Endoscopy-assisted Breast Conserving Surgery for Breast Cancer: A Preliminary Clinical Experience

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Purpose: Breast conserving surgery (BCS) has replaced modified radical mastectomy as the standard treatment for early breast cancer. However, even though the original shape of the breast is preserved, the significant scarring after BCS detracts from the natural appearance of the breast. Endoscopy-assisted breast surgery can be performed with small incisions that become inconspicuous after surgery. We report herein on our preliminary clinical experience for the aesthetic and treatment results of endoscopy-assisted BCS (EA-BCS).

Methods: We retrospectively analyzed 22 consecutive patients who underwent EA-BCS between June 2006 and February 2008. The skin incisions were made at the periareolar and axillary sites. We performed a dye- and/or radioisotope-guided sentinel lymph node biopsy (SLNB), and we dissected the axillary lymph nodes (level I and II), and excised tissue under endoscopic assistance. We carried out frozen section biopsies to rule out tumor invasion on the resection margins. The following information was obtained: the clinical and histopathological characteristics, the operative procedures, the surgical outcomes, the cosmetic evaluation, and the patients’ satisfaction. Results: The average age of the patients was 52.0 years (range, 32-74 years). The mean tumor size was 2.2 cm (range, 0.7-5.5 cm). All the patients underwent EA-BCS and SLNB. The postoperative complications were as follows: lymphedema in two patients, wound infection in three patients, and a total mastectomy due to positive margins on the final biopsy report in one patient. No locoregional recurrence was observed on the follow-up study (mean, 24.0 months). There were good to excellent aesthetic results for 95% of the evaluated cases. Almost all the patients were satisfied with the outcome of surgery. Conclusion: EA-BCS was a feasible and effective procedure for treating patients with breast cancer and it achieved good aesthetic results with reducing the surgical scarring. However, further study with more patients and long-term follow-up is needed.

Key Words: Breast neoplasms, Endoscopy, Segmental mastectomy
inconspicuous after surgery. Endoscopy-assisted breast surgery (EABS) has been recognized as a useful approach for performing aesthetic procedures such as augmentation mammoplasty. Many studies have reported on its application to breast disease, and even for malignant diseases, without worsening the therapeutic outcome. Therefore, we adopted performing EABS for those patients with early breast cancer with the objective of improving the cosmetic results. We report herein on the surgical method of endoscopy-assisted BCS (EA-BCS) that we used the aesthetic outcomes and patient outcomes after EA-BCS.

METHODS

Patients

Twenty-two patients that were underwent EA-BCS for breast cancer at the Department of Breast Care Center, Myongji Hospital, Kwandong University College of Medicine from June 2006 to February 2008. These patients were selected for EA-BCS according to the following criteria: 1) early breast cancer without any severe co-morbid conditions such as heart disease, liver dysfunction, renal failure, or a poor performance status, 2) no tumor extension to the nipple or direct invasion to the skin and pectoralis muscles, 3) no axillary lymph node metastasis, 4) no multifocal lesions and 5) no microcalcified lesions which could not localize by preoperative ultrasonography. The patients were evaluated by preoperative studies such as mammography, ultrasonography, chest computed tomography (CT), and magnetic resonance imaging (MRI). Informed consent was obtained from all the patients prior to performing EA-BCS.

Instruments for surgery

In addition to the basic endoscopic monitoring system (Stryker®; Stryker Endoscopy, San Jose, USA), Figure 1 shows the special tools we used for this surgery: 1) an Alexis® Wound Retractor (2–4 cm, XS: Applied Medical, Rancho Santa Margarita, USA) (Figure 1A) was used for axillary incision wound protection 2) Bipolar scissors BiSect (ERBE, Tuebingen, Germany) (Figure 1B) and a Harmonic ScalpelTM (Ethicon Endo-Surgery, Cincinnati, USA) were used for accurate resection and hemostasis 3) a VisiportTM Plus (5–11 mm: Tyco Healthcare, Norwalk, USA) (Figure 1C) was used for sentinel lymph node biopsy (SLNB) and axillary lymph node dissection (ALND) 4) an ENDOPATH® (Ethicon Endo-Surgery) (Figure 1D) was used for penetration of subcutaneous tissue, 5) an Endosector LE (Curexo, Anyang, Korea) (Figure 1E) and an Ultra Retractor (Johnson & Johnson KK, Tokyo, Japan) (Figure 1F) were used for dissection of the retromammary space. The endoscope is a rigid, straight instrument that is 5–mm in diameter, it is oblique at 30° and it is 10–mm in diameter and flat at 0°.

Surgical procedure

Under general anesthesia, the patient was placed in the supine position with the ipsilateral arm abducted to 90° without disturbing the operative field. The breast, chest wall, axilla, and ipsilateral arm were prepared and draped in the usual sterile fashion. The location of the tumor was confirmed by means of palpation and performing intraoperative ultrasonography, even if the tumor was non-palpable lesion. The tumor location and the quadrant to be excised were marked on the skin, A SLNB was performed with the dye-staining method or radioisotope-guided method, or a combined method at the beginning of the operation before gland resection on a case by case basis. For the cases using the dye staining method, we subcutaneously injected 5 mL of 0.8% indigocarmine in the periareolar region, and we performed breast massage for 10 min, A 3.5–cm skin incision was made along the line of the axillary skin crease, A VisiportTM Plus and 10–mm/0° scope was inserted from the axillary incision, and the stained lymph nodes were found with using endoscopy assistance. In the patients who were found to have a positive sentinel lymph node, an ALND was carried out at levels I and II through the same incision under endoscopy assistance. After completing the SLNB, the Alexis® Wound Retractor was inserted into the incision, Through the axillary incision, we cut the adipose tissue deep into the shallow lateral chest fascia, and we slide it to the lateral edge of the major pectoral muscle; we
then bluntly dissected the fascia beyond the retromammary space of the quadrant where the tumor was to be excised by using an Endosector LE or an Ultra Retractor under 5-mm/30° scope assistance. The fiberoptic breast retractor and a 10-mm/0° scope were inserted into the subpectoral pocket, and further dissection was performed using the Bipolar scissors BiSect or Harmonic Scalpel™ under endoscopic guidance. After completing the dissection of the retromammary space, we went through the subcutaneous tissue. A skin flap was made by the tunnel method. Further, we made a 3-cm periareolar skin incision in the direction of the tumor. The ENDOPATH™

Figure 1. Special surgical tools for endoscopy-assisted breast surgery. (A) Alexis® Wound Retractor. (B) Bipolar scissors BiSect. (C) Visiport™ Plus. (D) ENDOPATH™. (E) Endosector LE. (F) Ultra Retractor.
which has an opening that accommodates a 10–mm/0°
scope was next inserted beneath the skin flap of the peri-
areolar skin incision. The skin flap was made by blunt
thrusting of the ENDOPATH®. We completed the sub-
cutaneous flaps of the tumor quadrant with using the
Bipolar scissors BiSect or the Harmonic Scalpel™. The
Bipolar scissors BiSect or Harmonic Scalpel™ were also
used to vertically dissect the mammary gland. We par-
tially removed the mammary gland with free surgical
margins at least 1 cm away from the tumor border. The
resected gland was pulled out through the axillary Alexis®
Wound Retractor port. We stained the superficial cut
surface of the resected gland with India ink, with plac-
ing one or more sutures for directional orientation. The
resected gland was brought to the pathology department
and the frozen sections of its cut margin were immedi-
ately examined by a pathologist. If the cut margin was
positive, then additional resection was required until a
negative cut margin was confirmed. After the resection
was completed, meticulous dissection of the residual tissue
and hemostasis could be achieved with using the Harmonic
Scalpel™ and an electrocoagulator under endoscopic guid-
ance. After saline irrigation, the remaining mammary
glands were mobilized and sutured together to preserve
the original breast shape. A suction drainage was left in
place before closing the surgical wound. We reconstructed
the breast by immediate volume replacement as needed.
We placed an absorbable implant into the dead space. The
absorbable implant was made of Vicryl mesh® (polyglactin
910 Mesh; Ethicon, Johnson & Johnson, Somerville, USA)
wrapped with Interceed® (Oxidized regenerated cellulose:
Ethicon, Johnson & Johnson). In cases of immediate
volume replacement, however, we did not use a suction
drainage to preserve breast contour by seroma forma-
tion. The surgical wound was closed with a subcutaneous
reversed suture using 4–0 Vicryl. Compression was pro-
vided with a surgi-bra to prevent postoperative bleeding
and hematoma formation.

**Cosmetic evaluation and the patient satisfaction**

All the patients were regularly examined and questioned
about their satisfaction with the aesthetic results every
six months follow-up. Many methods of cosmetic assess-
ment have been reported. We used the 5–item–4–
step method (ABNSW) designed by Yamashita. The
method of ABNSW is the modified method of the MDACS
(malposition, distortion, asymmetry, contour deformity
and scar) grading system. ABNSW contains 5 items:
asymmetry (A), breast shape (B), nipple deformation (N),
skin condition (S) and wound scar (W). All items can be
scored by the patients themselves under the 4 steps of
the grading system as follows: 0: poor, 1: fair, 2: good,
3: excellent. The scores for the 5 items were then com-
bined to obtain a total score. On a scale of 15 points, the
summed points were defined as excellent: 15 points, good:
11–14 points, fair: 6–10 point and poor: <5 points. The
patients were also requested to evaluate the subjective
satisfaction of their postoperative aesthetic results as poor,
fair, good, or excellent using 4–step method of ABNSW
at every six months after surgery.

**RESULTS**

**Clinicopathologic features of patients**

The clinical/pathological features of all the patients are
presented in Table 1. The average age was 52.0 yr (range,
36–74 yr). The locations of the tumors are summarized
in Table 1. The upper–outer quadrant was the most com-
mon site (50.0%). The mean tumor size was 2.2 cm (range,
0.7–5.5). TNM staging was done according to the American
Joint Committee on Cancer staging system. All the pa-
tients were negative for lymph node metastasis on the pre-
operative evaluation, and this included ultrasonography
or MRI. A SLNB was performed in all patients. Four
patients who had positive sentinel lymph node frozen
biopsy results underwent ALND, and only one out of four
patients had positive axillary node biopsy results at level
I and II. For the postoperative diagnosis, 81.8% (18 out
of 22) of the patients were negative for metastatic lymph
nodes; however, 18.2% (4 out of 22) of the patients were
positive for lymph node metastasis: distant metastasis
was not observed in any patient. The disease in all the
patients with malignancies was classified as earlier than
stage IIIB. Estrogen receptor positive results were obtained
in 86.4% (19 out of 22) of the patients and the progesterone receptor status was positive in 95.5% (21 out of 22) of the patients. We defined more than three scores at the sum of proportional and intensity score as hormone receptor positive. An over-expression of HER2/neu was observed in 40.9% (9 out of 22) of the patients. The histopathological diagnoses of treated diseases are summarized in Table 1.

### Operative methods
EA–BCS was performed for 22 patients with breast cancer. A SLNB was performed in 22 patients. An ALND was performed in four patients who had positive sentinel lymph node frozen biopsy results. Immediate volume replacement treatment was carried out in 11 patients with an absorbable implant that was made of Vicryl mesh\textsuperscript{a} wrapped with Interceed\textsuperscript{b}. The mean operative time was 144 min (range, 105–190 min). The mean volume of the extracted mass was 219.2 cm\textsuperscript{3} (range, 56–1332 cm\textsuperscript{3}).

### Satisfaction level for surgery
Ninety five percent (21 out of 22) of the patients were questioned about their satisfaction with the aesthetic results every six months follow–up. There was one patient who underwent a skin sparing mastectomy (SSM) with immediate breast reconstruction due to a positive resection margin of the nipple specimen on the permanent report was excluded in this assessment. The postoperative evaluations after the procedures are shown in Figure 2. The scar from the wound was inconspicuous,

### Table 1. Characteristics of patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean±SD</th>
<th>No. of patients (%)</th>
<th>(n=22)</th>
</tr>
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<tbody>
<tr>
<td>Age (yr)</td>
<td>52.00±11.24</td>
<td></td>
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</tr>
<tr>
<td>BMI (kg/m\textsuperscript{2})</td>
<td>24.00±3.04</td>
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<td></td>
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<tr>
<td>Tumor size* (cm)</td>
<td>2.23±1.18</td>
<td></td>
<td></td>
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<tr>
<td>Tumor location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UOQ</td>
<td>11 (50.0)</td>
<td></td>
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<tr>
<td>UIQ</td>
<td>7 (31.8)</td>
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<tr>
<td>LOQ</td>
<td>3 (13.6)</td>
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<tr>
<td>LIQ</td>
<td>1 (4.5)</td>
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<tr>
<td>T Stage</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Tis</td>
<td>1* (4.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1a</td>
<td>1 (4.5)</td>
<td></td>
<td></td>
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<tr>
<td>T1b</td>
<td>1 (4.5)</td>
<td></td>
<td></td>
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<tr>
<td>T1c</td>
<td>9 (40.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>10 (45.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymph node metastasis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>18 (81.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>4 (18.2)</td>
<td></td>
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<tr>
<td>Stage (AJCC grouping)</td>
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<td></td>
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</tr>
<tr>
<td>0</td>
<td>1 (4.5)</td>
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<td></td>
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<tr>
<td>I</td>
<td>11 (50.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IIa</td>
<td>8 (36.4)</td>
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<td></td>
</tr>
<tr>
<td>IIB</td>
<td>2 (9.1)</td>
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<td></td>
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<tr>
<td>Pathology type</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>DCIS</td>
<td>1 (4.5)</td>
<td></td>
<td></td>
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<tr>
<td>IDC</td>
<td>16 (72.7)</td>
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<td></td>
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<tr>
<td>ILC</td>
<td>1 (4.5)</td>
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<td></td>
</tr>
<tr>
<td>IDC, ILC mixed</td>
<td>2 (9.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mucinous carcinoma</td>
<td>2 (9.1)</td>
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<tr>
<td>Hormone receptor state</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>positive</td>
<td>19 (86.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>negative</td>
<td>3 (13.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>positive</td>
<td>21 (95.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>negative</td>
<td>1 (4.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HER2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0</td>
<td>7 (31.8)</td>
<td></td>
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<tr>
<td>1+</td>
<td>6 (27.2)</td>
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<td></td>
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<tr>
<td>2+</td>
<td>3 (12.5)</td>
<td></td>
<td></td>
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<tr>
<td>3+</td>
<td>6 (27.3)</td>
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</tbody>
</table>

SD=standard deviation; BMI=body mass index; UOQ=upper outer quadrant; UIQ=upper inner quadrant; LOQ=lower outer quadrant; LIQ=lower inner quadrant; Tis=carcinoma in situ; AJCC=American Joint Committee on Cancer; DCIS=ductal carcinoma in situ; IDC=invasive ductal carcinoma; ILC=invasive lobular carcinoma; ER=estrogen receptor; PR=progesterone receptor; HER2=human epidermal growth factor, type 2.

*The largest tumor size was 5.5-cm which was ductal carcinoma in situ in pathology.

### Table 2. Cosmetic evaluation by ABNSW\textsuperscript{*} and patient's satisfaction

<table>
<thead>
<tr>
<th>ABNSW item</th>
<th>Average (Mean±SD)</th>
<th>(n=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymmetry</td>
<td>2.00±0.63</td>
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</tr>
<tr>
<td>Breast shape</td>
<td>2.33±0.48</td>
<td></td>
</tr>
<tr>
<td>Nipple deformation</td>
<td>2.52±0.60</td>
<td></td>
</tr>
<tr>
<td>Skin condition</td>
<td>2.57±0.50</td>
<td></td>
</tr>
<tr>
<td>Wound scar</td>
<td>2.76±0.44</td>
<td></td>
</tr>
<tr>
<td>Patient's satisfaction</td>
<td>2.52±0.51</td>
<td></td>
</tr>
<tr>
<td>Total ABNSW\textsuperscript{*}</td>
<td>12.20±0.98</td>
<td></td>
</tr>
</tbody>
</table>

SD=standard deviation.

\textsuperscript{*}ABNSW was comprised of five items: asymmetry (A), breast shape (B), nipple deformation (N), skin condition (S) and wound scar (W). All items scored under the 4 steps of the grading system as follows: 0: poor, 1: fair, 2: good, 3: excellent; The total ABNSW was a sum of the scores for the 5 items.
The shape of the breast appeared natural and nearly symmetrical. The patients were satisfied with the operation. The aesthetic results were evaluated using the original scoring system ABNSW. The mean total ABNSW score was 12.2 (Table 2). By comparing with 4-step method, scores greater than 11 points were considered good or excellent; subsequently, 95% of the evaluated cases had good or excellent results. In addition, the degree of satisfaction was evaluated using 4-step method of ABNSW. 100% (21 out of 21) of the patients scored good or excellent results. Almost all the patients were satisfied with the aesthetic results of their surgery.

Table 3 summarizes the surgical complications. The postoperative complications were as follows: lymphedema developed in 9.1% (2 out of 22), skin retraction developed in 9.1% (2 out of 22) and wound infection developed in 13.6% (3 out of 22). Two out of these 3 patients had wound infection because of the prosthetic infection. All cases of wound infection were developed in diabetes patients. Skin retraction was caused by reoperation of infected prosthesis removal.

Table 3. Complications after surgery

<table>
<thead>
<tr>
<th>Type of complication</th>
<th>No. of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seroma</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Wound infection*</td>
<td>3 (13.6)</td>
</tr>
<tr>
<td>Skin retraction</td>
<td>2 (9.1)</td>
</tr>
<tr>
<td>Lymphedema</td>
<td>2 (9.1)</td>
</tr>
<tr>
<td>SSM due to positive surgical margin</td>
<td>1 (4.5)</td>
</tr>
</tbody>
</table>

SSM=skin sparing total mastectomy.

*Wound infection was caused by prosthesis infection in two out of 3 patients; Skin retraction was caused by reoperation of infected prosthesis removal.

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ation. There were 9.1% (2 out of 22) of the patients who had to have their prosthesis removed because of infection of the Vicryl mesh. We did not additional procedure to preserve breast shape after the infected prosthesis removal. In addition, 4.5% (1 out of 22) of the patients had a positive resection margin of the nipple specimen on the permanent pathology report. Therefore, we performed a SSM with immediate breast reconstruction nine days after the initial operation. To detect local recurrence and distant metastasis, after surgery, ultrasonography was performed every six months and positron emission tomography–CT was performed one year after the operation. The patients underwent standard adjuvant therapy based on the recommendation of St. Gallen. After a mean follow-up period of 24.0 months (range 12–32 months), neither local/regional recurrence nor distant metastases were detected.

**DISCUSSION**

Preservation of the natural shape of the breast is very important for women who suffer with breast disease that requires surgery. BCS was originally introduced to improve the cosmetic outcomes of breast cancer treatment by Veronesi et al. and Fisher et al., and it has greatly improved the patient satisfaction with these procedures. However, when a long marked operation scar occurs this reduces the patient satisfaction with the cosmetic outcome.

Endoscopic surgery has been established as a treatment modality for abdominal and thoracic disorders. One of the main advantages of endoscopic surgery is that it can be performed via small incisions that become inconspicuous after the surgery. EABS was first developed for performing augmentation mammoplasty. In 1992, Kompatscher described the endoscopic capsulotomy technique for treating capsular contracture that occurs after breast augmentation. Following that numerous studies regarding endoscopy–assisted breast augmentation have been reported, EABS has now become the standard technique for breast augmentation. Although it is challenging as a surgical technique, it has the potential of becoming an important alternative approach for treating both benign and malignant tumors of the breast.

Kitamura et al. reported on endoscopic extirpation of benign breast tumors. In the past few years, endoscopic surgery has been successfully used for benign breast disease such as breast lump excision, breast augmentation, subcutaneous mastectomy for gynecomastia, and axillary dissection. Friedlander et al. first reported on EABS for breast cancer in 1995. They initially performed experimental surgery using an endoscope on porcine models and thereafter on cadavers. Yamagata and Iwai reported on endoscopic partial mastectomy and axillary dissection for breast cancer in 1997. Subsequently, there have been numerous reports on EABS for treating breast cancer. As Fukuma et al. and Yamagata et al. have suggested, almost all surgeries can be performed through a 3.5-cm axillary incision and a 3-cm periareolar skin incision in the direction of the tumor. However, the periareolar wound scar is more conspicuous than the axillary wound scar, and the former often distorts the nipple and the areola, and causes sensory disturbance around the areola. In the properly selected cases, we attempt to make only an axillary incision for those cases where the tumor is located in the outer–upper or inner–upper quadrant and the tumor is thought to be early breast cancer: all surgical procedures are currently performed with endoscopic assistance. Reconstruction of the conserved breast is simultaneously performed during the EABS at our center: an absorbable implant is placed into the dead space during the procedure. This likely contributes to the excellent cosmetic results after EABS (Figure 2A). We experienced two cases of prosthetic wound infection. All of these cases were developed in diabetes patients. After that, we did not use Vicryl mesh replacement in diabetes patients.

The status of the surgical margins is very important for assessing the risk of disease recurrence. To obtain accurate surgical margins, we used ultrasonography or MRI preoperatively and we performed accurate dissection under intraoperative ultrasonography with an endoscopic monitor. The surgical edge of the tumor was examined during surgery by fast–frozen section analysis. The permanent pathology report revealed one case with a positive resection margin in the nipple. In this case, we performed
Endoscopy-assisted Breast Conserving Surgery

SSM with immediate breast reconstruction nine days after the initial operation.

Endoscopy-assisted SLNB and ALND is another application of endoscopic surgery for treating breast cancer. These techniques have been mainly developed in Europe, and they appear to have significant advantages from a cosmetic point of view. SLNB has been established as an alternative treatment option for patients with early stage breast cancer. The oncological safety of SLNB was recently confirmed by a randomized controlled trial. Some investigators have recently reported on endoscopic SLNB and they have confirmed its superior, higher rate of identifying lymph nodes with tumor. The procedure was initially introduced in 1993 by Suzanne et al. who reported on the simplicity and safety of endoscopic axillary lymphadenectomy with fat aspiration. In 1996, Salvat et al. reported on the results of a randomized study that compared endoscopic sampling and open surgery for the axillary lymph nodes in patients with breast cancer; there were no statistical differences identified for the operation time between the two groups, as well as the duration of the hospital stay, the immediate post-operative complications, the number of lymph nodes removed, and the size of the lymph nodes. Most reports have concluded that endoscopic axillary lymphadenectomy produced a better cosmetic outcome with fewer sensory disturbances, and the number of removed lymph nodes did not differ from that of conventional surgery. However, some investigators have doubts about the clinical benefits of endoscopic axillary lymphadenectomy. We had 22 cases that underwent endoscopic-assisted SLNB. Four patients were found to have a positive sentinel lymph node on the frozen section, and ALND could be carried out at levels I and II through the same incision under endoscopic-assistance. Using an incision for the SLNB to insert the Alexis® Wound Retractor, we were further able to reduce the injury to the skin envelope of the breast, which apparently improved the cosmetic appearance after the surgery. Yet other than the cosmetic benefits, the advantages of endoscopy-assisted ALND remain unclear, and so further studies are needed to determine this.

Overall the cosmetic results and patient satisfaction are excellent. In the cosmetic evaluation by using ABNSW, more patient selected good score than excellent score in the items of the asymmetry (A), breast shape (B). Patients think that they will have the preoperative breast contour after operation by using the new operative techniques: such as EABS, Vicryl mesh replacement. The postoperative results fall short of patients' expectation. We think that these higher expectation lead up to these results, In practice, the semicircular surgical wound around the nipple becomes conspicuous after the surgery. For the properly selected cases, we started to make only an axillary incision to improve the cosmetic result. We are now developing another method of breast reconstruction to further the outcomes.

There are several factors to consider before performing EA-BCS instead of conventional BCS, and these factors include a longer operation time, difficulty in handling instruments and the safety from point of view of tumor recurrence. We can ask: Is the extra time and cost of EABS worth the benefit of reducing the size of the scar on the breast? However, endoscopic surgery has been used for a variety of breast surgery procedures over the past 10 yr and it is expected to be used for almost all surgeries of the breast in the future.

Our study had several limitations. First, evidence obtained from retrospective studies, like ours, is statistically weak. Second, the follow-up period was relatively short, and additional careful follow-up is needed to ascertain the long-term follow-up results of this procedure. Third, our wound infection rate was not lower than that reported in previous literature in cases where immediate reconstruction was performed. However, new specialized instruments must be developed for improving this technique and a large clinical trial with adequate follow up and then comparing the results with conventional BCS are needed to confirm the safety of EA-BCS.

CONCLUSION

EA-BCS was feasible and effective for treating breast cancer and it can be regarded as possibly the best surgical
option for obtaining better aesthetic results as it can be performed via a small and remote wound that becomes inconspicuous after surgery. EA–BCS has promising potential though there are several important factors to consider when performing this procedure. Further study with more patients and long-term follow-up is needed.

REFERENCES


