participated, including 77 (53%) who underwent immediate and 69 (47%) delayed reconstruction. Median age was 55 years in the immediate group and 60 years in the delayed group, with a median follow-up of 2.3 years. There were no significant differences between groups in breast satisfaction, chest physical well-being, psychosocial well-being, or(Short Form Survey) SF-36 quality-of-life scores (Kuhlefelt C et al., 2024).[19]

Table 1:Summary of Key Findings on Surgical Evolution in Breast Cancer Care

Study / Year	Intervention Comparison	Key Findings	Conclusion
Hasan MT et al., 2023	OPBCS vs CBCS	Compared with CBCS, OPBCS significantly reduces re-excision rates, while maintaining comparable safety and long-term oncological outcomes	Potential additional benefit of OPBCS in lowering local recurrence
Mohamedahmed AYY et al., 2022	OBCS vs BCS	Lower positive margins (OR 0.76), re-excision (OR 0.72), and locoregional recurrence (OR 0.62) with OBCS; similar complications	OBCS provides Lower rates of positive margins
Azhar RY et al., 2025	OPS vs BCS	Larger tumors; slightly higher complications in OPS, while positive margins were more common in BCS (9.3% vs 2.5%)	OPS safe in challenging tumors
Fang K et al., 2022	NAC with surgery vs potential surgery omission after pCR	Improved pCR rates and less extensive surgery; challenges remain in accurately confirming true pCR.	Surgery omission may be feasible in selected patients but requires validation through high-quality randomized trials.
Niinikoski L et al., 2019	OBCS vs BCS	Comparable recurrence and reoperation rates despite larger/aggressive tumors	OBCS Expands eligibility for breast conservation
Zaborowski AM et al., 2023	Nipple-sparing mastectomy	Local recurrence 5.4%; NAC recurrence 1.3%; distant recurrence 4.8%	Oncologically safe in selected patients
Frey JD et al., 2016	Nipple-sparing mastectomy	0.8% chest-wall recurrence; low complication rate (0.37 per patient)	Low complication rate
Moo TA et al., 2016	Nipple-sparing mastectomy	3-yearrecurrence-free survival rate 93.6%; locoregional recurrence 2.2%	Effective therapeutic option
Giuliano AE et al., 1994	Sentinel lymph node biopsy	95.6% accuracy; learning curve observed	Reliable axillary staging tool
Donker M et al., 2014	ALND vs ART	lower lymphedema with ART	Axillary recurrence was rare: 0.43% after ALND versus 1.19% after ART at 5 years.
Boughey JC et al., 2013	SLN surgery after NAC	False-negative rate 12.6%; 41% nodal pCR	caution required when omitting ALND
Boileau JF et al., 2015	SLNB + IHC after NAC	False-negative rate 8.4%; identification 87.6%	(IHC) in sentinel lymph node biopsy after neoadjuvant therapy requires further high-quality evidence before being incorporated into clinical guidelines
Kuhlefelt C et al., 2024	Immediate vs Delayed Reconstruction	No significant differences in satisfaction, physical or psychosocial well-being.	Both reconstruction timings acceptable

Oncoplastic surgery outcomes

Among 362 women from 32 UK centers, 81% underwent oncoplastic breast-conserving surgery. Clear margins were achieved in 82% after initial surgery, and 4% required completion mastectomy. Major complications were more frequent with immediate reconstruction. Volume displacement techniques improved breast satisfaction and psychosocial well-being, though chest-related physical well-being declined at follow-up (Charlotte Davies et al., 2025).[20]

In a study by Chauhan A et al., 2016, found that compared with 46 conventional cases, 33 patients undergoing oncoplastic surgery had larger specimen volumes and wider margins, with similar tumor volumes and complication rates. Close or positive margins were more common in the conventional group. No locoregional recurrences were observed after oncoplastic surgery at 18 months, whereas six occurred in the conventional group at 38 months. Oncoplastic surgery permits removal of larger tissue volumes and achieves wider margins compared with conventional breast-conserving surgery. However, extended follow-up is needed to determine whether this leads to improved locoregional control.[21]

Substituting conventional breast-conserving surgery with oncoplastic techniques does not compromise oncologic outcomes and is associated with enhanced patient satisfaction and improved psychosocial well-being (Tahmasebi S et al., 2022).[22]

Heeg E et al., 2020, found that among 18,188 patients, 72.5% underwent conventional breast-conserving surgery and 27.5% oncoplastic surgery, predominantly using volume displacement techniques. Re-excision rates were slightly lower with oncoplastic surgery (14.1% vs 15.6%), and adjusted analyses demonstrated a reduced risk of both re-excision and conversion to mastectomy compared with conventional surgery, particularly with volume displacement and reduction approaches; these results were consistent after propensity score matching.[23]

Emerging trend: omission or further de-escalation of surgery after pathological complete response (pCR)

Breast cancer management has advanced with neoadjuvant systemic therapy and improved tumor biology insights, enabling more personalized treatment. This review explores the possibility of omitting breast and axillary surgery in patients achieving pathologic complete response after therapy. Although accurately identifying these patients before surgery remains challenging, image-guided biopsy may improve selection. Ongoing trials show promising early results, and both patients and clinicians increasingly support further research into reducing or avoiding surgery in selected cases (Tasoulis MK et al., 2024).[24]

Predicting pathologic complete response after neoadjuvant chemotherapy is challenging, as clinical assessment, imaging, and biopsies may yield significant false-negative rates, though careful selection improves accuracy. Surgical omission trials show promising early results but are limited by small sample sizes and low patient acceptance. A more feasible approach may be surgical de-escalation, such as avoiding mastectomy. However, data are scarce for triple-negative and (Human Epidermal Growth Factor Receptor) HER2-positive multifocal or multicentrictumors, and further research is needed to confirm safety and applicability (Phang F et al., 2025).[25]

CONCLUSION

Based on the available evidence, the oncoplastic approach appears to be preferable to the conventional technique in women with breast cancer. Additionally, OPBCS was associated with more favorable re-excision outcomes (Hasan MT et al., 2023).[8]

Despite the absence of level I evidence, current data indicate that OBCS provides outcomes that are comparable or superior to conventional BCS. It allows resection of larger tumors, achieves wider margins, and offers improved cosmetic results (Mohamedahmed AYY et al., 2022).[9]

OPS represents a reliable alternative for managing early-stage breast cancer, particularly in challenging tumor locations, as it is associated with lower rates of positive margins and consequently fewer re-excisions (Azhar RY et al., 2025).[10]

Improvements in adjuvant therapy and longer survival have shifted attention toward patient quality of life. Over the past decades, breast and axillary surgeries have become less extensive as systemic treatments have grown more targeted and effective. This shift reflects recognition that surgery can be invasive and may not be required for certain patients, highlighting the need to explore alternative strategies for those who respond exceptionally well to neoadjuvant chemotherapy (Feng K et al.,2022).[11]

Intraoperative lymphatic mapping can reliably detect the sentinel lymph node most likely to harbor metastasis in selected patients. With increased expertise and refinement, this approach may improve staging precision and potentially reduce the need for routine axillary lymph node dissection (ALND) (Giuliano AE et al., 1994).[5]

Institutional analysis by Frey JD et al., 2016, of nipple-sparing mastectomy demonstrated a locoregional recurrence rate of 0.8%, with no recurrences involving the nipple–areolar complex. This outcome compares favourably with previously reported recurrence rates for both nipple-sparing and skin-sparing mastectomy.[14]

In patients with T1–2 breast cancer and a positive sentinel node, ALND and ART provide similarly excellent axillary control, but ART is associated with lower morbidity (Donker M et al., 2014).[16]

In women with cN1 breast cancer treated with neoadjuvant chemotherapy and at least two SLNs evaluated, the false-negative rate exceeded 10%. Therefore, to consider SLN surgery as a substitute for ALND, improved techniques and stricter patient

selection would be required to enhance diagnostic accuracy (Boughey JC et al., 2013).[17]

Charlotte Davies et al., 2025, concluded that oncoplastic breast-conserving surgery enables over 95% of women to avoid mastectomy, with fewer major complications than immediate reconstruction and improved patient satisfaction. It should be considered a viable alternative to mastectomy whenever technically appropriate.[20]

Ongoing trials on surgical omission show encouraging early outcomes; however, patient preferences must be carefully considered in future study designs. Broader implementation may be limited by available resources, and large-scale studies with extended follow-up are required to establish the safety of surgical de-escalation in high-risk patients(Phang F et al., 2025).[25]

Acknowledgement

The authors sincerely thank all researchers whose studies were included in this systematic review. They also express their appreciation to their mentor and supervisor for their valuable guidance and support throughout the study. No external funding was received for this work, and the authors declare no conflicts of interest.

REFERENCES

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2018 Nov;68(6):394-424. doi: 10.3322/caac.21492. Epub 2018 Sep 12. Erratum in: CA Cancer J Clin. 2020 Jul;70(4):313. doi: 10.3322/caac.21609. PMID: 30207593.
2. Halsted WS. I. The Results of Operations for the Cure of Cancer of the Breast Performed at the Johns Hopkins Hospital from June, 1889, to January, 1894. Ann Surg. 1894 Nov;20(5):497-555. doi: 10.1097/00000658-189407000-00075. PMID: 17860107; PMCID: PMC1493925.
3. Fisher B, Anderson S, Bryant J, Margolese RG, Deutsch M, Fisher ER, Jeong JH, Wolmark N. 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 Oct 17;347(16):1233-41. doi: 10.1056/NEJMoa022152. PMID: 12393820.
4. Veronesi U, Cascinelli N, Mariani L, Greco M, Saccozzi R, Luini A, Aguilar M, Marubini E. Twenty-year follow-up of a randomized study comparing breast-conserving surgery with radical mastectomy for early breast cancer. N Engl J Med. 2002 Oct 17;347(16):1227-32. doi: 10.1056/NEJMoa020989. PMID: 12393819.
5. Giuliano AE, Kirgan DM, Guenther JM, Morton DL. Lymphatic mapping and sentinel lymphadenectomy for breast cancer. Ann Surg. 1994 Sep;220(3):391-8; discussion 398-401. doi: 10.1097/00000658-199409000-00015. PMID: 8092905; PMCID: PMC1234400.
6. Kuehn T, Bauerfeind I, Fehm T, Fleige B, Hausschild M, Helms G, Lebeau A, Liedtke C, von Minckwitz G, Nekljudova V, Schmatloch S, Schrenk P, Staebler A, Untch M. Sentinel-lymph-node biopsy in patients with breast cancer before and after neoadjuvant chemotherapy (SENTINA): a prospective, multicentre cohort study. Lancet Oncol. 2013 Jun;14(7):609-18. doi: 10.1016/S1470-2045(13)70166-9. Epub 2013 May 15. PMID: 23683750.
7. Son BK, Bong JG, Park SH, Jeong YJ. Ductal carcinoma in situ and sentinel lymph node biopsy. J Breast Cancer. 2011 Dec;14(4):301-7. doi: 10.4048/jbc.2011.14.4.301. Epub 2011 Dec 27. PMID: 22323917; PMCID: PMC3268927.
8. Hasan MT, Hamouda M, Khashab MKE, Elsnhory AB, Elghamry AM, Hassan OA, Fayoud AM, Hafez AH, Al-Kafarna M, Hagrass AI, Rabea RK, Gbreel MI. Oncoplastic versus conventional breast-conserving surgery in breast cancer: a pooled analysis of 6941 female patients. Breast Cancer. 2023 Mar;30(2):200-214. doi: 10.1007/s12282-022-01430-5. Epub 2023 Jan 9. PMID: 36622565; PMCID: PMC9950210.
9. Mohamedahmed AYY, Zaman S, Zafar S, Laroiya I, Iqbal J, Tan MLH, Shetty G. Comparison of surgical and oncological outcomes between oncoplastic breast-conserving surgery versus conventional breast-conserving surgery for treatment of breast cancer: A systematic review and meta-analysis of 31 studies. SurgOncol. 2022 Jun;42:101779. doi: 10.1016/j.suronc.2022.101779. Epub 2022 May 10. PMID: 35567982.
10. Azhar RY, Dewayani BM, Erdiansyah Z, Nugraha P, Muhammad A, Alfarisy AN. Oncoplastic or Conventional Breast-Conserving Surgery? Outcomes from a West Java Retrospective Cohort Study. Int J Womens Health. 2025;17:5533-5540
11. Feng K, Jia Z, Liu G, Xing Z, Li J, Li J, Ren F, Wu J, Wang W, Wang J, Liu J, Wang X. A review of studies on omitting surgery after neoadjuvant chemotherapy in breast cancer. Am J Cancer Res. 2022 Aug 15;12(8):3512-3531. PMID: 36119847; PMCID: PMC9442028.
12. Niinikoski L, Leidenius MHK, Vaara P, Voynov A, Heikkilä P, Mattson J, Meretoja TJ. Resection margins and local recurrences in breast cancer: Comparison between conventional and oncoplastic breast conserving surgery. Eur J SurgOncol. 2019 Jun;45(6):976-982. doi: 10.1016/j.ejso.2019.02.010. Epub 2019 Feb 11. PMID: 30795953.
13. Zaborowski AM, Roe S, Rothwell J, Evoy D, Geraghty J, McCartan D, Prichard RS. A systematic review of oncological outcomes after nipple-sparing mastectomy for breast cancer. J SurgOncol. 2023 Mar;127(3):361-368. doi: 10.1002/jso.27115. Epub 2022 Oct 8. PMID: 36208279.
14. Frey JD, Alperovich M, Kim JC, Axelrod DM, Shapiro RL, Choi M, Schnabel FR, Karp NS, Guth AA. Oncologic outcomes after nipple-sparing mastectomy: A single-institution experience. J SurgOncol. 2016 Jan;113(1):8-11. doi: 10.1002/jso.24097. Epub 2015 Dec 2. PMID: 26628318.
15. Moo TA, Pinchinat T, Mays S, Landers A, Christos P, Alabdulkareem H, Tousimis E, Swistel A, Simmons R. Oncologic Outcomes After Nipple-Sparing Mastectomy. Ann SurgOncol. 2016 Oct;23(10):3221-5. doi: 10.1245/s10434-016-5366-1. Epub 2016 Jul 5. PMID: 27380643.
16. Donker M, van Tienhoven G, Straver ME, Meijnen P, van de Velde CJ, Mansel RE, Cataliotti L, Westenberg AH, Klinkenbijl JH, Orzalesi L, Bouma WH, van der Mijle HC, Nieuwenhuijzen GA, Veltkamp SC, Slaets L, Duez NJ, de Graaf PW, van Dalen T, Marinelli A, Rijna H, Snoj M, Bundred NJ, Merkus JW, Belkacemi Y, Petignat P, Schinagl DA, Coens C, Messina CG, Bogaerts J, Rutgers EJ. Radiotherapy or surgery of the axilla after a positive sentinel node in breast cancer (EORTC 10981-22023 AMAROS): a randomised, multicentre, open-label, phase 3 non-inferiority trial. Lancet Oncol. 2014 Nov;15(12):1303-10. doi: 10.1016/S1470-2045(14)70460-7. Epub 2014 Oct 15. PMID: 25439688; PMCID: PMC4291166.
17. Boughey JC, Suman VJ, Mittendorf EA, Ahrendt GM, Wilke LG, Taback B, Leitch AM, Kuerer HM, Bowling M, Flippo-Morton TS, Byrd DR, Ollila DW, Julian TB, McLaughlin SA, McCall L, Symmans WF, Le-Petross HT, Haffty BG, Buchholz TA, Nelson H, Hunt KK; Alliance for Clinical Trials in Oncology. Sentinel lymph node surgery after neoadjuvant chemotherapy in patients with node-positive breast cancer: the ACOSOG Z1071 (Alliance) clinical trial. JAMA. 2013 Oct 9;310(14):1455-61. doi: 10.1001/jama.2013.278932. PMID: 24101169; PMCID: PMC4075763.
18. Boileau JF, Poirier B, Basik M, Holloway CM, Gaboury L, Sideris L, Meterissian S, Arnaout A, Brackstone M, McCready DR, Karp SE, Trop I, Lisbona A, Wright FC, Younan RJ, Provencher L, Patocskai E, Omeroglu A, Robidoux A. Sentinel node biopsy after neoadjuvant

chemotherapy in biopsy-proven node-positive breast cancer: the SN FNAC study. J ClinOncol. 2015 Jan 20;33(3):258-64. doi: 10.1200/JCO.2014.55.7827. Epub 2014 Dec 1. PMID: 25452445.

19. Kuhlefelt C, Repo JP, Jahkola T, Kauhanen S, Homsy P. Immediate versus delayed breast reconstruction: Long-term follow-up on health-related quality of life and satisfaction with breasts. J PlastReconstrAesthet Surg. 2024 Jan;88:478-486. doi: 10.1016/j.bjps.2023.11.028. Epub 2023 Nov 23. PMID: 38101261.
20. Charlotte Davies, Leigh Johnson, Carmel Conefrey, Nicola Mills, Patricia Fairbrother, Chris Holcombe, Lisa Whisker, William Hollingworth, Joanna Skillman, Paul White, Douglas Macmillan, Charles Comins, Shelley Potter, Clinical and patient-reported outcomes in women offered oncoplastic breast-conserving surgery as an alternative to mastectomy: ANTHEM multicentre prospective cohort study, BJS, Volume 112, Issue 1, January 2025, znae306
21. Chauhan A, Sharma MM. Evaluation of surgical outcomes following oncoplastic breast surgery in early breast cancer and comparison with conventional breast conservation surgery. Med J Armed Forces India. 2016 Jan;72(1):12-8. doi: 10.1016/j.mjafi.2015.11.001. Epub 2015 Dec 13. PMID: 26900217; PMCID: PMC4723696.
22. Tahmasebi S, Mohammadipour M, Ghoddusi Johari M, Shariat M, Akrami M, Zangouri V, Karami M, Talei A. Determination of Oncologic Outcomes, Satisfaction, and Psychosocial Well-being in Patients with Breast Cancer after Oncoplastic and Conventional Breast Conserving Surgery. World J Plast Surg. 2022;11(3):72-77. doi: 10.52547/wjps.11.3.72. PMID: 36694674; PMCID: PMC9840764.
23. Heeg E, Jensen MB, Hölmich LR, Bodilsen A, Tollenaar RAEM, Laenkholm AV, Offersen BV, Ejlertsen B, Mureau MAM, Christiansen PM. 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 Dec;107(13):1762-1772. doi: 10.1002/bjs.11838. Epub 2020 Aug 6. PMID: 32761931; PMCID: PMC7689836.
24. Tasoulis MK, Lee HB, Kuerer HM. Omission of Breast Surgery in Exceptional Responders. Clin Breast Cancer. 2024 Jun;24(4):310-318. doi: 10.1016/j.clbc.2024.01.021. Epub 2024 Feb 1. PMID: 38365541.
25. Phang F, Weiss A. Omission of breast surgery in exceptional responders after neoadjuvant chemotherapy-what are future possibilities?-a narrative review. Transl Breast Cancer Res. 2025 Apr 18;6:13. doi: 10.21037/tbcr-24-65. PMID: 40421157; PMCID: PMC12104956.