The Breast 20 (2011) 141–144

Contents lists available at ScienceDirect

The Breast

journal homepage: www.elsevier.com/brst

Original article

The value of latissimus dorsi flap with implant reconstruction for total mastectomy after conservative breast cancer surgery recurrence

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ARTICLE INFO

Article history:
Received 29 July 2010
Accepted 18 October 2010

Keywords:
Latissimus dorsi flap
Implant
Breast reconstruction
Breast cancer
Radiation

ABSTRACT

Total mastectomy is usually indicated after breast conservative treatment cancer recurrence. Breast reconstruction in this group can be performed with many options. We did 63 latissimus dorsi flap with implants reconstructions between 2001–2007. All of them were performed in breast cancer recurrence cases after breast conservative treatment and preceded for total mastectomy. The patient age range from 31 to 71 years old (50.1 ± 7.3 years). The follow-up was 36.5 ± 14.9 months (22–141 months). Neither flap loss nor significant major donor-site complication was recorded. The capsular contraction Baker's grade III was observed in 2 cases (3.1%). The rest were grade I–II and there was no grade IV contracture. We purpose that LD flap with implant can be performed in irradiated breast with low capsular contracture rate. It is suitable in total mastectomy reconstruction after conservative breast cancer surgery recurrence.

Introduction

External radiotherapy (ERT) for breast cancer treatment is integrated as part of the treatment in most of breast conservative treatment and advance breast cancer patients. However, either the local effect of pre- or post-operative ERT can cause unpleasant surgical outcomes and complications for implant-associated breast reconstruction in these particular groups. The significant higher rate of capsular contracture and expander/implant-associated complications have been report in several literatures.[1–4] Latissimus dorsi (LD) flap with implant is one of the reconstructive procedures which is indicated for irradiated breast reconstruction to solve this issue. Both traditional myocutaneous LD flap with implant as well as extended LD flap with or without implant, have been used for immediate and delayed total breast reconstruction in many cases at the European Institute of Oncology (IEO), Milan, Italy. We retrospectively reviewed the cases of breast cancer recurrences after conservative surgery with previous radiation therapy and proceeded for total mastectomy. The surgical technique, results and complications of the LD flap for implant reconstruction in the previously irradiated breast were reported in this study.

Materials and methods

This study is a retrospective review of all patients who underwent breast reconstruction with LD flap with implant for immediate reconstructions at the European Institute of Oncology between February 2001 and February 2007. We had 63 cases of total breast reconstruction for of breast cancer recurrences after conservative surgery. All cases were treated with previous external radiation as a part of breast conservative surgery before developed cancer recurrence and proceeded for total mastectomy with immediate reconstruction. Inform consent was given by the patient before the operation. All of the procedures were carried out by plastic surgeons in our department.

Surgical technique

We had 63 LD flap for total breast reconstructions with the extended and traditional LD flaps with implants. There were 55 cases of traditional myocutaneous or muscle only LD flaps and 8 cases of extended LD flaps. All procedures were performed together with anatomical silicone implant insertions.

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doi:10.1016/j.breast.2010.10.007

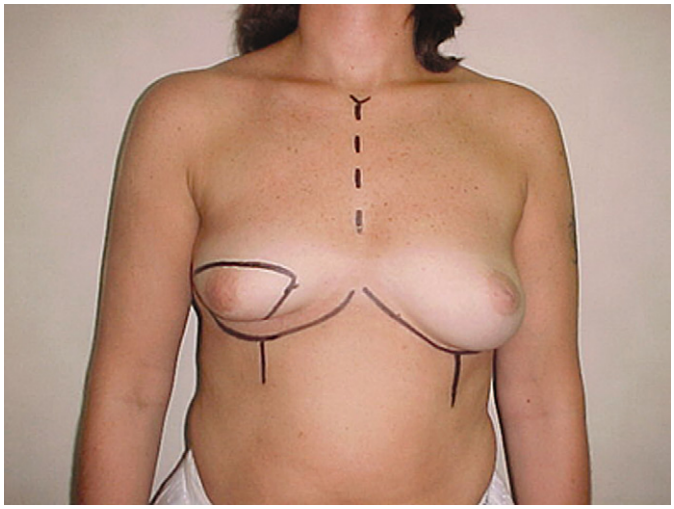

Fig. 1. Preoperative photograph of a 47 year-old patient who has recurrence breast cancer 3 year after breast conservative treatment with radiation.

The mastectomy was performed with great caution to preserve the sub-mammary fold and the tunnel to bring the flap to the anterior chest area was slightly high not to disturb the lateral breast limit, thoracodorsal nerve was preserved as well as the LD tendon was left in place.

Traditional LD flap (Figs. 1 and 2)

It was performed together with implant in every case and usually indicated when the patient was thin with limited quantity of fat tissue. There were 55 traditional LD flaps with horizontal scar at the level of the bra line or vertical scar at the anterior axillary line. In 50 cases were perform with the horizontal scars, the small skin island not exceed 6 × 12 cm were included in the flaps. Whilst, the vertical scars can be placed along the anterior axillary line with limited short scar less than 5 cm for harvesting LD muscle flap for breast reconstruction in patient without skin defect. The flap was transposed anteriorly and fixed on the chest wall along the limit of the original breast footprints and projection was obtained by the insertion of the anatomical implant.

Extended LD flap

It was selected when the adequate amount of fat tissue presented over the LD flap boundaries. The dorsal oblique design with large skin island with maximum area of 7 × 25 cm was obtained and all possible 5 areas of fat tissues were included within the LD flap according to the Delay et al. description.[5] The flap was transposed anteriorly and rotated 180°; so that, the previous inferior part was used for recreate the upper part of the breast and the axillary tail while the previous superior part with supra-scapular extension was manipulated for inferior projection and shape. Implant was inserted in order to get symmetry for insufficient volume and achieve better projection of the autologous flap. The LD muscle was denervated in every intervention.

Fig. 2. Thirty-six months after operation with traditional LD flap with implant.

For both traditional and extended LD flap, no preoperative infiltration of local anaesthetic was performed. Intraoperative intercostal nerve block with Naropine (Ropivacaine Hydrochloride, Astra, Milan); the long lasting local anaesthetic agent, was locally injected when finish the flap harvesting for better postoperative pain control.

Two drains were placed in the donor area before skin closure with a double layer of subcuticular continuous suture in order to achieve a better aesthetic scar. Drains exited in the sub-mammary fold and the dressing was aimed to hold the reconstructed breast and prostheses medially. In first day, the patients' mobilization was instructed by the nurses in order to reduce the tension on the delicate donor site. Limited upper arm motion to 90° of abduction was suggested for the first 3 weeks. Brassiere was immediately applied the first postoperative day. Drains were left in place for more than 10 days before subsequent removal and the compression garment was used soon after drain removal.

If the contralateral breast was also operated with implant augmentation, a sub-pectoral insertion was performed with peri-areolar approach. If necessary, the nipple areola reconstruction is then completed at a late stage with tattooing and local flap or nipple sharing technique. The patients were followed up in our clinic by plastic surgeons who performed the operations.

Results

From February 2001 to February 2007, we had 63 LD flaps for total breast reconstruction with the extended and traditional LD flaps with anatomic implants. The patient age range from 31 to 71 years (50.1 ± 7.3 years). The average follow-up was 36.5 ± 14.9 months with the range of 22–141 months.

The previous oncological procedures were 34 quadrantectomy with sentinel node dissections, 20 quadrantectomy with axillary node dissections and 9 quadrantectomy without axillary procedures. The duration between the previous radiation therapy to the breast reconstruction was 54.4 months (range from 7 to 141 months). The oncological procedures after the BCT recurrence were 31 skin sparing mastectomy, 28 nipple sparing mastectomy and 4 radical mastectomy.

There were 18 patients who underwent contralateral symmetrical procedures. There were 7 contralateral reduction mammoplasty, 7 contralateral mastopexy and 4 contralateral breast augmentation performed for symmetrical procedures.

The final histology were 48 infiltrative ductal carcinoma, 13 ductal carcimona in situ, 1 infiltrative lobular carcinoma and 1 sclerosing adenosis. Tumor staging were stage 0 13 cases, stage I 13 cases, stage IIA 14 cases, stage IIB 14 cases, stage IIIA 2 cases, stage IIIB 1 case and no stage IV.

Complications

Neither flap loss nor significant major donor-site complication was recorded. There was no case of skin necrosis or infection. Although, there were 2 cases of small area of wound dehisence at the donor site and were salvaged with wound revision under local

anaesthesia at one month after surgery. There were 2 cases (3.1%) of mastectomy flap superficial necrosis which healed after 3 weeks after wound dressing. Seroma was treated with weekly aspiration in the clinic and no more than 6 weeks of aspiration required.

Capsular contractures

The severity of capsular contracture was determined based on the Baker classification system.[6] If the patient developed grade III or grade IV then we considered for corrective procedure such as capsulotomy.

In particular 63 cases, the capsular contraction grade III was observed only 2 cases (3.1%) and required capsulotomy procedure. The rest were classified as grade I 36 cases (57.1%), grade II 25 cases (39.6%) and there was no grade IV.

Both cases of grade III contractures were reconstructed with LD traditional flaps with prosthesis and the corrective procedures were performed at 33 and 40 months after the reconstructive procedures. There were also 2 cases of implant substitutions due to unsatisfaction of previous volume and one case of expander substitution without evidence or symptom of severe capsular contracture.

Discussion

The risk of recurrence after conservative surgery is approximately 1% per year.[7,8]

The reconstructive procedures in this particular group after recurrence of breast cancer need different techniques from primary breast reconstruction especially previous irradiated tissue for breast conservative treatment. The abdominal donor site has been well established for autologous total breast reconstruction with the DIEP or SIEA or pedicle TRAM for irradiated breasts.[9–11] The LD donor site can be selected for total breast reconstruction. The traditional myocutaneaous flap, extended LD flap with or without implant and with subsequent lipofilling procedure can be performed.[5,12]

The use of breast implant alone has been limited to a risk of capsular contraction rate and expander/implant-associated complications, according to the published literatures, range from 11 to 70% with the subsequent need of capsulotomy and the previous RT will increase the risk of capsular contraction rate in the irradiated breast.[1–4,13–16] Other specific drawbacks of implant reconstruction are also including need of substitution, contour difference and mobility compared to the contralateral natural breast.

Autologous flap combine with implant can reduce capsular contraction even compared to immediate implant reconstruction.[5,9,10,17–21] The well vascularised muscle flap in the previous irradiated breast skin boundaries can also improve the quality of the remaining mastectomy skin flap. Moreover, it can improve the texture and the contour softness of the breast mould. The irradiated pectoralis major muscle which is left in the original place does not interfere with the reconstruction. The large amount of well vascularised tissue transferred with the LD is a good options for breast reconstruction especially in the setting of breast conservation surgery recurrence[18] or delayed reconstruction after mastectomy and radiation therapy in small to medium size breast.[5,12,17]

Recent publication of Spear et al.[19] reported LD flap or LD flap with implants and/or expanders for breast reconstruction in twenty-eight breast reconstructed patients after previous RT. With average follow-up of 28.8 months, their results show all patients had soft breasts at follow-up, with no evidence of capsular contracture. Donor-site complications included five donor-site seromas. However, the majority of patients (65 percent) underwent a planned two-stage reconstruction, and the majority of the revision operations were for exchanges to smaller implants. The overall satisfaction rating was 8.8 of 10 and 14 of 16 patients indicated that they would undergo this procedure again. Our findings are similar to Spear et al. regarding the comparative low rate of capsular contraction as our series has 3.1% from previous irradiated breast. But our cases were mainly only direct implant positioning without expansion or planned two-stage reconstruction and our follow-up was more than 3 years. Moreover, Spear et al. has 11 patients with previous BCT and recurrence compare to 63 patients in our series. In this subgroup, Spear et al. found all cases with Baker I and we found Baker score I in 36 cases (57.1%), score II in 25 cases (39.6%) and score III in 2 cases (3.1%).

Kronowitz and Robb has currently review 49 articles for radiation therapy and breast reconstruction.[20] They reported that even with the latest prosthetic materials and modern radiation delivery techniques, the complication rate for implant-based breast reconstruction in patients undergoing postmastectomy radiation therapy is greater than 40 percent, and the extrusion rate is 15 percent. The conclusion of this review literature is to perform delayed autologous tissue reconstruction after postmastectomy radiation therapy in patients who will receive or have already received postmastectomy radiation therapy. If postmastectomy radiation therapy appears likely but may not be required, delayed-immediate reconstruction may be considered. Compare to our series, we performed immediate LD flap with implant reconstruction for previously irradiated breast. Our complication rate is low and there were no prosthesis extrusion.

This particular group also reported in the series of Chang DW et al.[21] in 2008. There were 33 patients who received preoperative radiation therapy and selected for latissimus dorsi flap with implant reconstruction. There were 5 failed implant-based reconstruction (15.2%), 4 implant loss (12.2%), 2 infection (6.1%), 1 extrusion, rupture and capsular contracture (3.0%). However, they found no significant different in the group of no radiation therapy, preoperative radiation therapy and postoperative radiation therapy. In our series, we can achieve all LD flap with implant reconstruction and our capsular contraction rate is similar to their data (3.1% versus 3.0%). Moreover, Chang DW and his group also concluded that a combined autologous flap-implant reconstruction appears to reduce the incidence of implant-related complications in previously irradiated breasts.

Conclusions

Latissimus dorsi (LD) flap is well established for breast reconstruction with various indications and modifications. Our data support the indication of immediate LD flap with implant reconstruction in previous irradiated breast since it produces low capsular contracture rate and implant-related complications. We observed only 3.1% Baker III contracture and no major complication in 36.5 months follow-up period. The implant-associated complications are generally lower than those of implant reconstruction alone and are comparable to results of two-stage expander/implant reconstructions. It is suitable in reconstruction for total mastectomy after conservative breast cancer surgery recurrence. It should be also considered in case which need subsequent radiation after reconstruction.

Authorship

Concept and design – Cristina Garusi, Visnu Lohsiriwat, Fabricio Brenelli.

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Critically Revising – Fabio Rossetto, Jean Yves Petit, Francesca De Lorenzi, Mario Rietjens.

Conflict of interest statement

The author and co-authors declare no conflict of interest.

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