

Oncoplastic techniques in breast surgery for special therapeutic problems

Prakasit Chirappapha, Panuwat Lertsithichai, Thongchai Sukarayothin, Monchai Leesombatpaiboon, Chairat Supsamutchai, Youwanush Kongdan

Department of Surgery, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

Correspondence to: Dr. Prakasit Chirappapha. Breast & Endocrine Surgery Unit, Department of Surgery, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand. Email: onco.prakasit@gmail.com.

Abstract: Resection of large tumors can be challenging, from the view point of breast preservation. Oncoplastic techniques are a valuable component of breast surgery in patients with large breast tumors who desire breast preservation. These techniques have been shown to be oncologically safe, while maintaining acceptable breast cosmesis. For locally advanced or recurrent breast cancers, the goals of surgery include local disease control and palliation of clinical symptoms. Oncoplastic surgery is also effective and oncologically safe in these situations. The need to completely remove all foci of cancers with adequate surgical margins often requires the displacement of adjacent or distant skin and soft tissue to cover the resulting soft tissue defect. Sometimes doing so can be cosmetically pleasing as well. In this article we present three special therapeutic problems in three distinct conditions, all resolved with oncoplastic techniques: the benign breast condition, malignant breast condition, and the palliative setting.

Keywords: Breast conservative treatment (BCT); oncoplastic technique; breast reconstruction; phyllodes tumor; giant fibroadenoma; breast flap; random skin flap; salvage mastectomy; stage IV breast cancer

Submitted Mar 20, 2015. Accepted for publication Apr 29, 2015.

doi: 10.3978/j.issn.2227-684X.2015.05.04

View this article at: <http://dx.doi.org/10.3978/j.issn.2227-684X.2015.05.04>

Special therapeutic problems in benign breast conditions

Benign proliferative breast lesions are most frequently observed in women 30 to 40 years of age, sometime causing significant breast asymmetry because of the large size. The differential diagnoses for these lesions include pseudoangiomatous stromal hyperplasia (PASH), benign phyllodes tumors, juvenile fibroadenoma, and giant fibroadenoma with increased stromal cellularity. The principles of surgical treatment are different for each diagnostic category. The crucial steps in management consist of preoperative tissue diagnosis and surgical techniques for breast reconstruction after removal of the tumor.

Core needle biopsy (CNB) is preferable to fine needle aspiration for preoperative tissue diagnosis, because fibroadenomas and phyllodes tumors have similar cytologic features. Clinical findings that could increase the suspicion

of phyllodes tumors include older patient age, larger tumor size, and history of rapid growth (1). The major pathological feature that distinguishes a phyllodes tumor from a giant fibroadenoma is the cellularity of the stromal component in the former (2). However, the histologic features of benign phyllodes tumors can be difficult to distinguish from those of fibroadenomas on CNB.

It is common for a CNB of either a phyllodes tumor or fibroadenoma to be interpreted as a “fibroepithelial lesion”, hence a phyllodes tumor cannot be ruled out in such a situation. The clinical challenge for the surgeon is to decide whether to remove the entire lesion for management, as is done for a typical fibroadenoma, or to excise the lesion with wide margins, as is therapeutically indicated for phyllodes tumors. If large benign phyllodes tumors are excised with narrow or no margin, reexcision should be performed. Several publications advocated margins of at least 1 cm as adequate (3,4).



Figure 1 Presentation and management of a giant fibroadenoma. A 40-year-old woman presented with a palpable mass at the right middle inner quadrant, which had grown from 2.4 to 10 cm over 2 years. Imaging and core needle sampling at first presentation were interpreted as “fibroadenoma”. The final pathology on excision was a giant fibroadenoma. (A) Preoperative presentation with bulging mass apparent on inspection; (B) intraoperative view showing the large tumor and planned skin excision (outer de-epithelized line), which is drawn immediately superficial to the mass; (C) postoperative view after the “round block” mastopexy technique with 325 cc subglandular implant.

Appropriate techniques for breast reconstruction are crucial after removal of a large benign tumor. Lesions with microscopic appearance of a conventional fibroadenoma, however large, should still be classified as fibroadenomas and may be managed adequately by enucleation. Cosmetic sequelae after enucleation of large tumors are common. If an estimated 20% to 50% of breast volume has been resection, a type II breast deformity can occur (5). Reshaping the breast by using a “round block” technique such as the periareolar Benelli mastopexy is required to correct the defect after removing a large volume of the tumor (*Figure 1A-C*) (6). If total mastectomy is considered for a large benign phyllodes tumor, then a free flap or a pedicled flap such as a pedicled transverse rectus abdominis (TRAM) flap can be used to reconstruct the breast (*Figure 2A,B*).

Special therapeutic problems in malignant conditions

In patients with a CNB result interpreted as “malignant phyllodes tumor”, the crucial information is whether the tumor to breast size ratio is favourable (e.g., a low ratio) or not. A pseudocapsule of dense, compressed, normal tissue, often containing microscopic malignant cells, surrounds malignant phyllodes tumors. As a result, more tissue typically needs to be removed to achieve adequate margins (7). Simple mastectomy without axillary dissection has been recommended for malignant phyllodes tumors with high tumor to breast

size ratio. Margins can be typically wider than 1 cm, but a width greater than 2 cm is associated with the lowest risk of recurrence (8). After removing the tumor with negative margins, a large skin and soft tissue defect can be covered with a pedicled TRAM flap reconstruction (*Figure 3A-D*). In a patient who presented with local recurrence (LR) after performing left breast conservative treatment (BCT) for a malignant phyllodes tumor, and who also had large breasts with severe ptosis, we performed a restaging work-up to rule out distant metastases. The majority of such patients with LR after BCT are treated with mastectomy, although the use of repeat breast conservation surgery for LR has been reported (9). In the case of our patient, after a restaging work up ruled out distant metastasis, we performed a left mastectomy, and a reduction mammoplasty of the opposite breast to reduce breast weight, with a good cosmetic result (*Figure 4A,B*) (10). A reduction mammoplasty in the present setting can help relieve back pain and achieve good body balance, with only one remaining but smaller breast.

Special therapeutic problems in the palliative setting

Breast cancer patients who have concurrent distant metastases (stage IV disease) are primarily treated by palliative systemic therapy. Surgical removal of the breast tumor does not provide survival benefit. On occasion the primary tumor is removed in these patients for palliative reasons, such as for

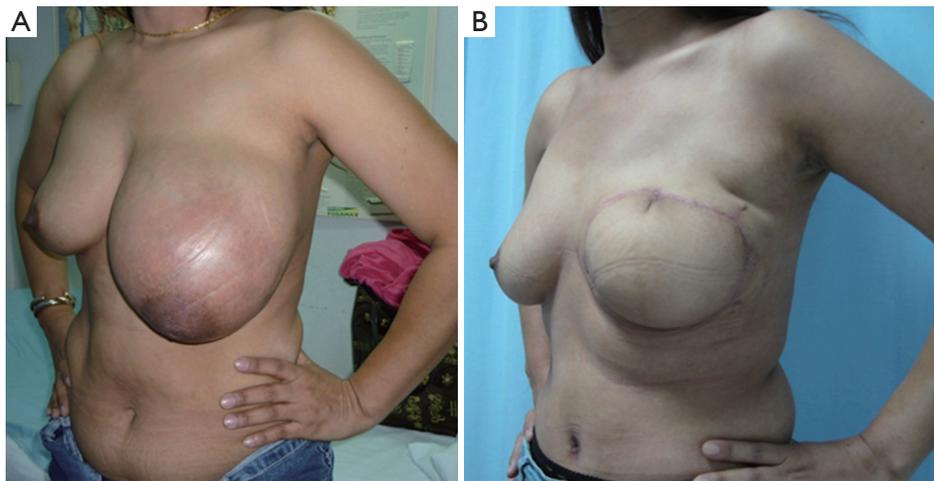


Figure 2 Presentation and resection of a large benign phyllodes tumor. A 39-year-old woman presented with a large mass in the left breast. Core needle biopsy (CNB) was reported as “benign phyllodes tumor”. (A) Preoperative presentation with bulging mass apparent on inspection; (B) postoperative view after performing a pedicled transverse rectus abdominis (TRAM) flap.



Figure 3 Presentation and management of a malignant phyllodes tumor. A 44-year-old woman presented with a large mass in the left breast. CNB was reported as “malignant phyllodes tumor”. (A) Preoperative presentation with a bulging mass apparent on inspection; (B) intraoperative view after simple mastectomy with 3 cm lateral margins of surrounding soft tissue; (C) the defect was covered with a pedicle TRAM flap; (D) postoperative view 2 weeks after surgery. CNB, core needle biopsy; TRAM, transverse rectus abdominis.



Figure 4 Presentation of local recurrence (LR) after left BCT for a malignant phyllodes tumor. Large breasts with severe ptosis can be seen. An assessment for metastatic disease showed no lesion on computed tomography of the chest and abdomen, bone scan and combined positron emission tomography-computed tomography. (A) Preoperative view in preparation for an inverted T inferior-pedicle breast reduction; (B) anterior view of the results at 6 weeks after performing left mastectomy and reduction mammoplasty of the opposite breast. BCT, breast conservative treatment.

disabling pain, infection, ulceration or bleeding. Nonetheless, these patients should be initiated on systemic therapy as the first-line treatment. Patients who respond to systemic therapy, or have persistent but non-progressive metastatic diseases, with good performance status, may be considered for palliative or salvage surgery for quality of life (QoL) reasons. The QoL benefits have been highlighted in a recent study (11). A salvage resection is defined as the resection of all visible lesions, extending to the surrounding skin with a safety margin of at least 2 cm (12). Closure or reconstruction of the soft tissue defect of the chest wall can be performed using skin grafts or different types of vascularized pedicled musculo-cutaneous flaps.

The choice of closure or reconstruction methods depend on the location and size of the defect, availability of the local and pedicled flaps, previous surgery or radiotherapy at the donor and recipient site, and the general condition of the patient. Direct simple closure is possible for small lesions. Skin grafts can be used for superficial chest wall defects involving only the soft tissue. Previous or post-operative radiation therapy may compromise the healing of skin grafts.

Local flaps

Breast flap

The breast parenchyma can be used as a flap to cover defects

located predominantly in the midline (*Figure 5A-D*). This flap is suitable for elderly patients with associated comorbidities, because of the short operative time required. The blood supply of breast flap is good, but the cosmetic outcome is rather poor (13).

Random skin flap from the lateral chest wall

This flap can cover small and moderate sized defect on the anterior and lateral aspects of the chest wall, and can be used in combination with the other flaps (*Figure 6A-E*). It is also suitable for the elderly, or for patients with poor functional status, due to the short operative time. The weakness of this method is a lack of sufficient volume to cover large defect.

Pedicled flaps

The regional pedicled musculocutaneous flaps available for reconstruction include the latissimus dorsi (LD) flap or TRAM flap. We prefer the use of the LD flap when available, and it is usually large enough to cover most defects (*Figure 7A,B*). The LD flap can be rotated widely, is easy to harvest, and can be tailored to cover the anterior, lateral, and posterior regions of the chest wall. In addition, this technique can be performed within a relatively short period of time, and patients experience fewer postoperative complications afterwards.

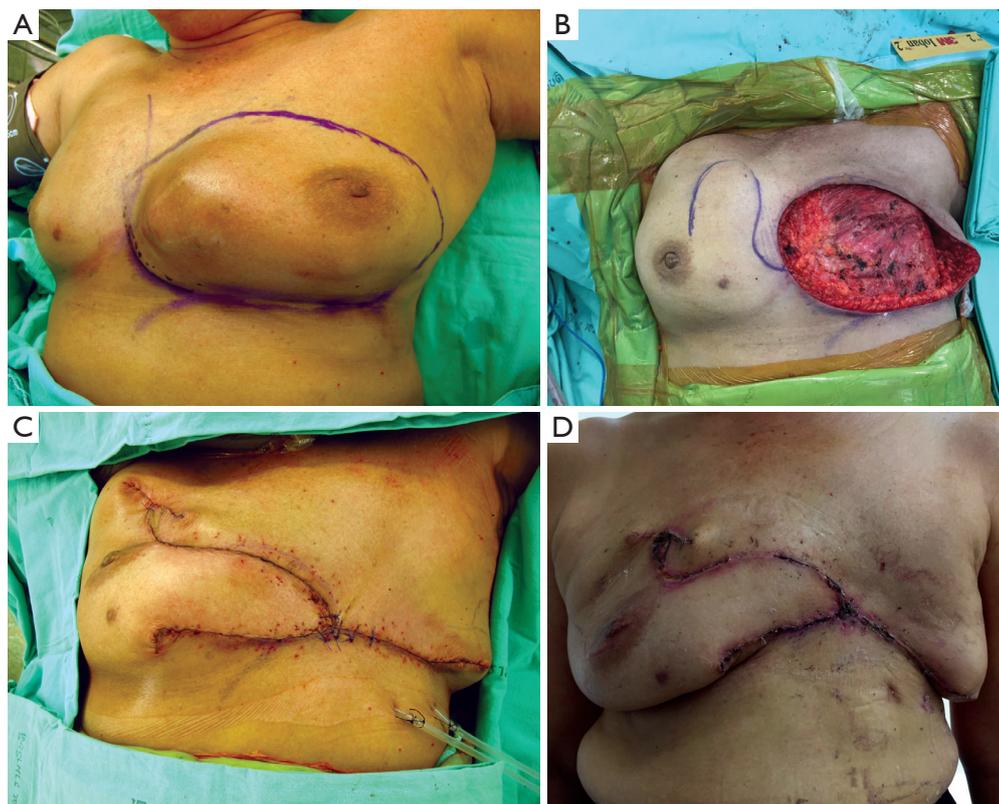


Figure 5 Presentation and management of invasive ductal carcinoma at left breast with stable bone metastasis. A 65-year-old woman presented with a large mass at the left breast. CNB was reported as “invasive ductal carcinoma”. An assessment for metastatic disease showed no lesion on computed tomography of the chest and abdomen, but multiple bone metastases were found on radionuclide scintigraphy. She received systemic endocrine therapy and her bone metastases stabilized. (A) Preoperative presentation with large mass apparent on left breast; (B) intraoperative view of medial chest wall defect after salvage mastectomy; (C) the defect was covered with a right breast flap; (D) anterior view of the results at 6 weeks after performing right breast flap. CNB, core needle biopsy.

Complications of oncoplastic surgery after radiation

Previous studies suggested that the surgeon should be more cautious in performing oncoplastic surgery in patients with irradiated breasts. The study by Losken *et al.* suggested that radiation therapy might decrease compliance of the covering soft tissue (14). Our results demonstrate that oncoplastic surgery is a simple and reliable technique to correct nipple areola complex (NAC) malposition after previous breast procedures, even in those patients who previously underwent locoregional radiotherapy that could negatively affect wound healing and graft intake (15).

In previously irradiated patient, our experience showed a mastectomy skin flap necrosis occurred after performing nipple sparing mastectomy (NSM) with LD flap plus implant reconstruction (*Figure 8A-D*). This finding may due

to the individual surgeon’s technique. The surgeon must carefully make the dissection of the gland more precisely and the preservation of the subdermal vessel network to the cutaneous flaps. To reduce severity of necrotic complications, the reconstruction should be performed with autologous flap (LD flap, TRAM flap) with the use of an additional implant. When mastectomy skin flap or NAC necrosis occurred, we sometimes performed only skin flap debridement with or without NAC and we did not remove implant because the flap could protect and cover it.

Conclusions

Breast reconstruction techniques are of crucial importance after removal of large benign proliferative lesions with an adequate margin. For large phyllodes tumors, oncoplastic surgery can

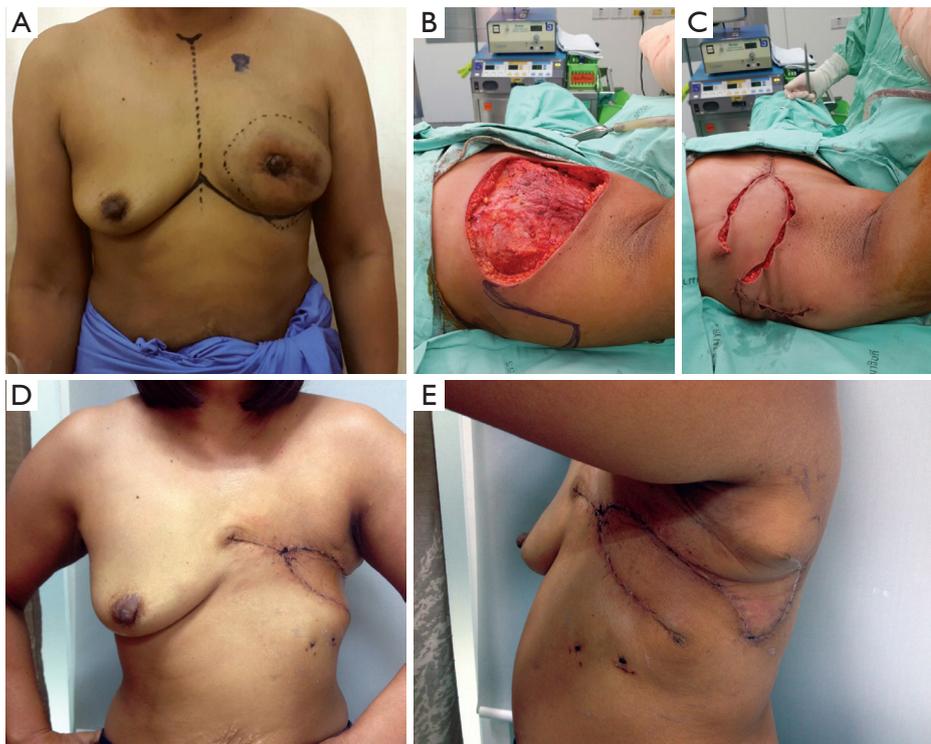


Figure 6 Presentation and management of invasive ductal carcinoma at left breast with stable bone metastasis. A 60-year-old woman presented with a large mass at the left breast. CNB was reported as “invasive ductal carcinoma”. An assessment for metastatic disease showed no lesion on computed tomography of the chest and abdomen, but bone metastases were found on radionuclide scintigraphy. She received systemic therapy for stage IV disease until her bone metastases stabilized. The large tumor was partially responsiveness to systemic treatment. The patient requested tumor removal because of pain. (A) Preoperative presentation with large mass apparent at left breast; (B) intraoperative view of the chest wall defect after salvage mastectomy; (C) the defect was covered with a random skin flap from lateral chest wall; (D) anterior view of the results at 6 weeks after surgery; (E) lateral view of the results at 6 weeks after surgery. CNB, core needle biopsy.

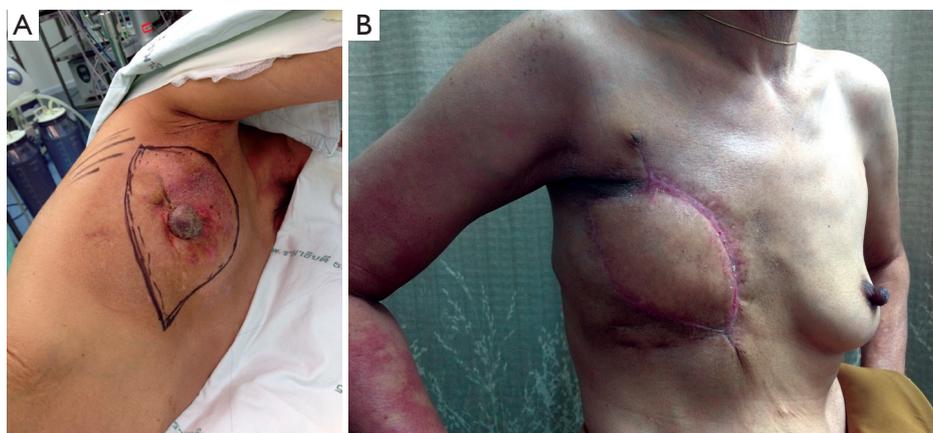


Figure 7 Presentation and management of invasive ductal carcinoma at right breast with stable bone metastasis. A 64-year-old woman presented with a tumor at the right breast. Skin involvement can be seen. CNB was reported as “invasive ductal carcinoma”. An assessment for metastatic disease showed no lesion on computed tomography of the chest and abdomen, but bone metastases was found on radionuclide scintigraphy. She received systemic endocrine therapy until bone metastases were stabilized. (A) Preoperative presentation with skin involvement; (B) anterior view of the results at 6 weeks after performing right LD flap closure of defect. CNB, core needle biopsy; LD, latissimus dorsi.

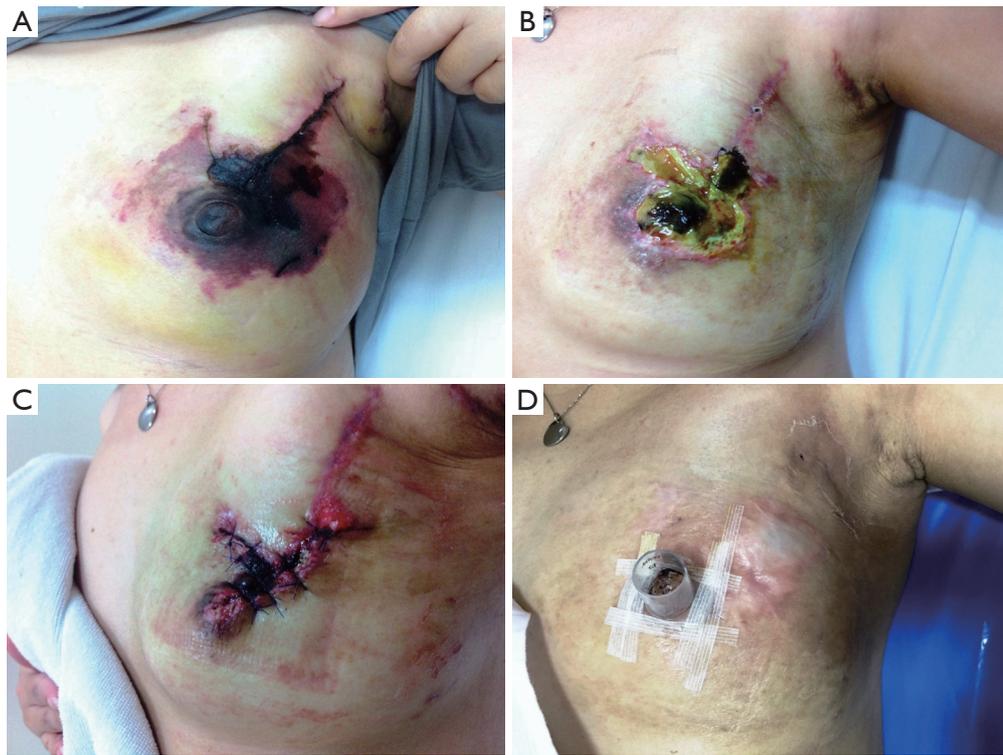


Figure 8 Presentation and management of a mastectomy skin flap necrosis occurred after performing NSM with LD flap plus implant reconstruction. A 46-year-old woman presented with recurrent tumor at the left breast. She had previously undergone a left lumpectomy with whole breast radiation. We performed NSM and immediate breast reconstruction with LD flap plus implant. (A) NAC necrosis with mastectomy skin flap necrosis around NAC. The necrosis occupied mostly in the superior outer quadrant and incision is supero-lateral radial incision; (B) we performed only skin flap debridement with NAC; (C) resuture mastectomy skin flap was performed with nylon 4-0; (D) postoperative view of the results at 6 weeks after debridement and nipple reconstruction. NSM, nipple sparing mastectomy; LD, latissimus dorsi; NAC, nipple areola complex.

prevent and correct breast deformities after adequate removal with wide margins, resulting in a good cosmetic outcome. Larger soft tissue and skin defects can be closed using oncoplastic methods. Salvage mastectomy and reconstruction for stage IV breast cancer is a feasible procedure, providing adequate local disease control and excellent palliation of very disabling symptoms in selected patients.

Acknowledgements

The authors wish to acknowledge their clinical fellows team as follows: Dr. Natthapong Saengow, Dr. Rujira Panawattanakul, Dr. Saowanee Kitudomrat, Dr. Paweena Luadthai, Dr. Pongsakorn Srichan and Dr. Piyawan Kensakoo to encourage these operations.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

References

1. Gabriele R, Borghese M, Corigliano N, et al. Phyllodes tumor of the breast. Personal contribution of 21 cases. *G Chir* 2000;21:453-6.
2. Ashikari R, Farrow JH, O'Hara J. Fibroadenomas in the breast of juveniles. *Surg Gynecol Obstet* 1971;132:259-62.
3. de Roos WK, Kaye P, Dent DM. Factors leading to local recurrence or death after surgical resection of phyllodes tumours of the breast. *Br J Surg* 1999;86:396-9.

4. Reinfuss M, Mitúš J, Duda K, et al. The treatment and prognosis of patients with phyllodes tumor of the breast: an analysis of 170 cases. *Cancer* 1996;77:910-6.
5. Clough KB, Cuminet J, Fitoussi A, et al. Cosmetic sequelae after conservative treatment for breast cancer: classification and results of surgical correction. *Ann Plast Surg* 1998;41:471-81.
6. Benelli L. A new periareolar mammoplasty: the "round block" technique. *Aesthetic Plast Surg* 1990;14:93-100.
7. August DA, Kearney T. Cystosarcoma phyllodes: mastectomy, lumpectomy, or lumpectomy plus irradiation. *Surg Oncol* 2000;9:49-52.
8. Belkacémi Y, Bousquet G, Marsiglia H, et al. Phyllodes tumor of the breast. *Int J Radiat Oncol Biol Phys* 2008;70:492-500.
9. Galper S, Blood E, Gelman R, et al. Prognosis after local recurrence after conservative surgery and radiation for early-stage breast cancer. *Int J Radiat Oncol Biol Phys* 2005;61:348-57.
10. Dennis CH. Reduction Mammoplasty and Mastopexy: General Considerations. In: Spear SL, editor. *Surgery of the breast: principles and art*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 2005:972-5.
11. Levy Faber D, Fadel E, Kolb F, et al. Outcome of full-thickness chest wall resection for isolated breast cancer recurrence. *Eur J Cardiothorac Surg* 2013;44:637-42.
12. Veronesi G, Scanagatta P, Goldhirsch A, et al. Results of chest wall resection for recurrent or locally advanced breast malignancies. *Breast* 2007;16:297-302.
13. Tukiainen E. Chest wall reconstruction after oncological resections. *Scand J Surg* 2013;102:9-13.
14. Losken A, Pinell XA, Sikoro K, et al. Autologous fat grafting in secondary breast reconstruction. *Ann Plast Surg* 2011;66:518-22.
15. Rietjens M, De Lorenzi F, Andrea M, et al. Free nipple graft technique to correct nipple and areola malposition after breast procedures. *Plast Reconstr Surg Glob Open* 2013;1:e69.

Cite this article as: Chirappapha P, Lertsithichai P, Sukarayothin T, Leesombatpaiboon M, Supsamutchai C, Kongdan Y. Oncoplastic techniques in breast surgery for special therapeutic problems. *Gland Surg* 2016;5(1):75-82. doi: 10.3978/j.issn.2227-684X.2015.05.04