Breast Reconstruction After Aesthetic Surgery 43

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Breast cancer is the commonest type of cancer affecting women worldwide. It was estimated that more than 1.38 million new cases would occur in 2008, causing more than 450,000 deaths, according to the World Health Organization [1]. In November 2011, the Surveillance Epidemiology and End Results (SEER) Program of the US National Cancer Institute estimated that 230,480 women would be diagnosed with breast cancer and 39,520 women would die from the disease [2, 3].

On the other hand, breast aesthetic surgery is the most popular cosmetic intervention in the USA and probably in many other countries as well. Breast augmentation based on implant insertion heads the five commonest interventions among 318,123 procedures performed in 2010. Breast reduction is in fifth place, accounting for 138,152 procedures performed [4, 5].

Statistics suggest that one in eight women will be diagnosed with breast cancer at some time in their lives. Women who previously had breast aesthetic surgery will obviously be at risk of breast cancer. It has been estimated that 45,000 women receiving breast augmentation each year and a smaller number of women undergoing reduction mammoplasty will develop breast cancer in their lifetime.

Therefore, breast reconstruction after breast aesthetic surgery is at the forefront of discussion. It is a challenge for both the plastic and the oncoplastic breast surgeon. Nevertheless, little is known about this topic, and a good level of evidence is lacking in the literature. Knowledge has been mostly acquired from the author's experience rather than gained from prospective studies.

Breast augmentation and breast reduction procedures are categorized as aesthetic breast surgical procedures. However, these procedures are quite different in terms of breast tissue manipulation (skin and glandular parenchyma). Therefore, distinct implications for breast cancer and breast reconstructive surgery arise from both types of surgery and evaluation should be performed separately.

For this reason, this chapter has been divided into two parts: breast reconstruction after breast augmentation and breast reconstruction after reduction mammoplasty. Each technique will be evaluated and discussed separately.

43.1 Breast Reconstruction After Breast Augmentation

As previously discussed, breast augmentation is the most popular cosmetic surgery in the USA and probably in many other countries as well. The incidence of breast cancer in this population is the same as in women who did not have augmentation [6]. Breast implants are not associated with an increased risk of breast cancer. Although some studies in rodents associated the presence of foreign bodies with sarcomas, subsequent studies refuted this association. Indeed, many other studies confirmed the safety of implants regarding breast cancer. In the past, silicone-based implants were considered a risk factor for the development of breast cancer and were prohibited by US FDA regulations. The use of these implants was approved after many publications that showed theis safety in breast augmentation [7–10].

Many patients with breast cancer in previously augmented breasts will be seen at outpatient clinics. In a patient without any previous surgery, the decision as to surgical treatment should be made differently. Reconstruction can be tailored to the patient, dependent on the oncologic approach. If breast-conserving therapy is indicated, a partial reconstruction will be required. In contrast, if mastectomy is indicated, total breast reconstruction will be necessary.

43.1.1 Partial Breast Reconstruction

Breast-conserving therapy involves quadrantectomy associated with radiotherapy. Despite some publications with a

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small number of patients with good cosmetic results [11, 12], this procedure has been correlated with poor outcome in many series, resulting in pain, implant exposure, and even rupture in retained breast implants. However, Guenther et al. [13] reported that 85 % of patients undergoing quadrantectomy and radiotherapy after augmentation surgery had a good cosmetic outcome. The authors suggested that capsular contracture is less common when the implant is positioned in the submuscular space.

On the other hand, capsular contracture is a very frequent finding in this patient group according to many authors. More than half of patients required a second or third surgical correction or even mastectomy. These complications usually resulted from radiotherapy. Tumor size and location, in addition to scarce remaining glandular tissue, may have contributed to an unnatural result [6, 14–16]. Complications are shown in Figs. 43.1 and 43.2.

Breast-conserving therapy with implant removal is a less desirable option. Women having breast augmentation often have scarce breast tissue, which is actually why many undergo this procedure. In addition, the presence of an implant results in thinning of the stretched overlying breast tissue over time. One study reported that native breast tissue comprised 50 % of overall breast volume [17, 18]. Therefore, this is a suitable option only for a very small group of patients who have a considerable amount of remaining tissue. In these cases, mammoplasty techniques should be used as a T Wise pattern or vertical scar technique (Lejour's technique).

Patients who are candidates for partial breast irradiation, especially those who are candidates for intraoperative radiotherapy could benefit from lumpectomy and implant maintenance [19]. Despite the paucity of evidence, this could be a good option for resection alone and local glandular flap partial reconstruction (Fig. 43.3). Figure 43.4 shows a flowchart for decision-making regarding augmented breast surgery and oncologic surgery.

Fig. 43.1 Capsular contracture and skin alteration after an augmented breast treated with lumpectomy and radiotherapy

Fig. 43.2 Capsular contracture and asymmetry after mammoplasty with an implant and radiotherapy

43.1.2 Total Breast Reconstruction

As previously discussed, mastectomy and immediate reconstruction seems to be the best treatment for breast cancer patients with preexisting breast augmentation [20–22]. Decisions on the type of reconstruction should be made according to local conditions following mastectomy. If a large amount of skin needs to be removed, reconstruction with autologous tissue is more suitable, e.g., a transverse rectus abdominis myocutaneous flap or deep inferior epigastric perforator flap. A latissimus dorsi flap with an implant is also a good option for these cases. An extended latissimus dorsi flap without an implant would probably not be a good option, since patients usually hope for a reconstructed breast that is the same size as before. With use of this technique, it is difficult to achieve the desired result. The choice of technique can be challenging, because many patients with augmentation surgery are thin and the donor site can be insufficient.

In contrast, if native skin can be preserved, a skin-sparing mastectomy (SSM) or nipple-sparing mastectomy (NSM) is performed. Reconstruction can easily be performed with a single-stage implant (implant or definitive breast expander) or a two-stage implant (tissue expander plus implant exchange). When implant-based reconstruction is chosen, it is critically important to evaluate both the quality of the skin and muscles (pectoralis major muscle and serratus muscle). As shown in previous chapters, adequate implant reconstruction is performed with a good muscular pocket that partially or completely covers the implant. In a partially covered implant where the skin is compromised

Fig. 43.3 **a** Lumpectomy after implant removal and inferior pedicle mammoplasty. **b** Intraoperative radiotherapy at the tumor bed **c** Final result after lumpectomy and implant reinsertion (new implant)

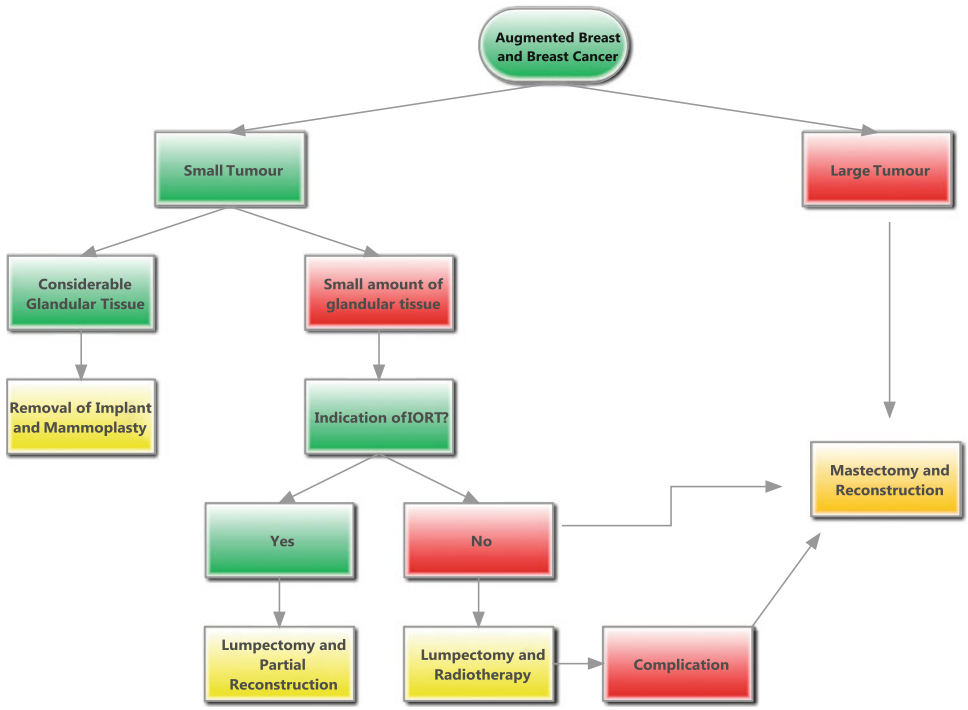

Fig. 43.4 Flowchart for the surgical decision for an augmented breast and lumpectomy. *IORT* intraoperative radiotherapy

(vascular suffering, infection, necrosis), the implant can be exposed and should be removed.

Definitive implant reconstruction is desirable in patients in whom a minimal amount of skin needs to be removed. The reason is that it is a faster technique with no donor site complications [23, 24]. In a previously augmented breast, skin coverage is rarely a problem and good cosmetic results can be achieved.

The need for adjuvant radiotherapy may play an important role in the decision for reconstruction. Although

Fig. 43.5 Left breast capsular contracture after mastectomy and implant reconstruction in a breast-augmented patient followed by radiotherapy

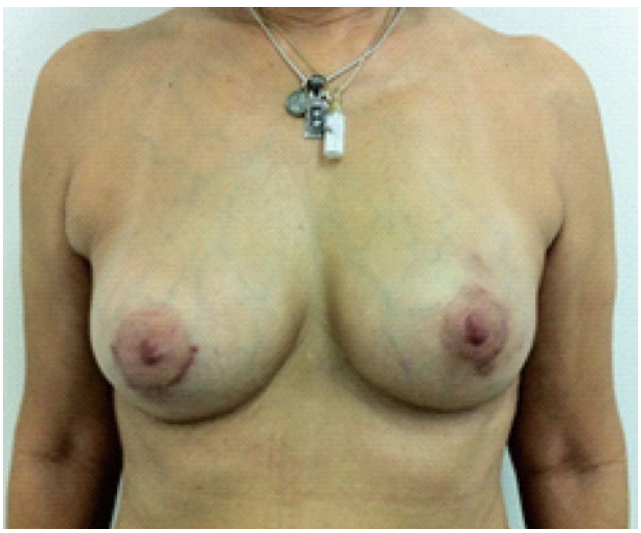

Fig. 43.6 Left breast implant-based reconstruction after left nipple-sparing mastectomy (NSM) in an augmented patient with radiotherapy

Fig. 43.7 Bilateral implant-based breast reconstruction after bilateral NSM in an augmented patient with no radiotherapy

Fig. 43.8 Periareolar mastectomy and reconstruction in previously augmented patient with partial necrosis of the nipple–areola complex (NAC)

Fig. 43.9 Periareolar bilateral mastectomy and reconstruction in a previously augmented patient with no complications

some authors strongly contraindicate reconstruction because of a high complication rate (up to 70–90 %) [25], good results have been achieved by many other authors, showing patient satisfaction of up to 80 % [26]. Indeed, we recommend implant reconstruction whenever feasible, even in a scenario of adjuvant radiotherapy. If complication happens afurther autologous reconstruction can alwaysbe performed. Figures 43.5, 43.6 and 43.7 show the results of breast reconstruction with and without radiotherapy.

Tumor location and skin incision is of major importance to surgical outcome. Skin or nipple–areola complex (NAC) necrosis can translate into reconstruction failure if there is exposure of the implant. There is no study addressing the

Fig. 43.10 Patient with periareolar breast augmentation and capsular contracture in the preoperative period, and postoperatively after left breast mastectomy and reconstruction using a radial scar and right breast implant exchange

use of a preexisting augmentation mammoplasty incision to perform mastectomy. When choosing an incision, the surgeon must consider the oncologic outcome and preexisting scarring which can translate into abnormality of the skin and NAC irrigation. Figures 43.8 and 43.9 show a periareolar approach in which a preexisting scar from breast augmentation is used.

Preexisting breast surgery is a well-known factor related to postoperative complications. Skin incisions for augmentation mammoplasty are periareolar (complete or partial) in the inframammary fold or in the axillary line when it is not associated with mastopexy (vertical or inverted-T pattern). SSM is performed with removal of the NAC, so the incision must be made in the central portion of the breast. However, when NSM is indicated, the incision can be made in any part of the breast (periareolar, inframammary fold, etc.). Therefore, the surgeon can attempt to use the preexisting scar to perform NSM.

To predict the surgical outcome relative to surgical access for mastectomy and reconstruction, an analogy was made between studies evaluating NSM incisions according to outcome. Wijayanayagam et al. [27] showed that a radial incision and an inframammary fold incision (in small breasts) are good options with a low risk of NAC or skin necrosis. Algaithy et al. [28] showed a low risk of necrosis with a superolateral radial incision and a high risk of complications with a circumareolar and periareolar incision. Figure 43.10 shows a radial approach to mastectomy and reconstruction in a patient with periareolar breast augmentation.

Therefore, a complete periareolar incision or a large circumareolar incision should be discouraged. Inframammary fold incisions should be performed in selected cases and only in patients with small breasts. A periareolar 180° incision can be performed, although the risk of wound dehiscence and skin necrosis is higher owing to direct skin traction during surgery. Table 43.1 shows the risk of skin and NAC necrosis according to the location of the incision and breast size.

Another issue that should be discussed is whether the implant should be exchanged during surgery or whether the old implant should be maintained. Many authors consider that implant exchange is mandatory when the implant is located in the subglandular space because it must be removed for adequate patient treatment. Other considerations that are clearly in favor of implant exchange are implant rupture, capsular contracture, infection, and poor cosmetic result [20, 21]. Few publications have advocated the possibility of maintaining a preexisting implant in the case of a new-generation implant located in the submuscular space [29]. Actually, this should be an exception rather than the rule, applied only to strictly selected cases.

Table 43.1 Risk of skin and nipple–areola complex necrosis according to the skin incision pattern in mastectomy and breast volume, based on published data [27, 28]

Incision	Large breast	Medium-sized/small breast
Complete periareolar	High risk	High risk
Periareolar 180°	Moderate risk	Moderate risk
Circumareolar	High risk	High risk
Radial	Low risk	Low risk
Inframammary fold	High risk	Low risk

Figure 43.11 shows a flowchart of decisions on augmented breast and total breast reconstruction.

43.2 Breast Reconstruction After Breast Reduction Mammoplasty

As previously discussed, breast reduction mammoplasty is the fifth commonest cosmetic intervention in the USA. A considerable number of patients undergoing this procedure will develop breast cancer at some time in their lives. The procedure per se reduces the risk of breast cancer. Some studies have shown up to 50 % reduction in breast cancer risk [30].

Considering the high prevalence of breast reduction surgery, a likely scenario encountered by the oncoplastic surgeon is breast cancer in a glandular parenchyma subject to many changes and skin scarring that may lead to vascular pattern abnormality. Despite the lack of specific studies concerning these abnormalities, it is a well-documented fact that previous mammoplasty is associated with minor and major postoperative complications, e.g., wound breakdown, fat and glandular necrosis, skin necrosis, and loss of the NAC [31, 32]. Although mammoplasty is a widely accepted procedure, it is associated with up to 42–50 % of complications in some series. Major complications include skin and NAC necrosis, leading to a reoperation rate ranging from 5 to 15 % [32].

Therefore, patients with preexisting mammoplasty and breast cancer undergoing large resections or mastectomy for cancer who require reconstructive surgery should be particularly and conscientiously evaluated. Counseling should be offered to these patients regarding the commonest postoperative complications.

43.2.1 Partial Breast Reconstruction

Partial breast reconstruction can be performed with local glandular remodeling or major remodeling, including dermal–glandular flaps with mammoplasty techniques. In the first situation, a low complication rate is found, unless large undermining has occurred and fatty tissue has more likely suffered necrosis (Fig. 43.12). Therefore, fatty breasts should be treated with minor undermining for the correction of defects, especially in patients with previous breast reduction.

If a large resection is required or the tumor is located in a quadrant where the aesthetic outcome can be unnatural, i.e., the internal or inferior quadrants, then a mammoplasty technique will be necessary. Studies with substantial evidence correlating preexisting mammoplasty with oncoplastic surgery are lacking. However, it is known that consecutive breast surgery may lead to an increased risk of complications. Therefore, we used data from studies evaluating risk factors for mammoplasty to estimate the risk of complications in partial breast reconstruction. Table 43.2 shows the risk factors for mammoplasty. In these patients, preexisting breast reduction per se raises the complication risk. Cumulative risk factors increase the rate of these complications.

When a mammoplasty or mastopexy technique is chosen to correct the breast defect, it is crucially important to know which technique was used previously. Despite the lack of evidence, we strongly discourage the use of patterns of mammoplasty in oncoplastic reconstruction different from those used in the previous surgical procedures, i.e., use of an inferior pedicle after a superior pedicle mammoplasty. Although the vascular autonomization phenomenon occurs, NAC vascularization may be compromised when a different pedicle pattern (inferior pedicle after a superior pedicle) is used. Necrosis is a proclaimed complication that affects aesthetic and oncologic outcome. Delayed healing can postpone adjuvant therapy. Figure 43.13 shows a satisfying result after mammoplasty and partial reconstruction with a new mammoplasty. Figure 43.14 shows a patient who underwent three mammoplasties for aesthetic reasons and a bad outcome with NAC necrosis after mammoplasty for cancer.

A good medical history and discussion with the patient are critically important for prediction of the outcome. A surgeon is obliged to choose the most suitable technique for oncoplastic surgery. If a high complication risk is expected

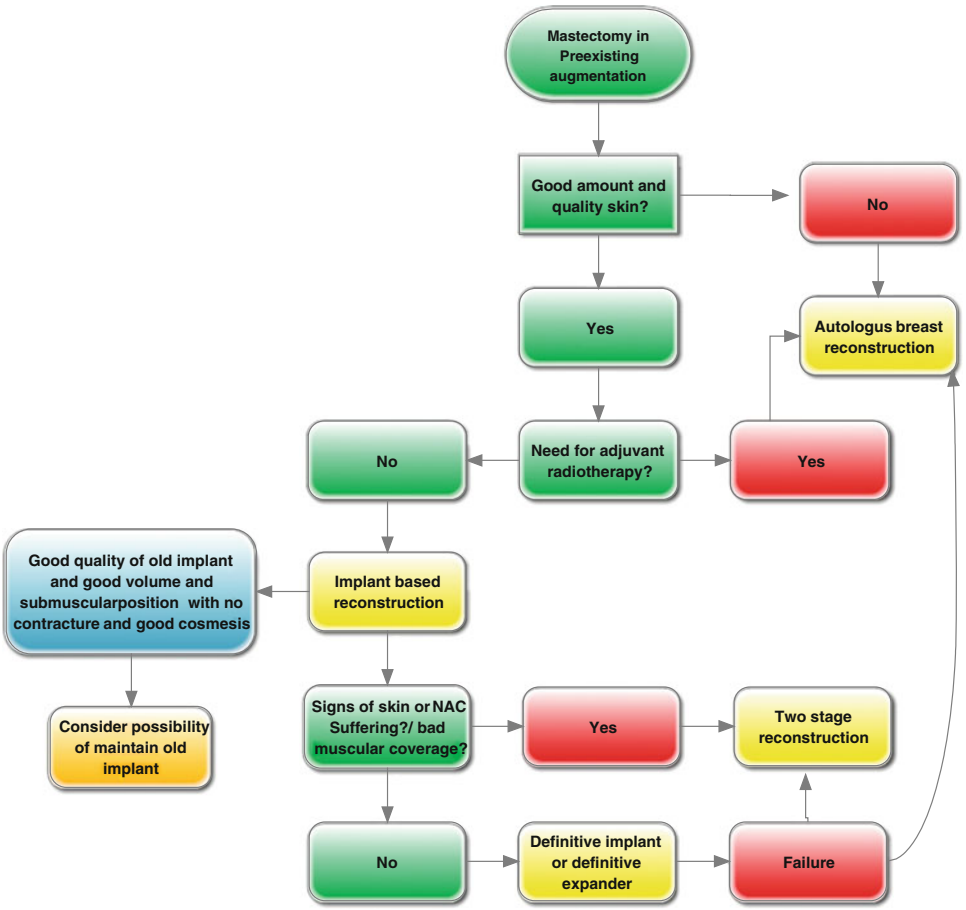

Fig. 43.11 Flowchart of indications for breast reconstruction after mastectomy in augmented patients

Fig. 43.12 Fat necrosis of the breast after extensive glandular undermining in oncoplastic partial reconstruction in a patient with previous mammoplasty and tumor in the inferolateral quadrant

Table 43.2 Risk factors for complications after mammoplasty

Risk factor	Risk of complication
Previous surgery	Medium/high
Heavy smoker	High
Obesity (BMI > 35)	High
Large resections (>1,000 g)	High
Diabetes (uncontrolled)	High
Age (>50years)	Low/medium

Fig. 43.13 Oncoplastic mammoplasty (superior pedicle breast reduction with excision of the tumor in the lower quadrant and SNB) in a patient with previous mammoplasty

Fig. 43.14 Bilateral NAC necrosis after oncoplastic mammoplasty for a tumor located in the upper quadrant of the left breast. The patient had undergone three mammoplasties before this procedure

(Table 43.2) and the lesion is located in the quadrant where the NAC vascular pedicle was previously based, or if the previous technique is unknown, minor surgery should be performed or another technique should be used. A free NAC graft or even mastectomy with reconstruction should be considered in these cases. Figure 43.15 shows the decision steps in partial breast reconstruction after mammoplasty.

43.3 Total Breast Reconstruction

The principles of total breast reconstruction in patients with previous reduction mammoplasty are quite similar to those of total reconstruction after augmentation mammoplasty described in this chapter.

However, the choice of the mastectomy reconstruction technique should be based on particularities of previous reduction mammoplasty. As already discussed, previous scars can lead to a higher risk of complications, especially in NSM and reconstruction [23, 25, 28]. Therefore, NSM and SSM may pose a higher risk of post-operative complications for these patients owing to larger and multiple skin scars caused by reduction mammoplasty.

Despite the paucity of evidence, we recommend obtaining a very good medical history andconsider NSM or SSM in low-risk patients (Table 43.2). The incision must preferably be made in a preexisting scar, e.g., a periareolar scar, a periareolar scar extended to a vertical scar, or a horizontal scar in the inframammary fold. The risks of complications according to the scar position are listed in Table 43.1 and can be used for preoperative risk analysis.

The reconstruction technique will once again depend on the choice of the patient, the amount of viable skin available, and preservation of the pectoralis major muscle and anterior serratus muscle. In addition, adjuvant treatment can also influence the decision about the technique. If radiotherapy is indicated, delayed reconstruction or autologous reconstruction can be indicated instead of an implant-based reconstruction (definitive or temporary implants).

A good alternative for this patient group is skin-reducing mastectomy with anatomic implant reconstruction, initially described by Nava et al. [33]. Since many patients undergoing reduction mammoplasty still have large breasts after surgery with ptosis frequently recurring over time, this technique reduces excess skin and corrects ptosis.

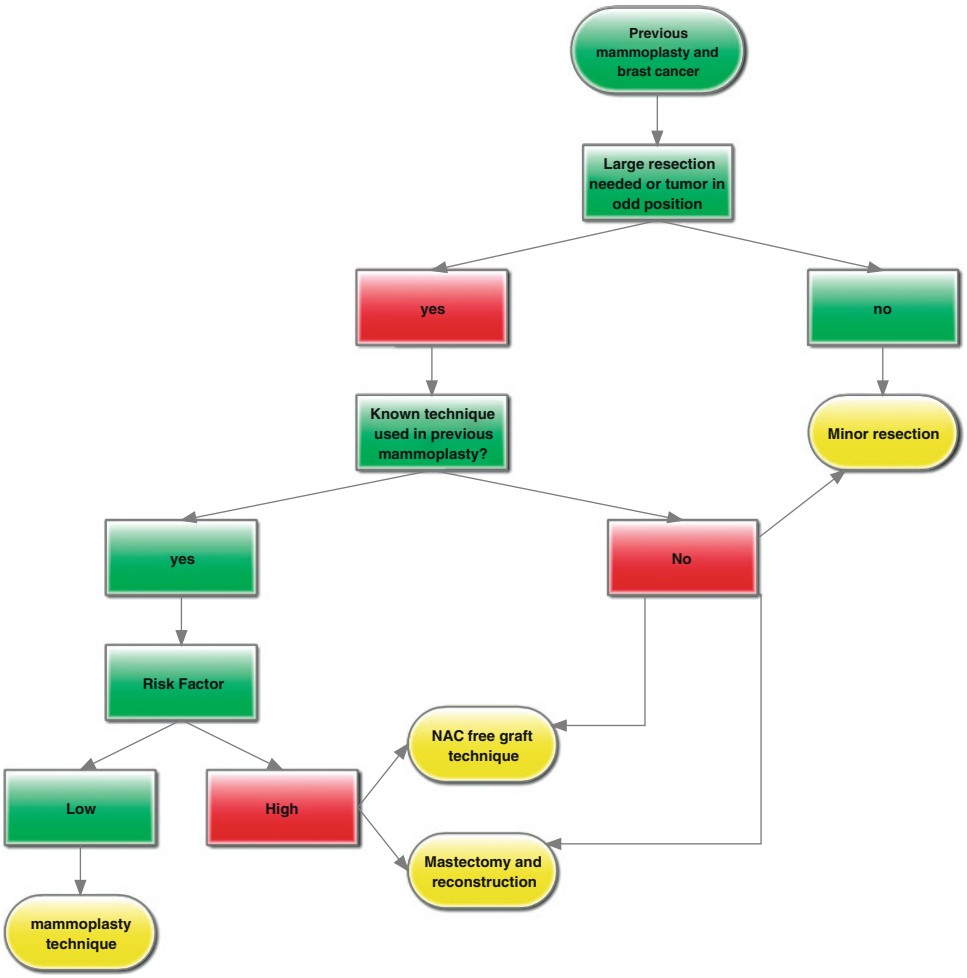

Fig. 43.15 Flowchart for the surgical decision about partial breast reconstruction in patients with previous mammoplasty

Fig. 43.16 Left NSM and reconstruction with an implant using a periareolar incision from a previous reduction mammoplasty. Note the partial areolar necrosis

Therefore, it is possible to use a definitive anatomic implant. With this technique, previous mammoplasty scar is removed since a Wise skin pattern resection is used. NAC's preservation in this group can be very risky due to necrosis. Discussion with the patient must be made before the procedure, and SSM maybe preferable.

Figures 43.16 and 43.17 show breast reconstruction with an implant after mammoplasty using a preexisting mammoplasty scar with and without a compromised areola. Figures 43.18 and 43.19 show a skin-reducing mastectomy after reduction mammoplasty with good results and one with postoperative complications.

Fig. 43.17 Bilateral NSM and reconstruction using the preexisting reduction mammoplasty incision. The patient had a history of breast reduction and posterior implant insertion

Fig. 43.19 Right skin-reducing mastectomy and implant reconstruction in patient with a previous mammoplasty with skin necrosis

Fig. 43.18 Left skin-reducing mastectomy and implant reconstruction in a patient with a previous mammoplasty

43.4 Conclusion

Breast aesthetic surgery is the most popular plastic surgery performed in the USA and probably in many other countries as well. As the technique becomes easier and technology is used to spread knowledge, more skilled surgeons can offer this treatment to patients. With cost reduction, an increasing number of women will be able to afford the procedure.

Breast, plastic, and oncoplastic surgeons will increasingly evaluate patients with breast implants or breast reduction and cancer. As previously discussed, this type of patient is different from a regular patient and deserves closer attention. In addition to optimal oncologic control, these patients expect good cosmetic results from the oncologic and reconstructive surgical team. Surgeons and patients must discuss indications, outcome, and complications thoroughly.

Patients should gain informed knowledge about surgical options and how to cope with good and bad results.

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