

New trends in breast reconstruction

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Rezumat

Tendințe noi în reconstrucția de sân

Introducere: Reconstrucția de sân (RS) după mastectomia radicală urmărește să creeze un sân cu un aspect natural, cu protejarea în același timp a siguranței pacientei și a calității vieții.

Scop: Evaluarea rezultatelor estetice și a complicațiilor diferitelor tehnici de RS după mastectomia radicală.

Pacienți și metodă: În perioada August 2006 - Martie 2010, 36 de femei au urmat o RS după mastectomie în instituția noastră. Foile de observație au fost analizate retrospectiv pentru a evalua rezultatele și complicațiile apărute. Am folosit RS imediată pentru stadiile I și IIa de cancer de sân și respectiv RS tardivă pentru stadiile IIb și III de cancer de sân.

Rezultate: Lamboul musculo-cutanat pediculat de drept abdominal a fost folosit în 13 cazuri, lamboul pediculat musculo-cutanat de Latissimus Dorsi cu implant de silicon în 10 cazuri, lamboul fascio-cutanat abdominal liber (DIEP) în 9 cazuri și alte proceduri în patru cazuri. Complicațiile întâlnite au fost: necroza totală a lamboului – un caz, necroza parțială a lamboului – trei cazuri, dehiscența zonei donatoare – un caz și serom – un caz.

Discuții: Tendințele în RS din ultimii ani se orientează mai mult către lambourile libere bazate pe perforante, printre care lamboul DIEP este liderul. Vasele mamare interne sunt

cel mai frecvent folosite ca și vase receptoare pentru vasele anastomozate. RS imediată, atunci când este indicată, are rezultate estetice mai bune. În țările mai puțin dezvoltate, casele de asigurări nu acoperă cheltuielile pentru implanturile mamare, astfel încât procedurile implicând țesuturi autologe sunt cele mai potrivite.

Cuvinte cheie: reconstrucție sân, lambou, DIEP, TRAM

Abstract

Background: Breast reconstruction (BR) after radical mastectomy is intended to recreate symmetrical natural-appearing breasts while preserving patient safety and quality of life.

Purpose: To evaluate the esthetic results and the complications of various BR methods after radical mastectomy.

Patients and Method: Between August 2006 and March 2010, 36 women underwent BR after mastectomy in our institution. Their charts were reviewed retrospectively to evaluate the results and complications. We used immediate BR for Stage I and IIa breast carcinoma, and delayed BR for stage IIb and III breast carcinoma.

Results: We performed a pedicled Transverse Rectus Abdominis Muscle flap in 13 cases, pedicled Latissimus Dorsi with silicone implant in 10 cases, free Deep Inferior Epigastric Perforator (DIEP) flap in 9 cases, and other procedures in four cases. The encountered complications were: total flap failure – one case, partial edge flap necrosis – three cases, donor area wound dehiscence – one case, seroma – one case, local infection – one case.

Discussion: Trends in BR in recent years focus more on free perforator flaps, with the DIEP flap being the leader.

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Internal mammary vessels are most often used as recipient vessels for anastomoses. Immediate BR when indicated has better aesthetic results. In less well-developed countries, insurance companies do not cover implant expenses and the autologous procedures remain the best option.

Key words: breast reconstruction, flap, DIEP, TRAM

Introduction

As the incidence of breast cancer increases, breast reconstruction (BR) is more often proposed and its indications are viewed in terms of quality of life. The goal of BR is to recreate symmetrical natural-appearing breasts while preserving patient safety and quality of life (1,2). The safety of the patient is essential and should always remain the primary concern in reconstructive procedures (1,3). These procedures should be tailored to the individual patient, taking into account the ultimate aesthetic outcome and the impact the reconstruction may have on the patient's quality of life (3,4).

Timing of BR depends on the stage of disease. There are three types of BR: immediate, delayed-immediate, and delayed. Immediate BR is performed for stage I and IIa of the disease. Delayed-immediate BR is performed for stage II and consists of the temporary placement of a tissue expander to avoid skin contraction. The final reconstruction is performed several weeks later when the pathology report does not indicate radiotherapy. The delayed BR is performed several months after mastectomy and radiotherapy.

BR can be performed using either prostheses or autogenous tissue (5). Silicone breast implants were introduced in the 1960s and offered the first opportunity to provide reconstruction of the breast following mastectomy (1). In the late 1970s, the latissimus dorsi (LD) myocutaneous flap was combined with implant placement to provide notably improved results in BR (1,6). Radovan's subsequent introduction of tissue expanders allowed the implant to be placed beneath the residual skin and muscle while uninflated (7).

In November 2006, the American Food and Drug Administration reversed the moratorium on the use of silicone gel-filled implants (8). Objective and medically grounded information has confirmed the safety of using both silicone gel-filled and saline filled implants for BR and aesthetic breast surgery (9,10). Rather than simply placing an implant beneath thin skin flaps, the latissimus muscle served to replace or even augment the pectoralis muscle to provide coverage of the implant.

Numerous techniques have evolved to allow for BR using autologous tissues rather than an artificial implant. The earliest techniques utilized muscles to provide blood flow to skin and fat so that that this tissue could be transported to the chest to create a breast mound. The LD flap was the most popular flap for BR in the 1970s (1,11). Today, this procedure is frequently used in combination with implants to provide a

fuller looking breast and decrease complications of the implant technique (11). In 1982, the first TRAM (Transverse Rectus Abdominis Myocutaneous) flap was performed. In this procedure, lower abdominal skin, fat and muscle is used to reconstruct the breast (11).

However, there are drawbacks to using these muscles and several techniques have evolved to spare the muscle (1,12). The use of microvascular free flaps allows transplanting tissue from one part of the body to another. The abdomen is the main source for most of these flaps. The TRAM free flap uses only a small portion of the rectus muscle, while the DIEP (Deep Inferior Epigastric Perforator) free flap and the SIEA (Superficial Inferior Epigastric Artery) free flap utilize none of the rectus muscle.

The buttock is another source of skin and fat that can be used to create a breast. GAP (Gluteal Artery Perforator) free flaps allow a hidden donor site, most useful for women with insufficient abdominal tissue. As a result of these procedures, women recover easier and have fewer complications from the donor site (1,11).

Patients and Method

Between August 2006 and March 2010, 36 women underwent BR after mastectomy. Their charts were retrospectively reviewed to evaluate the results and complications.

Treatment protocol

For Stage I and IIa breast carcinoma, the proposed treatment after mastectomy was immediate BR. For patients with Stage IIb and III, the recommended reconstruction time was at least six months after radiotherapy (delayed BR).

A) First stage of reconstruction

Patients were evaluated for the main flap donor areas, such as abdomen, back and buttocks. The volume and size of the healthy breast was an important factor in choosing the proper technique, along with the woman's choice.

The donor area was preoperatively evaluated using a Doppler probe to find the perforator vessels. For immediate BR, the procedure started concomitant with the mastectomy. The removed breast specimen was weighed for a better matching with the flap weight. Once the flap was harvested, the donor area was closed simultaneously with the flap inset (two teams). (Fig. 1-4)

B) Second stage

This consists of nipple reconstruction and breast reduction or lift on the contralateral side, performed at least six month after the first stage. Skate flap and "fish-tail" flap were used.

C) Third stage

This stage consists of areola tattooing done in two sessions one month apart. The color match was made using a professional medical tattoo machine. This stage was initiated one month after nipple reconstruction. (Fig. 5)

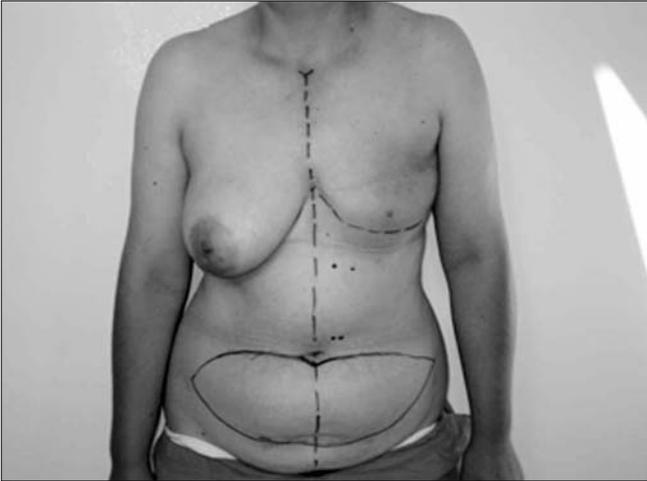


Figure 1. Three years after mastectomy



Figure 2. The DIEP flap is harvested based on single perforator

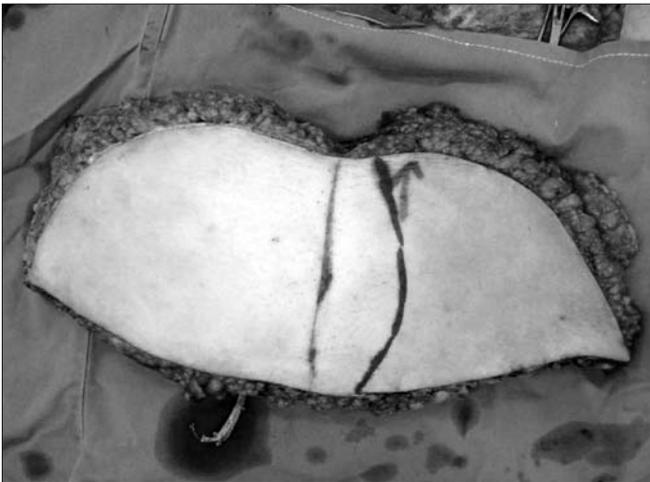


Figure 3. The abdominal flap before detachment of zone IV



Figure 4. Flap inset and the anastomoses to internal mammary vessels

Results

Thirty-six women underwent first-stage unilateral BR with the following flaps:

- Pedicled TRAM flap – 13 cases;
- Free TRAM – 1 case;
- Pedicled LD flap – 1 case;
- Pedicled LD with silicone implant – 10 cases;
- Free DIEP flap – 9 cases;
- Free SGAP (Superior Gluteus Artery Perforator) flap – 2 cases;
- Silicone implants alone – 1 case.

When free flaps were used for reconstruction, all the anastomoses were performed to the internal mammary vessels except for one case to the thoracodorsal vessels. Twenty-seven patients had immediate BR and nine patients had delayed BR. Seven patients underwent the second and third stages of BR.

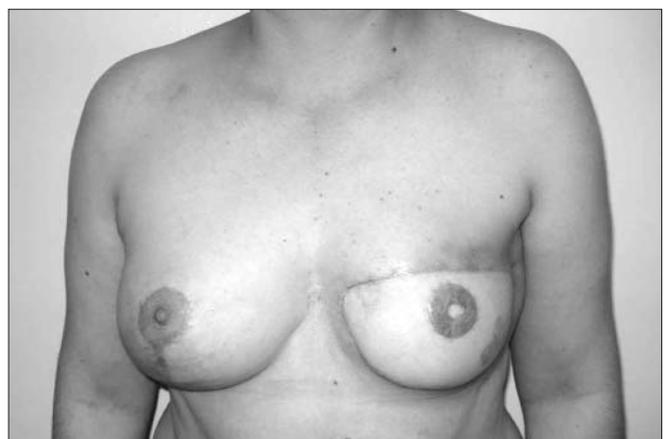


Figure 5. One year after completing the second stage (nipple reconstruction and mastopexy on the contralateral breast) and third stage (areola tattoo)

Breast reduction on the contralateral side was performed on three cases and mastopexy on the others. Skate flap for nipple reconstruction was used in 2 cases and "fish-tail" flap in five cases. Ear cartilage was used in a single case to enhance the nipple projection.

Most women (75%) were between 40 and 60 years of age. Seven patients were smokers (between a half to one package per day) and 11 were obese. The follow-up period varied from 6 months to 3 years and 7 months. No deceased patient was recorded.

The encountered complications were:

- Total flap failure – 1 case; subsequently, this patient had a silicone implant placed under the pectoralis major muscle.
- Partial edge flap necrosis – 3 cases; the wounds healed secondarily after debridement.
- Donor area wound dehiscence – 1 case.
- Seroma – 1 case.
- Local infection – 1 case.

Discussion

The search for the perfect BR technique is not over. The complication rate, the donor-site morbidity, the patients' aesthetic and general satisfaction, and the socio-economic costs influence the procedure choice. Each patient should benefit from the procedure that is best suited for her, according to her general health, anatomical particularities and her own choice.

Regarding BR timing, the immediate BR offers the best aesthetic outcomes (13). The complication rate for each reconstructive method varies widely according to the procedure. With the implant techniques, the complication rate is 40%, and the extrusion rate 15% when associated with radiotherapy. Autologous BRs should be delayed when postoperative radiotherapy is expected, because distortion of the breast can appear even with modern radiation delivery techniques (14).

Although good results have been reported for different techniques, complications should not be neglected. The most common acute complications with expander/implant BR are infection (2.7%) and breast skin necrosis (2.0%), while late complications are capsular contracture (10% of nonradiated breasts), severe rippling (6.6%) and implant loss (4%) (15,16).

When performing an LD flap, the incidence of dorsal seroma may be up to 35% (17,18). Increased age, obesity, invasive breast surgery and surgical techniques are risk factors for donor-site seroma formation, especially in the abdomen (17,19). We discourage obese patients with large abdominal pannus from obtaining flaps from this area. Different surgical techniques have been described to reduce the risk of seroma formation, including the use of quilting sutures, fibrin glue or Quixil sealant (20,21,22).

In LD reconstructions, some loss of shoulder function and strength may be anticipated, but complete recovery is expected to appear six months after surgery (23). Skin necrosis is another important complication, involving mainly the chest

skin, with smoking being a risk factor. Haematomas and chronic pain were less frequently encountered, while infections were infrequent, mostly associated with implant reconstructions and obesity. In our series, partial edge necrosis was encountered for large breasts when zone III of the abdominal flaps had partial venous insufficiency.

In the literature, the autologous flap BR has proven to have the best results over implant-based reconstructions, including general patient satisfaction, aesthetic satisfaction and patient preference. The abdominal-based flaps have proven to have better general and aesthetic results (24). More recently, the DIEP flap has become the first choice for BR for many authors (25,26,27,28,29). When the perforator size is not appropriate, a free TRAM or GAP flap can be used (30).

The main complications of the abdominal-based BR are fat necrosis, partial flap loss, total flap loss, abdominal bulge, laxity, or weakness, and abdominal hernia (29,31). The risk of fat necrosis in DIEP flaps is reported to be twice that in free TRAM flaps, while DIEP flaps had one-half the risk of abdominal bulge and hernias. In a systematic review of abdominal wall function following BR with abdominal-based flaps, the best abdominal muscle function was obtained with the DIEP flaps, followed by the free TRAM and the pedicled TRAM (32). In our study, no patient needed a mesh for the abdominal closure. Direct closure, when possible, is preferable to an inlay graft (33). No hernia or bulge was encountered in our series. When comparing the overall complication rate, the DIEP patients had higher flap-related complications, while the free-TRAM had higher donor-site morbidity (29).

The SIEA flap has the advantage of reducing donor-site morbidity, while having the disadvantage of an unreliable vessel anatomy (34). Some series have been reported, with satisfying results (35).

There is no standard technique for autologous BR. We are in favor of using the DIEP flap for BR. The SGAP flap may be considered to be a second choice for BR, particularly in larger breasts, scarred abdomens, and reduced abdominal wall fat and in bilateral reconstructions. This flap provides a reliable anatomy, with good aesthetic results and acceptable donor site morbidity, at the expense of a demanding dissection (26,36). There is a reported low complication rate in the breast, including necrosis, hematoma and seroma, and a higher incidence of seromas in the donor area (36).

The trends in BR in recent years have focussed more on free perforator flaps, with the DIEP flap being the leader. Internal mammary vessels are most often used as recipient vessels for anastomoses. Immediate BR when indicated has better aesthetic results. In less developed countries, insurance companies do not cover implant expenses and the autologous procedures remain the best option.

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