The extended latissimus dorsi flap in oncology breast reconstruction: Case report and literature review

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Abstract

The latissimus dorsi myocutaneous flap was one of the first methods of oncology breast reconstruction described. However, the standard latissimus dorsi flap alone often does not provide sufficient volume for breast reconstruction, it may have not been the first choice any more. The design of an extended latissimus dorsi flap has involved to include the parascapular and scapula fat fascia in addition to the lumbar fat for additional volume. The main advantage of the extended latissimus dorsi flap is that it can provide autogenous tissue to restore breast volume, it is suitable for Asian women whose breasts are not too large. The author reported the first case of breast reconstruction after mastectomy using the extended latissimus dorsi flap at Viet Duc University Hospital with 5-year follow up and literature review.

Introduction

Breast cancer is one of the most common types of cancer in Vietnamese women as well as in the world. Surgical treatment of breast cancer often requires extensive excision, especially in late-stage cases. The loss of one entire breast or even mild deformities still significantly affects the patient's psychology and confidence [1].

Breast reconstruction surgery postmastectomy has been becoming more and more popular all over the world, with various sources of materials from local flaps such as latissimus dorsi (LD) flap, rectus abdominis flap, deep inferior epigastric artery perforator (DIEP) flap,... to artificial material. Although the LD flap was the first flap to be applied in breast reconstruction, it has become rarely used in recent times in Western countries due to insufficient volume.

In Vietnam, there have been some reports on breast reconstruction after mastectomy but very little in-depth literature on the extended latissimus dorsi (ELD) flap [2]. We announce the results of the first case using this flap to reconstruct the breast after mastectomy at Viet Duc University Hospital (VDUH) since 2016 and review the literature.

Case report

A 63-year-old female patient, with an unknown mass detected in the superior medial quadrant of the right breast when she had her periodic health examination at her local medical facility one month before coming to VDUH in 2016. The result of physical examination showed the right breast had a mass of about 20x20mm in size at 1 o'clock position, solid density and poor mobility. Ultrasound showed a 10x20mm infiltrative mass, fine-needle biopsy showed an invasive ductal carcinoma grade 2. A PET- CT

scan showed an increased metabolic mass of the right breast with no lymph node metastasis. After patient was consulted on by breast oncologists and plastic surgeons, her family decided to go through with the mastectomy and immediate breast reconstruction. On March 11, 2016, the patient underwent an operation where the nipple areola complex (NAC) and the entire mammary gland were removed, axillary lymph nodes were dissected and immediate breast reconstruction was initiated with an ELD flap due to the small size of the left breast (Figure 1). After surgery, the patient was referred to the oncology department.

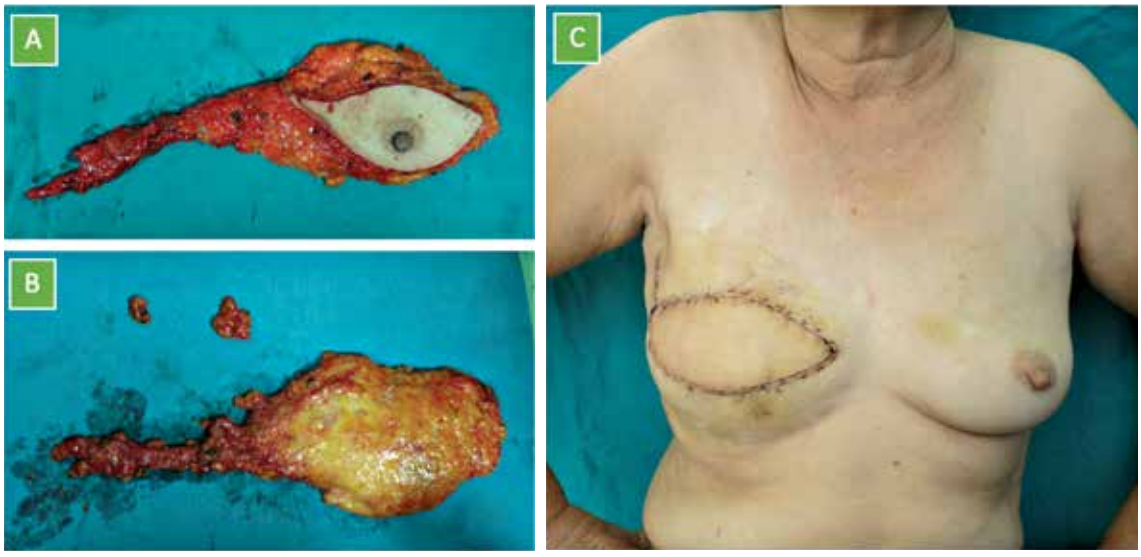

Figure 1. Surgical specimens (A, B) and immediate result after surgery (C)

Surgical technique

The flap was designed while the patient was in the standing position, the longitudinal axis of the cutaneous flap was along the back strap of the bra, with the size of the flap being 50x150mm. After the patient was anesthetized in the supine position, complete surgical removal of the mammary gland, NAC and lymph node dissection were performed. The patient was repositioned to lying on the left side, the ELD myocutaneous flap was dissected, with the anterior border being the mid-axillary line, the posterior border being the spine, the superior border being the inferior border of the scapula, and the inferior border being the iliac crest. The flap was transposed through a subcutaneous tunnel, without cutting the muscle insertion and thoracodorsal nerve. The donor site could be sutured directly. Two negative pressure drains were placed. The patient was repositioned into the supine position so the surgeons could begin reconstruction the excised breast, the entended fat at the edges of the flap is rolled to the center.

Result

Postoperatively, there was a little seroma in the donor site requiring a single aspiration, the incisions heal well, and the flap completely survived. The treatment according oncologist started on the 3rd week after surgery.

At 5 years follow-up, there is not any complication or recurrence of cancer in both clinical and paraclinical examinations. Regarding the aesthetic outcome: the volume, shape and density of the reconstructed breast are similar to the healthy breast, the patient refuses reconstruction of the NAC (Figure 2). Regarding the patient's psychology, she had no difficulty in dressing herself and was satisfied.

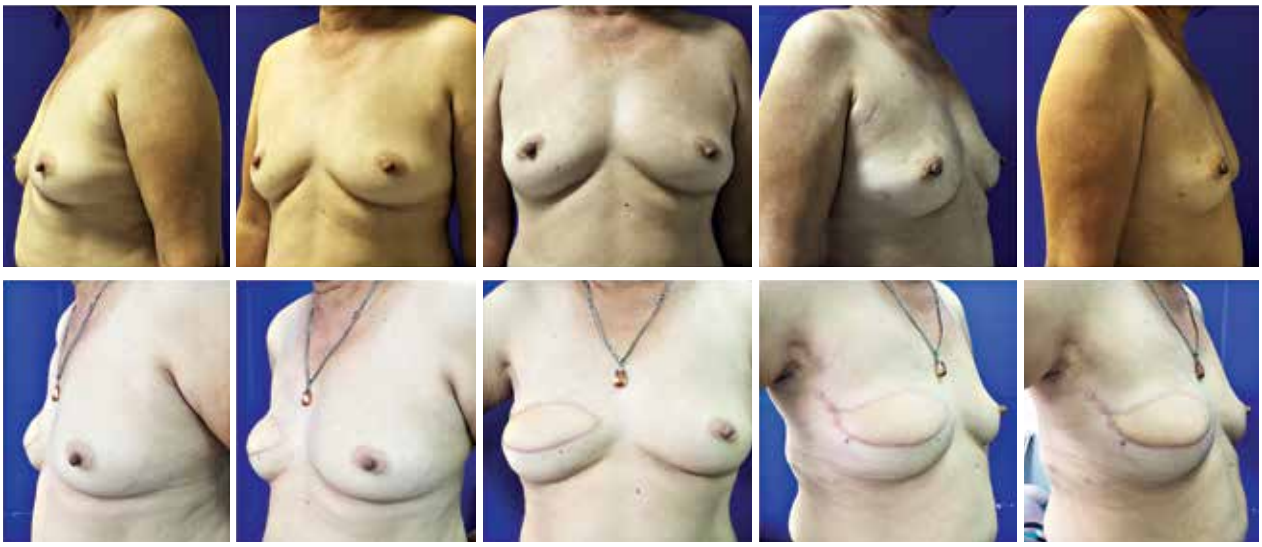

Figure 2. Immediate postmastectomy breast reconstruction with ELD flap
(A 63-year-old woman, right breast cancer, complete surgical removal of NAC - mammary gland and lymph node dissection, pre-operation and 2 years post-operation)

Discussion

The two most commonly used pedicled flaps in breast reconstruction after mastectomy are the LD flap and the rectus abdominis flap. Teisch et al [3] analyzed information on nearly 30000 cases reported all over the world and reported that using the LD flap resulted in higher rates of complications at the donor site while using the rectus abdominis flap increases the treatment time and rates of lung-related complications. The author believed that it is safer to use a LD pedicled flap compared to other adjacent flaps.

The LD flap was one of the first flaps used for breast reconstruction in the world by Italian surgeon Tansini in 1960, but it only became widely used in the 1970s. However, over time, the rectus abdominis flap has become more and more popular and was the first choice in postmastectomy breast reconstruction. One of the main reasons is that the volume of the standard LD flap is not enough to restore the breast volume after total mastectomy. In fact, most cases using the standard LD flap still required artificial materials (implants) or other flaps such as the rectus abdominis flap or the thoracodorsal artery perforator (TDAP) flap to increase breast volume. The concept of the ELD myocutaneous flap was first described by Hokin in 1983, the author mobilized the paraspinal fat to increase the flap volume. There were many unique designs of the flap reported. In general, reports suggested that the entire LD muscle, the subcutaneous fat in the scapula area, the trapezius, and the superior iliac crest could be taken. The size of the skin island depended on the elasticity and existing excess of the skin, the ideal size should be from 6-10cm in width and 20-25cm in length. It is possible to design the skin island extending beyond the anterior margin of the LD muscle about 5-7cm without necrosis risking of the flap due to malnutrition [4]. In this case, the longitudinal axis of the skin flap was along the back strap of the bra in the standing position, this ensured the aesthetic outcome because postoperative scar was completely hidden behind the strap (Figure 3).

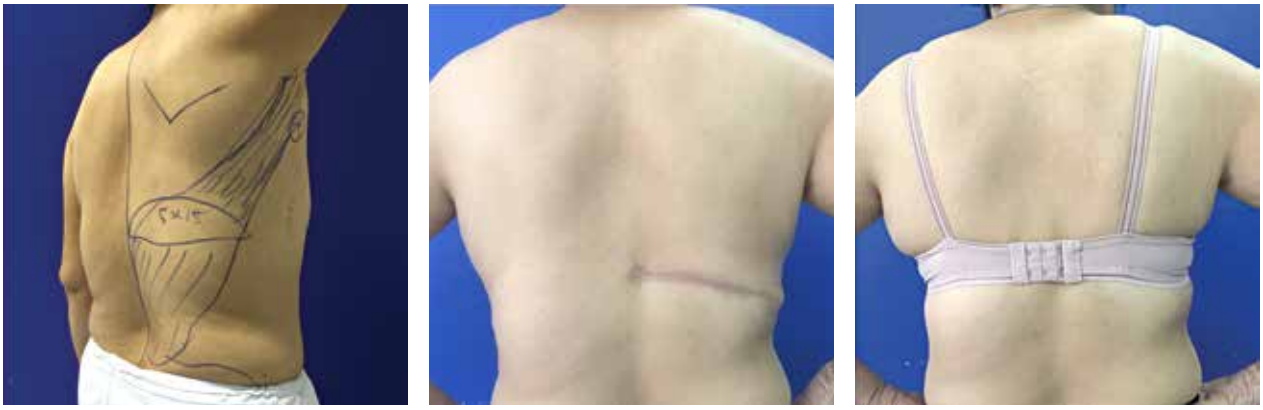

Figure 3. The flap was designed to hide the scar behind bra strap

Chang had studied 67 cases in 10 years and reported that the breast size varied mainly from A-cup to C-cup, the ELD flap volume in Western women was estimated to be about 300-400 ml, so it was completely sufficient to restore volume in these cases, even after the flap was reduced for about 20-30% in volume due to post-operative muscular atrophy [5]. Tran Viet The Phuong studied 59 cases of total mastectomy in Vietnamese women, the average volume of the excised breast was only 183.2 ml [2]. Although there have been no precise measurements on the average volume of the ELD flap in Vietnamese women but generally it can provide enough tissue to restore the volume of the excised breast in Vietnamese women, because of their smaller breast volume compared to Western women.

Regarding the function, Garusi et al reported that there were almost no effects on the function of the ipsilateral shoulder joint after using this flap in patients who are not professional sport competitions [6]. Whether or not the muscle attachment to the humerus should be cut is still a controversial issue. Some authors reported that doing so could help to increase the mobility of the flap and reduce the over fullness of the armpit after surgery. However, most cases of necrosis flap reported in the literature were in the group with muscle attachment removal. The reason may be the pedicle of the flap was stretched or twisted after muscle attachment removal. In this case, we advocated not cutting the muscle attachment to the humerus and did not have any difficulty to transpose the flap.

There is still much debate about cutting the motor nerve distributing to the muscle. Kiiski et al reported that there was no difference in post-op results between the neurectomy and non-neurectomy groups, the result showed that neurectomy took more time and increased the risk of vascular damage [7]. Some reports suggested the application of endoscopy with a short incision of about 3-5 cm in size in the armpit to dissect the LD muscle flap [4]. However, the incision around the skin island of the ELD flap was enough to dissect the flap without the use of endoscopy, the surgeons can use an integrated light source or a headlight to better control the operation. In this case, we also only used the headlight when dissecting the flap. Endoscopy was really valuable when dissecting the muscle flap without taking the accompanying skin island.

Flap necrosis is rarely reported in the literature because of the rich blood supply to the flap. At the donor site, the rate of complications was ranging from 25% to 38.7%, mainly seroma [8]. To prevent this complication, many methods had been proposed such as limiting monopolar electrical dissection, placing long-term drains, fixing the skin flap into the chest wall with sutures, spraying bio-glue into the cavity before suturing the incision... In this case, we sutured the skin flap to the chest wall and placed two

negative pressure drains. The drains were removed on the 5th day after surgery when the fluid was less than 30ml in volume. The seroma appeared at the donor site two weeks post operation, so we aspirated 12ml of fluid and applied compression bandages. Re-examination after four weeks showed no signs of seroma.

Conclusion

Mastectomy is performed more and more in recent times due to the increasing rate of breast cancer. In modern society, due to the higher quality of life, many patients demand immediate breast reconstruction after mastectomy. Because the breast volume of Vietnamese woman is not too large, the ELD flap is suitable to reconstruct the excised breast, overcoming the drawback of the standard flap lacking volume. This flap is reliable because of its stable anatomy, the technique is relatively not too complicated and can be applied in many surgical hospitals at different levels with reasonable treatment costs.

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