

CASE REPORTS

The Versatility, Plasticity and Esthetic Aspect of Latissimus Dorsi Muscle-Cutaneous Flap in Breast Reconstruction - Case Report

Iulia Gabriela Marcu¹, Ovidiu Stefanescu¹, Cristian Radu Jecan^{1,2}, Tiberiu Paul Neagu^{2,3}, Ioan Lascar^{2,3}

Abstract

Background: The reconstruction of the breast with latissimus dorsi muscle-cutaneous flap and implant continues to be a reliable and easy to perform method, both by the experienced surgeons and also for the beginners. **Case presentation:** This article describes the case of a 38-year old woman who underwent breast reconstruction after 5 months from the mastectomy. After the clinical and paraclinical evaluation, all reconstruction options were presented to her, with advantages and disadvantages. Following the detailed pre-operative evaluation and observing, as much as possible, the desires of the patient – to have a bigger breast compared to the amputated one and, at the same time, with an as natural as possible aspect, observing the integrity of the abdominal wall and the possibility to hide the scar of the donor area at the back – the surgical team together with the patient decided the reconstruction of the right breast with latissimus dorsi muscle – cutaneous flap and silicone implant (295cc). Even if the specialty literature presents this technique with some disadvantages in the final results and functionality of the ipsilateral shoulder, in this case the latissimus dorsi muscle-cutaneous flap offered a good coverage with satisfactory cosmetic outcome and proper functionality of the shoulder. **Conclusions:** Through the approach of a standardized protocol and adjusted to the requirements and anatomic possibilities of the patient, the breast reconstruction with LD and implant remains one of the most versatile techniques of reconstruction and which local complications are comparable to the ones in the esthetic mammary augmentation.

Keywords: breast, latissimus dorsi muscle, reconstruction, surgery, mastectomy.

Rezumat

Introducere: Reconstrucția sânelui cu lambou musculo-cutan latissimus dorsi și implant continuă să fie o metodă de încredere și ușor de realizat, atât de chirurgii experimentați cât și de cei aflați la început de drum. **Prezentarea cazului:** Acest articol prezintă cazul unei femei în vârstă de 38 de ani căruia i s-a efectuat reconstrucția sânelui la o distanță de 5 luni de la mastectomie. După evaluarea clinică și paraclinică, pacientei i s-au prezentat toate opțiunile reconstructive împreună de avantajele și dezavantajele fiecăreia. În urma consultului pre-operator și luând în considerare, pe cât posibil, dorințele pacientei – de a avea un sân mai mare față de cel amputat și în același timp cu un aspect cât mai natural, cu păstrarea integrității peretelui abdominal și posibilitatea ascunderii cicatricii din zona doare la spate – echipa chirurgicală împreună cu pacienta au decis reconstrucția sânelui drept cu lambou musculo-cutan de latissimus dorsi și implant de silicon (295cc). Cu toate că literatura de specialitate prezintă această tehnică ca fiind însoțită de unele dezavantaje în rezultatul final și în funcționalitatea umărului ipsilateral, în acest caz lamboul musculo-cutan de latissimus dorsi a oferit o bună acoperire cu rezultat cosmetic satisfăcător și cu o bună funcționalitate a umărului. **Concluzii:** Prin abordarea unui protocol standardizat și ajustat la necesitățile și posibilitățile anatomice ale pacientei, reconstrucția cu latissimus dorsi și implant rămâne una dintre tehnicile versatile de reconstrucție ale cărei complicații locale sunt comparabile cu cele din augmentarea mamară de natură estetică.

Cuvinte cheie: lambou musculo-cutan de latissimus dorsi, reconstrucție mamară, chimioterapie

¹ Department of Plastic and Reconstructive Surgery, "Prof. Dr. Agrippa Ionescu" Clinical Emergency Hospital, Bucharest, Romania

² Clinical Department No. 11, "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

³ Department of Plastic, Aesthetic Surgery and Reconstructive Microsurgery, Clinical Emergency Hospital, Bucharest, Romania

Corresponding author:

Iulia Gabriela Marcu,

Department of Plastic and Reconstructive Surgery, "Prof. Dr. Agrippa Ionescu" Clinical Emergency Hospital, Bucharest, Romania.

E-mail: marcuilulia55@gmail.com

BACKGROUND

In the last decades, the approach manner of the defects of the soft parts post-mastectomy developed significantly together with the innovative surgical techniques of oncoplastic surgery.

Among these techniques, the reconstruction of the breast with LD flap and implant continues to be a reliable and easy to perform method, both by the experienced surgeons and also for the beginners¹.

The reputation of this technique had, down the ages, an oscillating evolution, initially being considered a fast solution which offers contour and volume (in association with an implant) both in immediate reconstruction and also in the tardive one, and subsequently it was preferred the reconstruction with autologous tissue freely transferred¹.

When we talk about breast reconstruction, the attention shall be focused on four basic elements: to provide a volume as close as possible to the natural one, the supply of tegument with an aspect as similar as possible to the mastectomy flaps, the reconstruction of the nipple - areola complex and the obtaining of the symmetry of the two breasts in shape and contour¹.

The use of the LD muscle – cutaneous flap in breast reconstructions provides essential elements, a muscular and tegumentary tissue of good quality, well vascularized and with big dimensions and offers acceptable esthetic results, and it can be considered a safe technique in the case of the patients without significant co-morbidities, when other reconstructive techniques cannot be used^{1,2}.

CASE PRESENTATION

In this work we proposed to present a case of breast reconstruction after 5 months from the mastectomy, in the case of a 38 years old patient. The disorder of the right breast was discovered by the patient through self-palpation after a significant weight loss of about 10 kg, in February 2016. It was performed a biopsy of the tumor in another surgical clinic and, according to the histopathological result, the patient was subjected to chemotherapy with Adriamicină and Docetaxel. In September 2016 the patient addresses to our clinic and it is performed the curative mastectomy of the right breast and surgical removal of the lymph nodes in the first two stations. The histopathological result present-



Figure 1. Anterior view of the scar, preoperative image.



Figure 2. Lateral and posterior view.



Figure 3. Lateral and posterior view.



Figure 4. Intraoperative aspect of LD flap.

ted the following aspects: right superior – internal invasive breast carcinoma NST G2, pT1 c(m)No (AJCC7), immunohistochemical positive for hormonal receptors, positive (3+) for HER2, Ki67 3%, with the absence of the invasion of the lymph nodes and absent residual tumor R0. After the surgery, the patient is subjected also to a hormonal treatment, the treatment diagram including Tamoxifen and Herceptin.

In January 2017, the patient returns to the clinic to start the reconstruction process of the right breast. After the clinical and paraclinical evaluation, all reconstruction options are presented to her, with advantages and disadvantages. Based on a mutual agreement, it is decided the reconstruction of the right breast with latissimus dorsi muscle – cutaneous flap and silicone implant.

TECHNIQUE

The patient was prepared according to the pre-operative surgical protocol and also anesthetic and the incision lines and measurements necessary for reconstruction were drawn at the pre-operative evaluation.

The first approach area was the mastectomy area where it was performed the excision of the cicatricial



Figure 5. Intraoperative aspect of LD flap.

tissue and its sending for HP examination, followed by the lifting of the flaps and the preparation of the area for reconstruction.

The approach at the level of the posterior thorax was performed along the cutaneous island with oblique orientation, followed by dissection in anatomical plans of the flap and its lifting, being maintained the integrity of the TD pedicle and its humeral insertion.



Figure 6. 1 month after the reconstruction.

Subsequently it was performed the tunneling at axillary level and the trans-positioning of the flap in the mastectomy area. The implant (295cc) was positioned between the big pectoral and the flap, the last one being laterally anchored to the serratus anterior muscle, medial to the big pectoral and inferior to the abdominal rectus with the reconstruction of sub-mammary tunnel. It was performed the suture in anatomical plans both of the reconstruction and also of the donor area, with the placing of two drainage tubes. Intra-operatory, it was administered the therapy with antibiotics (Cefort 500 mg), this being continued for 7 days after the surgery, and anti-coagulant medication until the mobilization of the patient. The drainage tubes were removed in day 7 (from the breast level) and day 8 (donor area) post-operatory, the patient being discharged after 10 days, having a favorable evolution.

DISCUSSION

The option represented by the reconstruction of the breast with LD and implant is a procedure through which two basic techniques of the reconstructive surgery are associated. In the first stage, the tegument and

soft tissue are ensured by the LD pediculate muscular – cutaneous flap as an autologous component of reconstruction and, subsequently, the breast volume offered by the implant with silicone. The use of this association allows to potentiate the advantages and, at the same time, an addition of all disadvantages for each technique^{2,3}.

The reconstruction only with implant – a versatile technique and at hand for all plastic surgeons – can be performed within a relative short period of time and with a reduced hospitalization period compared to the reconstruction with analogous tissue, with the adjustability in time of the dimension of the breast and recommended in the situation in which the general condition of the patient does not allow an ample surgery⁴. The main disadvantage is represented by the risk of capsular contracture which symptoms may vary from asymptomatic to very painful and which clinical manifestation can evolve to the complete distortion of the breast⁴. The periprosthetic infection and the risk of implant rupture are added to the unpleasant events of this technique, and also the cosmetic aspect different from the natural one of the reconstructed breast. Also, the tegumentary supra-adjacent necrosis of an implant with its exposure or extrusion, can prejudice the reconstructed breast, with the loss of the implant and its replacement⁴.

From the other point of view, the approach of an autologous flap needs surgical experience and a detailed pre-operative preparation both for the reconstruction of the breast and also for the donor area. The hospitalization period can be longer, now the attention being focused on both areas and the patient must fulfill certain criteria for this technique to prove its advantages in the best manner possible⁵.

The additional use of the LD muscular – cutaneous flap proved to be, in certain cases, a protection factor against the risk of capsular contracture even when the reconstructed breast was subjected to radiotherapy⁵. Also, the physical aspect and the dynamics of the analogous tissue are related to the evolution of the patient⁶. The flap offers a natural aspect and a soft consistence, similar to the normal one, it modifies based on the variations of weight of the patient and has a sensitizing capacity in time⁶. By using an implant, the need for a big volume of autologous tissue decreases and also the complications at the level of the donor area are reduced, thus ensuring a “full” shape of the reconstructed breast. On the other hand, some authors present a series of disadvantages of this association⁷.

Based on the specialty literature, the incidence of the early complications – seroma and hematoma – is

increased. And on long and medium term, there are more often discussed the aspects related to the distortion of the breast, capsular contracture and the need to replace the breast prosthesis together with the capsulotomy^{8,9,10}.

One of the studies with the biggest period of follow-up is the retrospective one developed by Ignazio Tarantino and co.¹¹, which presents in a detailed form these manifestations. There was included a number of 68 patients and the follow-up period was of about 14.9 years. According to the statistical evaluations, 50% of the cases needed a re-intervention for the replacement or removal of the implants and in 10% of the cases it was necessary the final removal of the prostheses. The idea presented by both authors was that, through this technique, the patient is exposed to an association of co-morbidities of the two used techniques (autologous tissue and the presence of the implant) and it is recommended only if the reconstruction cannot be performed only using the autologous tissue. With respect to the effects over the functionality of the reconstruction ipsilateral shoulder, the authors present the fact that 1/3 from the cases showed a low level up to a severe level of loss of the function and force of the shoulder, even if the specialty literature presents insignificant effects over shoulder functionality when the LD is used¹²⁻¹³.

From another point of view, the specialty literature presents this percentage of re-intervention at a smaller value, 2-35% and also a reduced follow-up period. However, the acceptance period of the body regarding the implant and the side effects continue to be a real problem within the reconstruction technique¹¹.

Because the surviving rate continues to grow after breast cancer, the purpose of a reconstructive procedure must provide an optimum cosmetic and functional aspect on long term, with a reduced degree of morbidity which needs "adjustments" as rarely as possible in the far future¹¹.

The studies show that the expectations of the patient are higher in the case of the immediate reconstruction or within a short period after the mastectomy, and they decrease directly proportional if the period until the reconstruction is longer¹¹. Also, the evaluators who are not from the surgical field, have a more critical eye regarding the final result than the plastic surgeons who are more focused on the difficult character of the technique and its details. We consider that such a reconstructive procedure, with a major impact over the cosmetic aspect, should take into consideration the expectations of the patient from a medical point of view. The final esthetic aspect of the breast reconstructed with LD, is one of the main elements to which we must pay

attention, but this attention must be distributed also to the donor area, the scar and the functionality of the shoulder after reconstruction^{11,12}.

The abundant vascularization of the LD muscular – cutaneous flap enables many variations when it is sampled, both in the anatomical dissection of the muscle (split, extended or muscle-sparing latissimus dorsi) and also the orientation of the cutaneous island (oblique, transversal or vertical) which may reach a length of 20 cm and a width of 12 cm¹³. With respect to the positioning of the dorsal scar, the number and preferences of the patients began to increase considerably, no matter the age or their social – economical statute¹⁴.

According to the study performed by Bailey and co.¹⁴, who evaluated the preferences of the patients (240 cases) with respect to the positioning of the scar in the dorsal donor area, the results pleaded especially for the low or middle transversal positioning of the scar.

However, when the reconstruction plan is drafted, there must also be considered the degree of tegumentary loss and the presence or absence of the inframammary channel⁸.

The reconstruction of the breast through the transposition of the LD muscular – cutaneous flap is considered a versatile option with a series of advantages, but it can also present a series of side effects over the final result¹⁵⁻¹⁸.

Some publications present symptoms of muscular spasm, retraction, discomfort and deformation of the breast together with the contraction of the flap¹⁵. Through the extension movement of the ipsilateral superior muscle, it can be noticed the superior – lateral contraction of the entire reconstruction so that the prevention of this distortion of the breast can contribute to a higher degree of satisfaction of the patient¹⁶.

In various studies it was reported the muscular spasm at the level of the trans-positional flap, causing discomfort and a feeling of hard tissue caused by the persistence of the flap innervation. In these cases, the evaluators recommended the sectioning of the thorax – dorsal nerve – even on a distance of 4 cm – to prevent these inconveniences¹⁸.

To support this idea, we can see the retrospective study made by Klaus F. Schroegendorfer and co.¹⁹, who followed the evolution of two groups, one with intact thoraco-dorsal nerve and other with the nerve sectioned on a distance of 4 cm. At the evaluation at 12 and respectively 24 months, all persons in the group with intact pedicle presented a muscular spasm at the level of the breast, this being absent in the case of the group with sectioned nerve and without the association of a partial or total loss of volume from the used flap.

Other authors consider adequate the maintenance of the integrity of the pedicle in order to prevent this loss of volume and secondary asymmetry following muscular hypotrophy, therefore shortening the surgery time by avoiding the meticulous dissection of the thoraco – dorsal pedicle^{18,23}.

The middle opinion belongs to Kääriäinen M and co.²⁰ who performed a prospective study in the case of 28 patients with breast reconstruction, out of which 14 cases with sectioning on a distance of 1 cm of the thoraco-dorsal nerve. The conclusions of this study showed that the maintenance of the integrity or sectioning of the nerve does not influence in a significant manner the contractile activity of the flap or the distortion of the breast when the flap disinsertion is performed.

According to the discussions in the specialty literature and the studies performed, it is considered that the use of this technique (LD + implant) in breast reconstruction after breast cancer brings also the risk of capsular contracture (on an average period of at least 2 years and similar to one in the breast esthetic surgery), of course based on the type of implant and neoadjuvant or adjuvant therapy²¹.

It was proved that chemotherapy has a protective role in the development of the capsular contracture, even if reconstruction is performed after a few months or even years, a result based on the anti-proliferative effect of the chemotherapy agents²²⁻²³.

With respect to the role of the use of the LD muscular flap in breast reconstruction and its value in the function of the shoulder after reconstruction, the specialty studies present a functional impotence immediately after the surgery, followed by the gradual recovery until the almost complete recovery within a period of 1 year. The major impact and with significant effects over the lifestyle was noticed in the case of the performance swimmers and the persons interested in alpinism (the climbing function)²⁴. Also the quality of life in relation to the physical component is significantly decreased after the surgical intervention, having a duration of no more the 6 months, to be followed by an improvement associated to the physical improvement²⁴⁻²⁶.

Why did we used this technique and how was it accepted by the patient considering the above described criteria.

Following the detailed pre-operative evaluation and observing, as much as possible, the desires of the patient – to have a bigger breast compared to the amputated one and, at the same time, with an as natural as possible aspect, observing the integrity of the abdominal wall and the possibility to hide the scar of the donor

area at the back – the surgical team together with the patient decided the use of this technique.

In the pre-operative diagram, the cutaneous island was oblique orientated, having a width of about 8 cm and a length of 12 cm, for a better access of the thorax – dorsal pedicle, but especially to ensure a covering without tension of the soft tissue supra-adjacent to the implant of 295cc, an enough length on the clavicle – sub-mammary channel line and the reconstruction of the infra-mammary channel which shall enable an optimum symmetry with the contralateral breast (image 4). In order to prevent, as much as possible, the risk of capsular contracture, it was used a silicone implant with a textured surface which, according to the comparative studies regarding the implants with even surface, it was proved to be superior regarding the decrease of the incidence of the symptomatic capsular contracture.

At 14 days after the surgery, our patient presents a muscular spasm of the flap, when she moves the shoulder and the arm, but without being considered as unpleasant effects by the patient. The pre-operative option to keep the integrity of the thorax – dorsal pedicle and its handling without trauma, was based on the previous clinical experience of the surgeons which pleaded for the substantial loss from the volume of the flap together with the removal of the nerves within at least 12 months.

With respect to the effects over the function of the ipsilateral shoulder, in our case, this immediate dysfunction was relatively reduced for our patient and the recovery process of the function of the shoulder has an ascendant trend with complete reintegration and life quality similar to normal.

Seven months later it was performed the symmetrization procedure of the contralateral breast with subcutaneous mastectomy and immediate breast reconstruction with sub-muscular implant (295cc) (picture 6 final result 7 month later).

CONCLUSIONS

The selection of the reconstructive method type for the breast is a personal decision which considers many factors among which the preference of the patient, the lifestyle and physical aspect, but also the technique chosen by the surgeon. Each reconstructive procedure has its own particular indications and limitations and if these are ignored the results can be less satisfying.

Following a detailed assessment of the post-mastectomy defect, the plastic surgeons can select the orientation and dimensions of the cutaneous island, can reduce to a minimum the scar in the donor area, can improve the cosmetic aspect and can provide durable

results and as close as possible to natural for the reconstructed breast through the use of latissimus dorsi muscle-cutaneous flap.

Through the approach of a standardized protocol and adjusted to the requirements and anatomic pos-

sibilities of the patient, the breast reconstruction with latissimus dorsi and implant remains one of the most versatile techniques of reconstruction and which local complications are comparable to the ones in the esthetic mammary augmentation.

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