

Original Papers

## A Study on Skin-Sparing Mastectomy in Patients Ineligible for Breast-Conserving Therapy

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**Abbreviations:** SSM, skin-sparing mastectomy; NSSM, non skin-sparing mastectomy; DCIS, ductal carcinoma in situ; EIC, extensive intraductal component; TRAM, transverse rectus abdominis musculocutaneous flap; LD, latissimus dorsi musculocutaneous flap

### Abstract

**Background:** Although breast-conserving therapy consisting of wide excision followed by radiation therapy has been established as a standard treatment for breast cancer, a number of patients are ineligible for this treatment option. We carry out skin-sparing mastectomy (SSM) with immediate breast reconstruction for such patients. This study assessed therapeutic outcomes with SSM in patients treated at our department.

**Patients and Methods:** Thirteen patients who underwent an SSM with immediate breast reconstruction between November 2000 and October 2002 were reviewed. Fourteen patients treated by a conventional non-skin-sparing mastectomy (NSSM) with immediate breast reconstruction during the same period served as controls.

**Results:** The SSM technique was used more often in patients with ductal carcinoma in situ (DCIS) or early-stage cancer including T1 ( $P = 0.0132$ ). Minor flap necrosis was observed in 2 patients who underwent an SSM and in 1 who underwent an NSSM postoperatively. Two patients (14.3%) who underwent an NSSM presented with local recurrences and 3 (21.4%) with distant metastases. It is remarkable that no patients who underwent an SSM presented with local recurrence and 1 (7.7%) with distant metastasis.

**Conclusion:** SSM with immediate breast reconstruction is a preferable surgical option for patients ineligible for breast-conserving therapy, especially those with wide-spreading DCIS.

**Key Words:** breast cancer, mastectomy, skin-sparing mastectomy, breast reconstruction

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### Introduction

Breast-conserving therapy consisting of wide excision followed by radiation therapy has been established as a world wide standard treatment for breast cancer, but some patients who have wide-spreading ductal carcinoma in situ (DCIS), invasive ductal carcinoma with an extensive intraductal component (EIC), large tumors, or multicentric disease are ineligible for this treatment option. Immediate breast reconstruction has become the standard treatment for some women who will require a mastectomy and choose preservation of the breast. Particularly in skin-sparing procedures that involve the removal of the nipple-areola complex and mammary gland, preservation of the skin envelope of the breast permits immediate breast reconstruction, minimizes de-

formity and improves cosmesis<sup>1-5</sup>). Although skin-sparing mastectomies (SSM) have achieved remarkable aesthetic restoration, a number of studies have addressed the issue of whether or not these procedures are oncologically safe<sup>6-13</sup>). This study assessed the therapeutic outcomes of patients who underwent SSM at our institution.

### Patients and Methods

A retrospective review was performed of 13 patients who underwent SSM with immediate breast reconstruction who opted for breast conservation from November 2000 through February 2003 at Tokyo Women's Medical University Medical Center East. Fourteen patients treated during the same period by a conventional non-skin-sparing mastectomy (NSSM) with immediate breast reconstruction served as controls.

Ineligible reasons of breast-conserving surgery in the SSM group were wide-spreading DCIS in 6 patients, invasive carcinoma with EIC in 4 and invasive carcinoma near the nipple in 3, whereas that in the NSSM group

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were EIC in 6 patients, tumor size over 3.0 cm in diameter in 6, invasive carcinoma near the nipple in 1 and multicentric carcinoma in 1 patient.

SSM was defined as a procedure in which all gross breast tissue, including the nipple-areola complex, was removed. Commonly used incisions for SSM were the periareolar incision or a radial extension added to the periareolar or elliptical incision (Fig. 1). Axillary node dissection or sentinel lymph node biopsy was performed through a separate axillary incision. Patients who underwent or did not undergo SSM were reviewed separately for clinicopathologic characteristics and outcomes of treatment. The age at surgery, reconstruction procedures, skin incision for SSM, axillary dissection, tumor staging, number of positive nodes and histologic type for patients are shown in Table 1. And the same clinicopathologic characteristics other than the skin incisions for NSSM are shown in Table 2. Patients' records were reviewed for postoperative complications, local recurrence, distant metastases and death from disease. The incidences of these events were compared between both groups.

Statistical analysis was performed where appropriate using the chi-squared method, and  $P < 0.05$  was considered significant.

## Results

The mean age at surgery of the patients who underwent SSM was  $48.1 \pm 9.7$  years (range 33-68), and that of the NSSM patients was  $48.8 \pm 11.1$  years (range 34-75), the difference was not statistically significant. The immediate reconstruction in the SSM group consisted of the transverse rectus abdominis musculocutaneous (TRAM) flaps in 6 patients including free TRAM flaps in 4, the latissimus dorsi musculocutaneous (LD) flaps in 4 and silicone implant in 3 patients. And in the NSSM group there were 3 patients with the TRAM flap, the LD flap in 1 and tissue expander followed by silicon implant in 10 patients. Surgical procedures for breast reconstruction often included the use of autogenous tissue in the SSM group and implants in the NSSM group. Pathologic characteristics of the tumor are shown in Table 3. Most of the

patients in the SSM group had early-stage cancer including Tis or T1, whereas patients in the NSSM group had advanced-stage cancer including T2 or T3 ( $P = 0.0132$ ). About 50% of the patients in the SSM group had DCIS, whereas 100% of the patients in the NSSM group had invasive carcinoma ( $P = 0.0095$ ).

Median follow-up of the SSM group was 61 months (range, 35-66 months), whereas the median follow-up of the NSSM group was 64 months (range, 18-81 months). There were no significant differences between the two groups.

Postoperative complications involving the reconstructed breast were minor. Minor flap necrosis was observed in 2 patients in the SSM group and in 1 in the NSSM group. Two patients (14.3%) in the NSSM group presented with local recurrences and 3 (21.4%) with distant metastases. Local recurrences were seen within 1 year of treatment, however, no patients in the SSM group presented with local recurrence. One patient (7.7%) in the SSM group presented with distant metastasis (Table 4). There were no significant differences between the two groups.

## Discussion

The first description of SSM was by Toth and Lappert in 1991<sup>14</sup>. Subsequently, SSM have achieved remarkable aesthetic restoration, a number of studies have addressed the issue of whether or not this procedure is oncologically safe<sup>6-13</sup>. On the other hand, the outcomes of SSM have not been reported in Japan to date, as there are not many plastic surgeons performing breast reconstruction and most Japanese women with breast cancer ineligible for breast-conserving treatment have not been offered breast reconstruction as a surgical option.

The SSM technique was used more often in patients with DCIS or early-stage cancer including T1 ( $P = 0.0132$ ). Surgeons may exhibit a selection bias by favoring smaller tumors for the SSM procedure. Simmons et al<sup>9</sup>. reported this technique was used more often in patients with smaller tumors further proving this bias. This circumstance seems to suggest that DCIS or T1 tumors

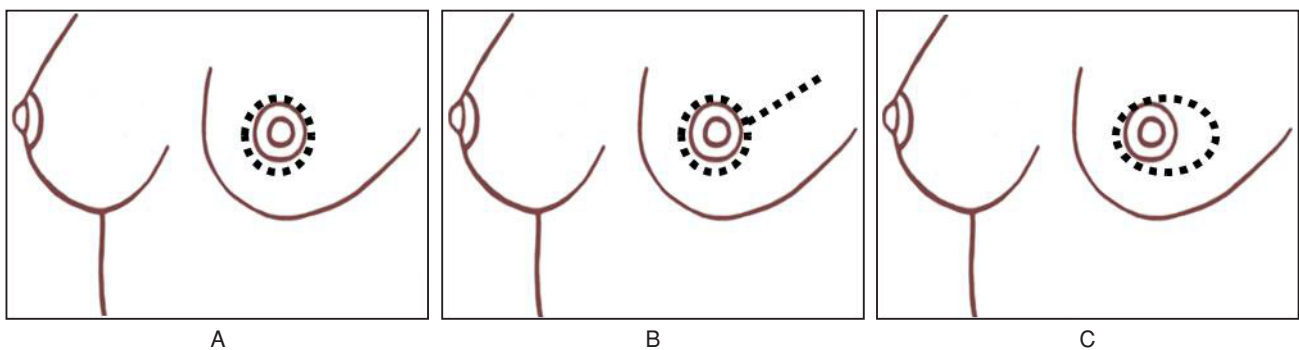


Fig. 1 Three types of skin-sparing mastectomy incisions: (A) Periareolar, (B) periareolar with radial extension, (C) elliptical.

Table 1 Clinicopathologic characteristics of patients with SSM

No	Age at surgery	Reconstruction procedures	Skin incision	Axillary dissection	T	N	Number of positive nodes	Histologic type
1	37	Free TRAM	Periareolar	+	T2	N0	0	IDC
2	50	Free TRAM	P/R	+	T1	N0	0	IDC
3	46	Silicon	P/R	+	Tis	N0	0	DCIS
4	59	Silicon	P/R	+	T1	N0	0	DCIS
5	53	Free TRAM	Elliptical	+	T2	N0	0	IDC
6	49	Free TRAM	Elliptical	+	T2	N1	1	IDC
7	46	LD	Elliptical	+	T1	N1	1	IDC
8	34	LD	Elliptical	-	T2	N0	unknown	Mucinous carcinoma
9	33	LD	Elliptical	+	Tis	N0	0	DCIS
10	52	LD	P/R	-	Tis	N0	unknown	DCIS
11	51	TRAM	Elliptical	+	T1	N0	0	IDC
12	68	Silicon	Elliptical	SLNB	T2	N0	0	DCIS
13	47	TRAM	P/R	SLNB	Tis	N0	0	DCIS

SSM, skin-sparing mastectomy; TRAM, transverse rectus abdominis musuolocutaneous flap; IDC, invasive ductal carcinoma; P/R, periareolar with radial extension; DCIS, ductal carcinoma in situ; LD, latissimus dorsi musculocutaneous flap; SLNB, sentinel lymph node biopsy

Table 2 Clinicopathologic characteristics of patients with NSSM

No	Age at surgery	Reconstruction procedures	Axillary dissection	T	N	Number of positive nodes	Histologic type
1	46	TRAM	Level III	T4c	N2	25	IDC
2	40	LD	Level II	T2	N0	0	IDC
3	40	TRAM	Level II	T2	N0	0	IDC
4	43	TE	Level II	T2	N0	0	ILC
5	65	TE	Level II	T2	N0	1	ILC
6	53	TE	Level II	T2	N0	1	IDC
7	34	TE	Level II	T1	N0	1	IDC
8	46	TE	Level II	T2	N0	0	IDC
9	75	TE	-	T2	N0	unknown	IDC
10	41	TE	Level II	T2	N0	0	IDC
11	58	TE	Level II	T2	N1	18	IDC
12	44	TE	Level II	T3	N0	13	IDC
13	53	TE	Level II	T1	N0	3	IDC
14	45	TRAM	Level II	T2	N0	11	ILC

NSSM, non skin-sparing mastectomy; TRAM, transverse rectus abdominis musuolocutaneous flap; IDC, invasive ductal carcinoma; LD, latissimus dorsi musculocutaneous flap; TE, tissue expander; ILC, invasive lobular carcinoma

Table 3 Pathologic characteristics of the tumor

	SSM (n=13)	NSSM (n=14)	<i>p value</i>
T			
Tis	6	0	0.0132
T1	3	2	
T2	4	10	
T3~	0	2	
Number of positive nodes			
0	9	5	0.1062
1-3	2	4	
≥4	0	4	
unknown	2	1	
Histologic type			
DCIS	6	0	0.0095
Invasive ductal carcinoma	6	11	
Mucinous carcinoma	1	0	
Invasive lobular carcinoma	0	3	
Hormone receptor			
ER (+) PgR (+)	4	6	0.0095
ER (+) or PgR (+)	1	5	
ER (-) PgR (-)	7	3	
unknown	1	0	

SSM, skin-sparing mastectomy; NSSM, non skin-sparing mastectomy; DCIS, ductal carcinoma in situ; ER, estrogen receptor; PgR, progesterone receptor

Table 4 Postoperative complications and outcomes

Postoperative complications/ outcomes	SSM (n=13)	NSSM (n=14)	<i>p value</i>
Hemorrhage	2 (15.3%)	1 (7.1%)	0.4959
Minor flap necrosis	2 (15.3%)	1 (7.1%)	0.4959
Local recurrences	0 (0%)	2 (14.3%)	0.1567
Distant metastases	1 (7.7%)	3 (21.4%)	0.3154
No evidence of disease	12 (92.3%)	11 (78.6%)	0.3154

SSM, skin-sparing mastectomy; NSSM, non skin-sparing mastectomy

should certainly be considered candidates for SSM.

The local recurrence rates associated with SSM in comparison with NSSM have been reported in several studies. The local recurrence rates in patients who had undergone SSM in these studies have ranged from 3.9% to 7.0% and have had no significant difference from those patients who had undergone an NSSM<sup>4-8</sup>. On the other hand, the local recurrence rate in patients who had undergone an SSM in other studies was no comparison with the NSSM patients who have ranged from 0% to 5.5%<sup>9-13</sup>.

Newman et al<sup>15</sup>. reported no significant differences in local recurrence or distant relapse rates for 50 patients undergoing immediate breast reconstruction and 72 patients not undergoing immediate breast reconstruction for locally advanced breast cancer. There were 5 local recurrences and 16 distant metastases in the immediate breast reconstruction group (10% and 32%, respectively), 9 and 26 in the other group (13% and 36.1%, respectively). Foster et al<sup>11</sup>. evaluated outcomes after SSM with immediate breast reconstruction for 25 patients with locally advanced breast cancer. Local recurrence was present in only 1 patient (4%), with successful local salvage treatment and distant metastasis present in 4 patients (16%). As a result, most authors have concluded that the SSM procedure is oncologically safe, equal to that of NSSM. In our study, no patients in the SSM group presented with local recurrence or distant metastasis. All the patients in the SSM group in this study had an early-stage breast cancer, more than 50% of the patients had DCIS, and therefore it seemed that they had no local recurrence or distant metastasis. In Japan, patients with DCIS can expect close to a 100% cure of their disease after conventional mastectomy, therefore will not permit SSM if local recurrence will develop after this procedure. Rubio et al<sup>16</sup>. reported the local recurrence rate in 95 patients treated with SSM and immediate breast reconstruction for DCIS was 3.1%, and described it was equal to the incidence of local recurrence after conventional mastectomy for DCIS, and removing additional tissue assessing margin status by intraoperative specimen radiography may lower the risk of local recurrence. Carlson et al<sup>10</sup>. reported the incidence of local recurrence in 175 patients with SSM for stage 0 was 0.6%, and Spiegel et al<sup>13</sup>. reported 44 patients with SSM for DCIS had no local recurrence.

On the other hand, 2 patients (14.3%) in the NSSM group in our series presented with local recurrences, 3 (21.4%) with distant metastases, and local recurrences presented within 1 year of treatment. Foster et al<sup>11</sup>. reported incidence of distant metastasis was not high compared with 16% of the patients who presented with distant metastases. Incidence of local recurrence was clearly higher than that reported in a number of studies. However, Carlson et al<sup>10</sup>. reported the local recurrence

rates of the patients who underwent an SSM followed by adjuvant radiotherapy for stage II breast cancer was 15% and with stage III was 10%. Two patients with both local and distant recurrence in our study had multiple positive nodes and received adjuvant radiotherapy. Therefore, it seems the patients with advanced-stage breast cancer should be informed of the increased risk of local recurrence.

SSM with immediate reconstruction seems oncologically safe and effective in patients ineligible for breast-conserving treatment. There were no local recurrences or distant metastases with SSM as compared with patients with NSSM. However, our study group was relatively small and the average follow-up period was shorter than in other studies, we will continue to perform this procedure for the patients ineligible for breast-conserving treatment and plan to extend the follow-up period and increase the number of patients for future studies.

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