



and Other Interventional Techniques

## Endoscopic-assisted subcutaneous mastectomy and axillary dissection with immediate mammary prosthesis reconstruction for early breast cancer

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### Abstract

**Background:** Endoscopic surgery has been applied successfully in breast lump excision, breast augmentation, subcutaneous mastectomy for gynecomastia, and axillary dissection. Since subcutaneous mastectomy has been proven to be oncologically safe for early breast cancer, we have sought to develop a reproducible minimally invasive endoscopic-assisted technique to address this condition.

**Methods:** Between December 1998 and May 1999, endoscopic-assisted subcutaneous mastectomy and axillary dissection with immediate reconstruction using a mammary prosthesis was performed in nine patients with early breast cancer at the Prince of Wales Hospital, Hong Kong. A 5-cm skin incision was made along the line of the lowest axillary skin crease. Dissection was continued down to the lateral border of the pectoralis major muscle. A subpectoral pocket was gently created by an endoscopic breast dissector. The endoscopic breast retractor and 10-mm/30° scope were introduced into the subpectoral pocket, and further dissection was carried out using a 7-in harmonic scalpel under endoscopic vision down to a level 1 cm caudal to the inframammary fold. This subpectoral space was used for the insertion of the mammary prosthesis later on. Endoscopic-assisted subcutaneous mastectomy was performed afterward. Combined level I and level II axillary dissection was carried out via the same incision under direct vision.

**Results:** Apart from minor skin flap bruises in our first two patients, there were no major complications. Histological examination of all the specimens showed clear margins. Postoperative radiotherapy and chemotherapy were given in the usual manner. All patients were satisfied with the reconstructive outcome.

**Conclusions:** We have described a novel endoscopic technique for subcutaneous mastectomy with immediate mammary prosthesis reconstruction in treating early breast cancer patient. This technique can minimize skin incision, re-

duce blood loss, and improve reconstructive outcome. It is easy to learn and well accepted by patients.

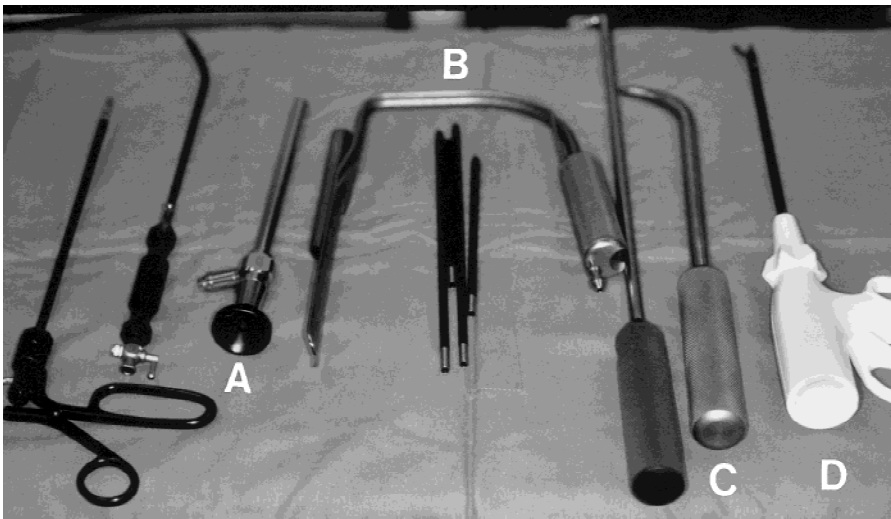
**Key words:** Endoscopic-assisted subcutaneous mastectomy — Early breast cancer — Reconstructive outcome — Breast — Cancer

It was not until after the annual meeting of the American Society of Plastic and Reconstructive Surgeons in September 1992 that plastic surgeons began to apply the technology of endoscopic surgery to forehead and face lifts, breast surgery, facial fractures, hand surgery, body contouring, and reconstructive surgery, including tissue expansion and harvest of tissue for pedicle and flap transfer. In the past few years, endoscopic surgery had been applied successfully to breast lump excision, breast augmentation, subcutaneous mastectomy for gynecomastia, and axillary dissection [1, 2, 5, 13, 15]. Now that subcutaneous mastectomy has been proven to be oncologically safe for early breast cancer [6, 7, 8, 9, 14], we have sought to develop a reproducible minimally invasive endoscopic technique to treat this condition that can minimize skin incision, reduce blood loss, and improve reconstructive outcome.

### Patients and methods

Between December 1998 and May 1999, nine consecutive patients with primary invasive breast cancer <3 cm in size or with extensive ductal carcinoma in situ (DCIS) who did not want lumpectomy and postoperative radiotherapy or mastectomy underwent endoscopic-assisted subcutaneous mastectomy and axillary dissection with immediate mammary prosthesis reconstruction at the Prince of Wales Hospital, Hong Kong. Patients with primary tumor size >3 cm, tumor fixed to skin or muscle, and retroareolar tumor were excluded.

Anatomically shaped McGhan style 150 expandable mammary implants were used for immediate reconstruction. This implant has a textured surface with an adjustable saline-filled inner lumen surrounded by a sili-



**Fig. 1.** Endoscopic breast surgery instruments. A, 10-mm/30° scope; B, endoscopic breast retractor; C, endoscopic breast dissector; D, 7-in harmonic scalpel.

cone gel outer lumen, which offers a better opportunity to reconstruct a natural-looking breast.

Postoperative radiotherapy and chemotherapy were given in the usual manner. Serial examinations and clinical photos were done to assess and record the reconstructed breast for definition of inframammary fold, ptosis, condition of nipple-areola complex, firmness, and symmetry. The degree of patient satisfaction was documented using the Patient Self-Assessment Satisfactory Index (0–10; 0 = very dissatisfied, 10 = very satisfied).

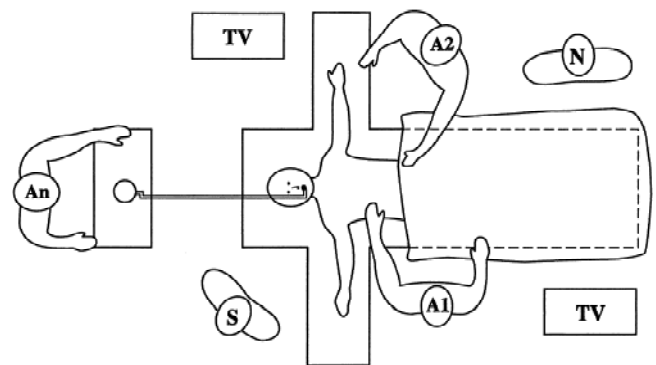
### Operative technique

Preoperative markings of the inframammary fold are made with the patient in a sitting or standing position. A single dose of Monocid (cefonicid) is administered during induction of anesthesia. In addition to the basic light source and camera system, the specific endoscopic breast surgery instruments include a 10-mm/30° scope, endoscopic breast retractor, endoscopic breast dissector, and a 7-in harmonic scalpel (Auto Suture, Snowden-Pencer, Inc., 5175 South Royal Atlanta Drive, Tucker, GA 30084, USA) (Fig. 1). The harmonic scalpel is used to reduce thermal injury during tissue dissection and coagulation.

The operative setting is shown in Fig. 2. The position of the surgeon and the first assistant may be switched to facilitate the dissection of the medial aspect of the breast. The patient is put in supine position with both arms abducted to 90°. A 5-cm skin incision is made along the line of the lowest axillary skin crease. The wound is deepened to the lateral border of the pectoralis major muscle. A subpectoral pocket is gently created by the endoscopic breast dissector (Fig. 3A). The endoscopic breast retractor and 10-mm/30° scope are inserted into the subpectoral pocket, and further dissection is continued by using the harmonic scalpel under endoscopic vision down to a level 1 cm caudal to the inframammary fold. This subpectoral space is used for the insertion of the mammary prosthesis later on. Endoscopic-assisted subcutaneous mastectomy is carried out afterward (Fig. 3B).

The plane between the breast disc and the pectoralis major muscle is opened up via diathermy under direct vision to create a working space. The endoscopic breast retractor is introduced into this space to lift up the breast disc. Using the harmonic scalpel, the breast disc is then dissected off the pectoralis major muscle up to the clavicle under endoscopic vision. After that, the plane between the skin flap and the breast is opened up under direct vision to create a working space for the excision of all the breast tissue endoscopically. The skin flap is of the same thickness as in simple mastectomy. In large-volume breasts, an inferior circumareolar incision is made to facilitate the dissection of the medial lower quadrant of the breast. Any previous excisional biopsy scar is removed together with the breast tissue. After the excised breast tissue is pulled out through the axillary wound, en bloc combined level I and level II axillary dissection is continued through the same wound under direct vision (Fig. 4).

A McGhan style 150 expandable mammary implant is used for immediate subpectoral mammary reconstruction. Once the prosthesis has been



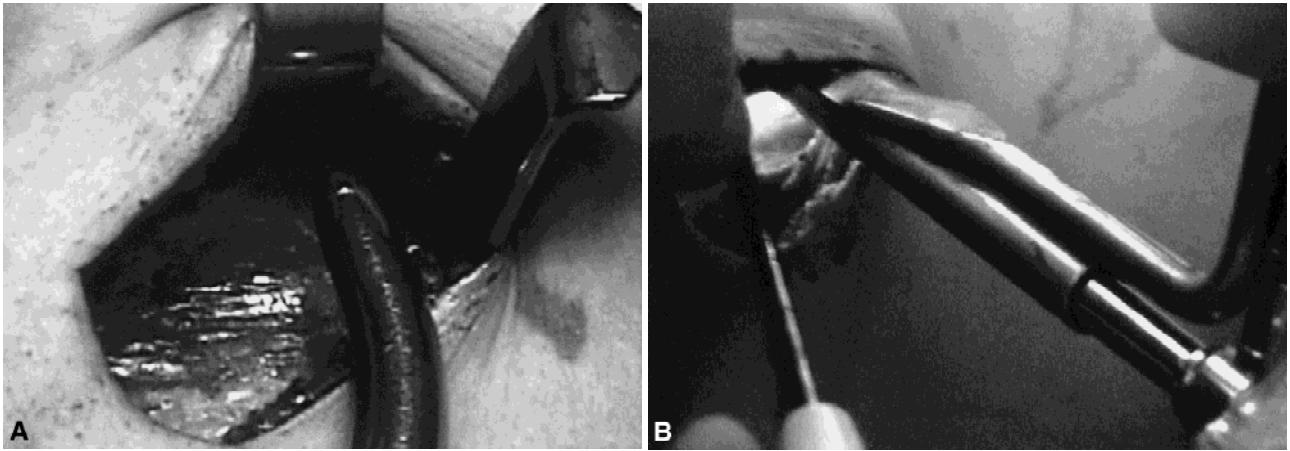
**Fig. 2.** Operating theater setup and patient positioning. An, anesthetist; S, surgeon; A1, first assistant; A2, second assistant; N, scrub nurse.

inserted into the subpectoral pocket, normal saline is injected to inflate the prosthesis via a remote injection port. Care must be taken to check the position of the prosthesis and the definition of the submammary line. A subcutaneous pocket is created in the subaxillary region to accommodate the injection port. One suction drain is left in the axillary region. A light supportive dressing is used for 48 h to keep the prosthesis in a medial position. The drain is removed if the output is <20 ml on 2 consecutive days.

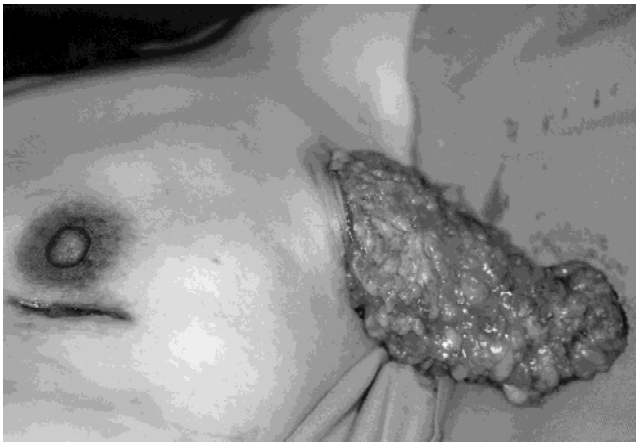
### Results

A total of nine endoscopic-assisted subcutaneous mastectomies with immediate mammary prosthesis reconstruction were performed in nine patients over a period of 5 months. All of them had early breast cancers (five DCIS, two T1, and two T2). Their mean age was 38.8 years (range, 32–50). Their primary tumors were >2 cm away from the nipple-areola complex and were not fixed to muscle or skin.

The average volume of prosthesis for reconstruction in these nine patients was 235 ml. Because of the small average breast volume in our locality, we excluded primary tumors >3 cm from the study. We managed to perform the operation under one axillary incision in six patients (Fig. 5). The other three patients had a greater breast volume, so an additional circumareolar incision was made to facilitate the



**Fig. 3.** A Gentle dissection of the subpectoral pocket by the endoscopic breast dissector. B One-port endoscopic dissection of the breast disc.



**Fig. 4.** The previous excisional biopsy scar is removed together with the main specimen. The excised breast tissue is pulled out through the axillary wound, and en bloc axillary dissection is performed via the same wound under direct vision.

dissection of the medial lower quadrant of the breast and to avoid excessive retraction of the skin flap (Fig. 6).

The operative time ranged from 3 h 15 min to 4 h 35 min (mean, 3 h 54 min), and the average blood loss was 135 ml. The long operative time was due to the learning curve associated with this novel technique, but we managed to perform the operation within 3 h 30 min in the last two patients. The most difficult part of the operation was the dissection of the medial lower quadrant of the breast, which contributed significantly to the long operative time.

Histological examination of all the specimens showed clear margins. Hospital stay was 4–12 days (mean, 6.78). Because of the inadequate primary health care system in Hong Kong, the practice was to discharge the patient from the hospital only after the drain had been removed. Apart from skin bruises due to excessive retraction in the first two patients, there were no major complications. The bruises subsided in 3–4 weeks. The intercostobrachial nerve was preserved routinely, and there was no nerve injury, no skin necrosis, and no axillary seroma. On first follow-up, the mobility of the shoulder on the side of surgery was normal

in all nine patients. Postoperative radiotherapy and chemotherapy were given in the usual manner. The average score for the Patient Self-Assessment Satisfactory Index was 8, and all patients were satisfied with the final reconstructive outcome.

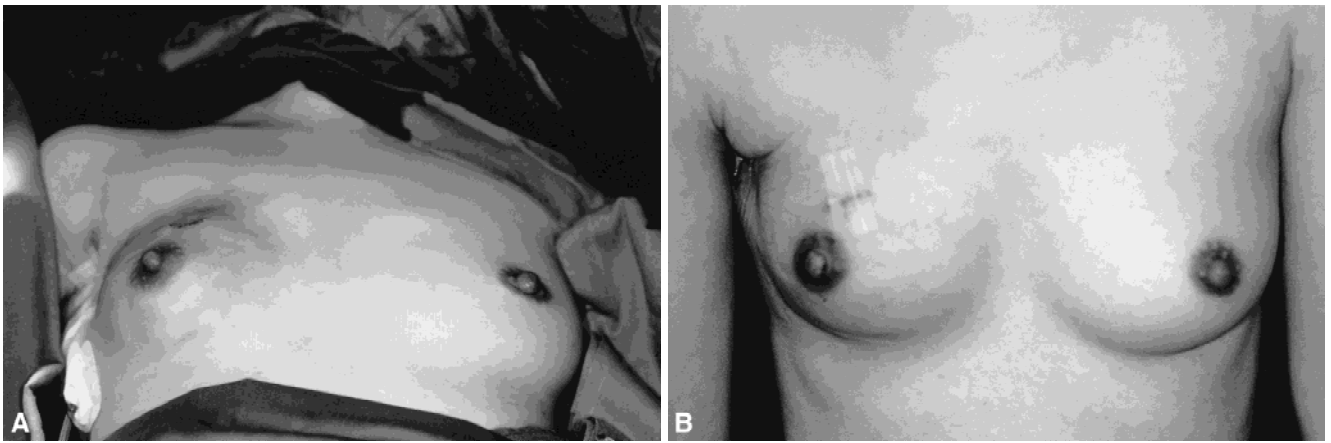
## Discussion

Because it is a mutilating procedure, mastectomy is often associated with an increased incidence of psychological disturbances. Mastectomy patients tend to suffer from ongoing anxiety and depression over the disfigurement of their bodies and the loss of a feminine figure. This crisis in self-confidence may be followed by sexual disturbances, as well as disruption in marital and interpersonal relationships [10]. Breast reconstruction has overwhelming positive effects that help patients cope with daily life [11]. The adverse psychological consequences can be minimized, and self-esteem increases after successful breast reconstruction [12].

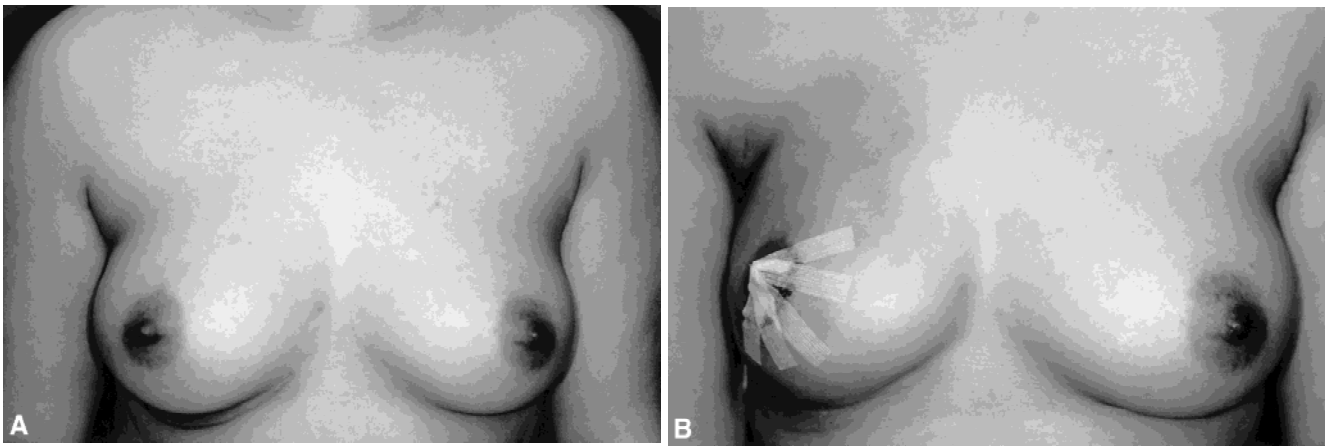
Dean et al. demonstrated that immediate reconstruction reduces psychiatric morbidity, particularly in women with unsatisfactory marriages. Furthermore, women who underwent reconstruction had more freedom in their choice of clothing and were less likely to be repulsed by their own naked appearance than women who did not undergo reconstruction [4].

With advances in minimally invasive endoscopic techniques, patients who are candidates for open subcutaneous mastectomy and immediate mammary prosthesis reconstruction can now have the operation done with endoscopic assistance to minimize skin incision, improve reconstructive and rehabilitative outcome, and perhaps further reduce psychosocial morbidity.

The long-term survival of a breast cancer patient depends on the presence of distant metastases at the time of presentation. It is not affected by the type of local operation performed. Cheng et al. showed that there is no significant difference in the local recurrence rates between well-matched patients undergoing subcutaneous mastectomy and those who have a simple mastectomy for invasive primary



**Fig. 5.** Patient with 445-ml right breast requiring reconstruction. **A** Preoperative appearance. **B** Two days after the operation, a circumareolar incision was required for the procedure.



**Fig. 6.** Patient with one axillary incision. **A** Immediately after the operation, the previous excisional biopsy scar was excised together with the main specimen. There is some irregularity of the contour of the reconstructed breast. **B** Two weeks after the operation, the irregularity resolved, and the reconstructive outcome was satisfactory.

breast cancer; they further demonstrated that subcutaneous mastectomy is an oncologically safe option [3]. At the same time, breast conservation treatment has now been widely adopted for early breast cancer. However, in our locality, the average breast volume of the local Chinese women is small. Wide local excision of the tumor frequently causes significant disturbance of the breast contour and the nipple-areola complex, resulting in a poor cosmetic outcome. Endoscopic-assisted subcutaneous mastectomy with immediate reconstruction may provide a better alternative for this group of patients.

Under endoscopic vision, meticulous dissection and hemostasis can be achieved with the harmonic scalpel. The average blood loss is less than with the conventional method. The scar created by the previous excisional biopsy for the diagnosis of breast cancer was excised routinely, together with the main specimen. Whether this practice is justified oncologically needs further evaluation.

In conclusion, we have presented a novel endoscopic-assisted technique for subcutaneous mastectomy and axillary dissection with immediate mammary prosthesis reconstruction. This technique reduces surgical scarring, has excellent cosmetic results, and was well accepted by our patients.

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