Skin Sparing Mastectomy with Immediate Reconstruction in Early Breast Carcinoma: A Preliminary Study

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Background and Objective: *Surgical treatment for breast cancer has some special aspects different from other cancers, since surgeons have to concern of both oncologic safety and esthetic outcome. Modified radical mastectomy (MRM) can give the oncologic safety but not esthetic outcome. Breast conserving therapy improves cosmetic but results in more local recurrence than modified radical mastectomy. Skin sparing mastectomy (SSM) with immediate reconstruction for early breast cancer has been reported by several investigators to have comparable outcome with MRM and better esthetic result. The purpose of the present study was to examine patients who underwent SSM with immediate reconstruction at King Chulalongkorn Memorial Hospital.*

Material and Method: *Patients who underwent SSM with immediate reconstruction by the authors at King Chulalongkorn Memorial Hospital, Bangkok Thailand between May 2007 and January 2011 were studied. The immediate reconstruction was performed with transverse rectus abdominis musculocutaneous flaps or latissimus dorsi flaps. Postoperative early and late complications as well as local recurrence were studied to examine the oncologic safety and esthetic outcome.*

Results: *Fourteen patients were enrolled into the present study. The age ranged from 33 to 59 years (mean 47 years). The follow up time ranged from six to 50 months (mean 26.5 months). Postoperative complications included wound infection in one patient (7%), seroma at donor site of latissimus dorsi flaps in two patients (40%) and fat necrosis in five patients (55%). There was no skin flap necrosis, no hematoma, no arm numbness, no wound dehiscense, no abdominal wall hernia, and no lymphedema of the arm. No local recurrence was detected.*

Conclusion: *This preliminary report shows that skin-sparing mastectomy with immediate reconstruction is a good alternative in management of early breast cancer. There was no serious postoperative complication. The esthetic result was acceptable. No local recurrence was observed. Long-term follow up with more patients are required to confirm its applicability in early breast cancer patients.*

Keywords: *Skin sparing mastectomy, Immediate reconstruction, Early breast carcinoma*

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Breast carcinoma is the most common malignancy in Western countries and is the leading cause of death among young women. Incidence of early breast carcinoma has been increasing since more patients are diagnosed from screening mammography resulting in 20 to 30% reduction in mortality[1,2]. It is generally accepted that multimodality approach is the principal method of treatment, which consists of surgery, radiation, and systemic therapy. With the advancement of modern researches in molecular biology, several new generations of drugs for treatment such as chemotherapy, hormonal therapy, and target therapy have emerged along with improvement of outcome. However, surgery remains the essential part of treatment; adequate surgery is needed to reduce locoregional recurrence. Although oncologic safety is definitely obtained in total or modified radical mastectomy (MRM), the psychological result is considerable and breast conserving therapy (BCT) becomes an attractive alternative when indicated. It has been shown that after long term follow-up, the overall survival of patients who were treated with MRM and BCT was not significantly different but more local recurrence was observed in the latter group[3]. Skin sparing mastectomy (SSM), which was introduced to overcome such disadvantage of lumpectomy or quadrantectomy was reported in early 1990s[4]. Principle of this procedure is removal of most of the mammary glands and nipple areolar complex but

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preserve the skin and inframammary fold. The aim of this procedure is to achieve both oncologic safety and esthetic outcome.

Multifocality of breast carcinoma may occur in approximately 5 to 40% of patients[5-15]. These multifocal lesions may affect local recurrence in patients treated with BCT by leaving the undetectable pre-existing lesions in the remaining breast tissue. SSM reduces risk of local recurrence by removing all the multifocal carcinomas. Several large studies with long term follow-up have demonstrated similar outcome between SSM and MRM or non-skin sparing mastectomy (NSSM). These comparable results were observed in patients with early stage breast carcinoma[16-22].

The purpose of the present study was to examine results of SSM with immediate reconstruction performing on patients with early breast carcinoma at King Chulalongkorn Memorial Hospital. Cosmetic results, postoperative complications, and local recurrence are investigated to evaluate the technical possibility, esthetic outcome, and local recurrence.

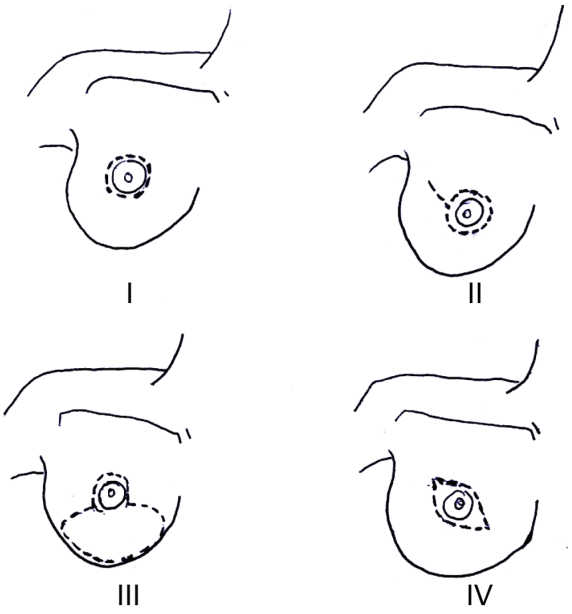

Fig. 1 Type of skin incisions I: periareolar, II: tennis racquet, III: reduction, IV: modified ellipse

Material and Method

This is a retrospective study of patients who had early breast carcinoma and underwent SSM with immediate reconstruction by the authors at King Chulalongkorn Memorial Hospital, Bangkok, Thailand between May 2007 and January 2011. When SSM was considered an appropriate treatment, the patients were informed about the surgical techniques, possible complications, and prognosis of difference types of surgery; *i.e.* NSSM, SSM, and BCT. The patients then decided and chose type of operation by themselves. The inclusion criteria for SSM are DCIS, stage I, and stage IIA breast carcinoma. All patients had BIRADS IV or V on preoperative ultrasonography and mammography. Fine needle aspiration cytology (FNA) or core biopsy was routinely performed and confirmed the diagnosis of breast carcinoma before operation. SSM was performed by the first author (SS) and immediate reconstruction was performed by the co-author (AA) who is a plastic surgeon at King Chulalongkorn Memorial Hospital.

Surgical techniques

SSM consists of removing nipple-areolar complex, breast parenchyma, skin over superficial tumor, and preserving inframammary fold and skin flap. Although several methods of incision including periareolar, tennis racquet, reduction, and modified ellipse have been described, only periareolar incision was used in this study (Fig. 1). After adequate subcutaneous dissection, the whole breast parenchyma is removed without difficulty. In the patient with superficial tumor (distance to skin < 1 cm), the skin overlying the tumor was also removed[16-18]. All patients underwent axillary lymph node dissection through separate axillary incision.

Immediate reconstruction was performed by the co-author. Type of reconstruction was discussed with the patient preoperatively. The use of pedicled transverse rectus abdominis musculocutaneous (TRAM) flap or latissimus dorsi (LD) flap with or without prosthesis depended on breast volume and adequate fat tissue, which were evaluated by the co-author. LD flap with or without prosthesis was used in the condition of inadequate TRAM flap.

Immediately after the operation, the patients were evaluated for local wound problems including hematoma, skin flap necrosis, surgical site infection, seroma under the skin flap, and numbness at inner aspect of the ipsilateral arm.

All patients were regularly followed at the outpatient clinic where evidence of lymphedema of the arm, fat necrosis, and local recurrence were looked for. The most common complication of TRAM flap reconstruction was fat necrosis as reported by several studies. It was difficult to differentiate fat necrosis

from tumor recurrence, as these two conditions were similar in clinical findings. The usual presentation of fat necrosis was ill-defined mass with hard consistency, which required imaging study to differentiate from tumor recurrence. If the patients were suspected of having fat necrosis, mammography and ultrasonography were performed. When mammography and ultrasonography could not clearly exclude local recurrence, MRI was then used. However, FNA was routinely performed to confirm the diagnosis. After that, the patients were followed every three months, and underwent mammography and ultrasonography every six months for two years to evaluate the stability of the lesions. Without fat necrosis, the patients were followed every three months and underwent mammography and ultrasonography annually to detect local recurrence.

Results

During the present study period, 14 patients were enrolled into the present study. The age ranged from 33 to 59 years (mean 47 years). All patients underwent preoperative mammography, ultrasonography, fine needle aspiration or core biopsy for tissue diagnosis.

TRAM flaps were used in nine patients. LD flaps with prosthesis were used in five patients. Immediate postoperative complications were wound infection in one patient (7%) and seroma at donor site of LD flaps in two patients (40%). There was no skin flap necrosis, no hematoma, no arm numbness, and no wound dehiscense. Late complications were fat necrosis in five patients (55%) (Table 1). There was no abdominal wall hernia and no lymphedema of the arm. No local recurrence was detected. On interview at the outpatient clinic, all patients appreciated the appearance of their reconstructed breasts.

Discussion

In breast cancer patients, factors affecting nipple areolar involvement were tumor-nipple areolar distance, tumor size, lymph node metastasis, and nuclear grade. Nipple areolar involvement depends largely on distance between nipple-areolar complex and the tumor. The incidence was 20 to 95% of patients with tumor located within 2.5 cm from the nipple compared with less than 10% of patients with peripheral tumors[5,9-11]. The nipple involvement was detected in 10 to 40% versus 5 to 18% of patients with tumor > 2 cm and ≤ 2 cm, respectively[6,7,15]. The difference in nipple involvement was also related to axillary lymph node metastasis. In patients with axillary lymph node metastasis, higher incidence of nipple involvement was reported (30 to 70% versus 15 to 30%)[5,7-9]. Nuclear grade was also observed to influence nipple-areolar involvement. Nipple involvement was detected in 10% of patients with low-grade tumors compared

Table 1. Demographic data, type of reconstruction, and complications in 14 patients

Patient number	Age (years)	TNM stage	Type of reconstruction	Complications		Follow-up time (months)
				Immediate	Late	
1	48	T2N2	TRAM		Fat necrosis	50
2	53	T1N0	TRAM		Fat necrosis	33
3	36	T2N1	TRAM			32
4	33	T1N0	LD	Seroma at donor site		30
5	53	T2N0	TRAM		Fat necrosis	29
6	53	T2N0	TRAM		Fat necrosis	27
7	49	T1N1	LD			16
8	42	T1N0	LD			39
9	58	T1N0	TRAM			19
10	47	T2N0	TRAM		Fat necrosis	19
11	42	T1N1	LD	Wound infection		10
12	46	T2N0	LD	Seroma at donor site		6
13	47	T2N0	TRAM			32
14	51	T1N0	TRAM			29

TRAM = transverse rectus abdominis musculocutaneous; LD = latissimus dorsi

with up to 75% of patients with high-grade tumors[5,9,11]. Lymphovascular invasion was also associated with nipple-areolar involvement[10,15]. With these above mentioned factors, nipple-areolar complex should be removed with breast parenchyma. In the subgroup of patients with low incidence of nipple-areolar involvement such as small tumor (< 2 cm), no axillary lymph node involvement, low grade tumor, no lymphovascular invasion and peripheral tumor (nipple-tumor distance > 4 cm), it is possible to preserve nipple-areolar complex.

Simmons et al reported nipple involvement even in the favorable subgroup but rare areolar involvement (0.9%) and performed areolar-sparing mastectomy in selected patients[14]. Several series conducted nipple-areolar sparing mastectomy in patients with no malignant cells under nipple-areolar complex by sensitive intraoperative evaluations such as touch preparation cytology and frozen section. For oncologic safety even negative malignant cells, intraoperative radiotherapy is used. These techniques give satisfactory cosmetic outcome, although long-term data is needed to ascertain comparable outcome with NSSM[12,15].

When performing in selected patients such as high-risk patients for prophylaxis, patients with DCIS and early stage carcinoma, SSM has similar outcome with NSSM.

Concerning factors as tumor size, lymph nodes metastases, tumor grade and lymphovascular invasion should be considered when selecting patients who are suitable for SSM. Small tumor (< 2 cm) gave favorable outcome with local recurrent free survival of 96.3% versus 90% (T ≥ 2 cm)[19,20]. Lymph node involvement also affected local recurrent free survival (LRFS), in the group with lymph node metastases, there was 90% LRFS compared with 97% of patients without lymph node metastases[19,20]. High nuclear grade and lymphovascular invasion were associated with higher local recurrent rate. It is important to perform SSM on selected patients who have low risk of local recurrence. After being diagnosed with local recurrence, up to 75% had systemic metastases and half of these die[16,19,21]. SSM had similar outcome with NSSM when performing on patients with DCIS, T1, T2 N0, low nuclear grade and for prophylaxis purpose. All except one of the presented patients had early stage breast cancer as inclusion criteria of the present study. Number of lymph nodes involvement was difficult to predict preoperatively; consequently, one of the presented patients had unexpected multiple axillary lymph nodes metastasis which resulted in increased risk of local recurrence. With follow-up time of 50 months, she was still free of disease.

Local and distant recurrence

To achieve comparable outcome with NSSM, selected patients should undergo SSM although it is difficult to make accurate preoperative evaluation of some factors such as axillary lymph node metastasis and lymphovascular invasion. Local recurrence affected long-term outcome as nearly half of these with local recurrence had distant metastasis.

Most local recurrence occurred in native skin flap, which could be simply diagnosed by detection of a palpable mass in more than 90% of patients[16,21,22]. The less common site of recurrence is at the chest wall muscle that needs imaging such as ultrasonography, mammography, MRI or CT scan to detect. Accuracy of physical examinations combined with mammography and ultrasonography is 87% versus 92% with MRI to screen for local recurrence, but the most accurate assessment is biopsy lesion with suspicious findings[23].

Complication rate of SSM and NSSM is also reserved to discuss. Complications of SSM are factors that patients should be informed to choose desirable operation. Several investigators have reported that overall complications such as skin flap necrosis, infection, hematoma, and seroma are comparable between SSM and NSSM. There were specific complications that depended on type of reconstruction. If LD flap is used, seroma at donor site occurred as high as 30%. For TRAM flap reconstruction, abdominal wall hernia and fat necrosis were complicated in 3 to 4% and 10 to 60% of patients, respectively[16-18,24]. In the present study, the complication rate was comparable to those reported elsewhere. For immediate complications, seroma was the most common in patients reconstructed with LD flap. However, it was successfully treated with single aspiration. Fat necrosis was the most common complication in patients reconstructed with pedicled TRAM flap, all of them underwent subsequent investigations to exclude the occurrence of local recurrence. Apart from concerning of local recurrence, fat necrosis had a benign clinical course. The indurating mass gradually resolved with time (Fig. 2).

Adjuvant therapy

Indications for adjuvant chemoradiation are the same as NSSM. Most patients undergoing

Fig. 2 One year postoperative result of the patient with fat necrosis of TRAM flap

SSM have early stage breast carcinoma so it is not necessary to receive adjuvant radiation except in cases of unexpected multiple lymph nodes metastases. When undergoing postoperative radiation, there were no serious complications among any types of reconstructions. One of the patients in the present study had unexpected advanced breast cancer which was diagnosed postoperatively from discovering multiple axillary lymph nodes metastases. She received adjuvant chemoradiation and close follow-up for 50 months without tumor recurrence. After radiation, there was no complication to the reconstructed breast.

In conclusion, SSM with immediate breast reconstruction is a good alternative in management of early breast carcinoma. The obvious advantages of this treatment modality are adequate oncologic safety and acceptable cosmetic results. Careful selection of patients is of utmost importance for best long-term outcome. To confirm its applicability in early breast cancer patients, long-term follow-up and more patients are needed.

Potential conflicts of interest

None.

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การผ่าตัดเต้านมแบบเก็บผิวหนังและทำการเสริมสร้างทันทีในผู้ป่วยมะเร็งเต้านมระยะแรก: ผลการศึกษาเบื้องต้น

สุกัญญา ศรีอัษฎาพร, อภิชัย อังสพัทธ์

ภูมิหลังและวัตถุประสงค์: *การผ่าตัดรักษามะเร็งเต้านม นอกจากต้องการผลการรักษาที่มีโอกาสเกิดการเป็นซ้ำน้อยที่สุดแล้ว ถ้าสามารถทำให้ผู้ป่วยมีเต้านมที่ใกล้เคียงปกติได้ก็จะมีผลดีทางด้านจิตใจมาก การผ่าตัดเต้านมออกทั้งหมดทำให้โอกาสเกิดซ้ำของมะเร็งบริเวณนั้นน้อยลงมาก แต่มีข้อเสียคือผู้ป่วยเหลือเต้านมเพียงข้างเดียว การผ่าตัดแบบเก็บเต้านมไว้ช่วยแก้ไขข้อเสียดังกล่าว แต่โอกาสการเป็นซ้ำในเต้านมข้างนั้นจะมากกว่าการตัดเต้านมทั้งหมด จากการศึกษาก่อนหน้านี้พบว่าการทำผ่าตัดเต้านมทั้งหมดโดยเก็บผิวหนังและทำการเสริมสร้างทันทีในการรักษามะเร็งเต้านมระยะแรกให้ผลการรักษาที่ดี โดยมีการกลับเป็นซ้ำในเต้านมข้างเดียวกันใกล้เคียงกับการตัดเต้านมทั้งหมด และยังสามารถมีลักษณะของเต้านมซึ่งใกล้เคียงเต้านมปกติด้วย ผู้นิพนธ์ได้ศึกษาผลการผ่าตัดรักษามะเร็งเต้านมด้วยวิธีเก็บผิวหนังและทำการเสริมเต้านมไปพร้อมกัน โดยติดตามภาวะแทรกซ้อนและการกลับเป็นซ้ำของมะเร็งเต้านม*

วัสดุและวิธีการ: *เป็นการศึกษาผู้ป่วยที่ได้รับการผ่าตัดรักษามะเร็งเต้านมด้วยวิธีตัดเต้านมทั้งหมดโดยเก็บผิวหนังและทำการเสริมสร้างไปพร้อมกัน ที่โรงพยาบาลจุฬาลงกรณ์ กรุงเทพฯ ระหว่างเดือนพฤษภาคม พ.ศ. 2550 และเดือนมกราคม พ.ศ. 2554 โดยทำการผ่าตัดเอาเนื้อเต้านมออกทั้งหมดแต่เก็บผิวหนังยกเว้นบริเวณหัวนมและฐานหัวนมไว้ และทำการเสริมสร้างด้วยเนื้อเยื่อผู้ป่วยเพียงอย่างเดียวหรือร่วมกับเต้านมเทียม ผู้นิพนธ์ได้ทำการติดตามภาวะแทรกซ้อนและการกลับเป็นซ้ำของมะเร็ง*

ผลการศึกษา: *มีผู้ป่วยในการศึกษานี้ 14 ราย อายุอยู่ระหว่าง 33-59 ปี (เฉลี่ย 47 ปี) ระยะเวลาติดตามการรักษา 6 ถึง 50 เดือน (เฉลี่ย 26.5 เดือน) ไม่พบการกลับเป็นซ้ำในเต้านมที่ทำการเสริมสร้าง, พบแผลติดเชื้อ 1 ราย (ร้อยละ 7), ภาวะมีของเหลวสะสมใต้ผิวหนังตำแหน่งเดิมของกล้ามเนื้อแลทติสสิมุสดอร์ไซ 2 ราย (ร้อยละ 40), ไขมันตายบางส่วน 5 ราย (ร้อยละ 55) ไม่พบผิวหนังเต้านมตาย, ก้อนเลือด, แขนชา, แผลแยก, ผนังหน้าท้องแยก หรือ แขนบวมระหว่างทำการติดตามผู้ป่วย*

สรุป: *การศึกษาเบื้องต้นนี้บ่งว่า การผ่าตัดเต้านมทั้งหมดโดยเก็บผิวหนังและทำการเสริมสร้างไปพร้อมกันในผู้ป่วยมะเร็งเต้านมระยะแรกเป็นวิธีที่อาจนำมาใช้ได้วิธีหนึ่ง หลังผ่าตัดไม่พบภาวะแทรกซ้อนที่รุนแรง ผู้ป่วยพอใจที่ยังมีเต้านม และไม่พบการเกิดซ้ำของมะเร็งในข้างที่รักษาด้วยวิธีดังกล่าว อย่างไรก็ตาม ยังต้องการการติดตามผลการรักษาในระยะยาวและจำนวนผู้ป่วยมากกว่านี้ก่อนจะได้ข้อสรุปชัดเจน*