Cosmetic and reconstructive breast surgery

Thomas Lam
MBBS, FRCS(Glasg), FRCSEd, FCSHK, FHKAM(Surg), FRACS, is a plastic and reconstructive surgeon, Westmead, Auburn and Bankstown Hospitals, New South Wales.

Meagan Brennan
BMed, FRACGP, DFM, FASBP, is a breast physician, NSW Breast Cancer Institute, Westmead Hospital, New South Wales. meaganb@bci.org.au

James French
MBBS, FRACS, is a breast and endocrine surgeon, NSW Breast Cancer Institute, Westmead Hospital, New South Wales.

This fifteenth and final article in our series on breast disease provides general practitioners with information that will allow them to give their patients a balanced view about issues related to cosmetic breast surgery. As well as breast augmentation and breast reduction surgery, the latest on the breast implant 'silicone controversy' and other procedures such as breast reconstruction following mastectomy are discussed.

Cosmetic breast surgery is common in Australia. Patients considering breast augmentation or breast reduction surgery often approach their general practitioner requesting referral to a plastic and reconstructive surgeon. These patients have often 'researched' these procedures through the popular media and may have an overly glamorous view of what surgery can achieve.

Breast augmentation (breast enlargement)

The silicone controversy

Augmentation mammaplasty (breast enlargement) has been performed since the 1800s. Attempts have been made to transplant fat, use grafts or flaps, and to inject materials such as paraffin or silicone into the breasts. All of these techniques have proven unsatisfactory due to unpredictable results or foreign body reactions. The injection of paraffin and silicone is still performed in some developing countries (including Asian countries) and patients who have had this procedure are sometimes seen in Australia.

In 1964, the first clinical trial of a silicone gel implant was used and within a few years it became the gold standard for breast augmentation. The implant was designed as a silicone bag filled with a silicone gel, but there were problems with capsule formation and contracture and the design was modified. There were reports of 'bleeding' (leaching of silicone gel from the implant shell). In addition, some of these implants ruptured, leaking silicone into the capsule (intracapsular rupture) or through the capsule into the breast parenchyma (extracapsular rupture) (*Figure 1a, b*). Further modifications were made, leading to a lower rate of rupture and capsular contracture.

While there have been concerns about silicone implants causing breast cancer, there is no evidence that this is the case.[1] In fact, some epidemiological studies have shown that the incidence of breast cancer is lower (but not statistically significantly lower) in women who have silicone implants.[2]

It has also been questioned whether silicone breast implants increase the risk of autoimmune disease. Many studies have addressed this issue and none have found a link between implants and autoimmune disease.[3] The American College of Rheumatologists issued their policy statement stating that silicone implants are not associated with an additional risk of connective tissue or rheumatic disease.[4]

Despite the lack of evidence of silicone implants causing any health problems, hysteria developed and they were withdrawn from sale in the United States in 1992, and subsequently in Australia. In 2001, after further research and experience in Europe, silicone implants were once again approved for use in Australia. The use of saline filled implants has never been restricted. Breast implants currently available are:

- silicone gel
- saline
- adjustable, and
- polyurethane coated silicone implants.

The advantages and disadvantages of the different types of implants are shown in *Table 1*.

Patient expectations

It is essential that the patient has realistic expectations of what breast augmentation

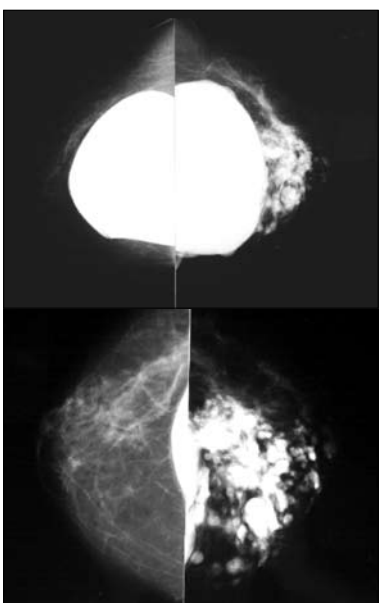

Figure 1a, b. Mammogram showing bilateral breast implants. a) craniocaudal view, and b) craniocaudal pushback or Eklund view. There is rupture of the left sided implant and leakage of silicone into the breast parenchyma. This also demonstrates how much the presence of implants may impact on the interpretation of screening mammograms

can achieve. Considerable time must be spent to ensure the patient does not have any underlying psychological problems and that she fully understands what is involved in the procedure. Side effects and complications such as infection, asymmetry and capsular contraction need to be discussed for informed consent (*Table 2, Figure 2a–d*). Breast augmentation – before and after – is shown in *Figure 3a, b*.

Breast implants and breast cancer screening

Breast augmentation decreases the sensitivity of screening mammography in asymptomatic women. However this does not appear to translate into breast cancers in women with implants being any more advanced at diagnosis.[5]

The presence of breast implants reduces the amount of breast tissue seen on a mammogram. It is usually recommended that women with breast implants have the standard two-view mammography and additional 'push back' (Eklund) views that attempt to push the implant out of the way to get a better view of the breast parenchyma. These views increase the amount of breast tissue imaged. 'Push back' views tend to be more successful in women who have subpectoral implants than those with submammary implants.

If there is concern that mammography is inadequate, it can be supplemented with breast ultrasound. Ultrasound has the additional benefit of being more sensitive for detecting implant rupture than mammography. If rupture is suspected and ultrasound is inconclusive, magnetic resonance imaging (MRI) is indicated.

Breast reduction

Bilateral reduction mammaplasty (breast reduction) (*Figure 4a, b*) is a common procedure. Women presenting for breast reduction surgery frequently complain of back, shoulder and neck pain resulting from the weight of the breasts. There is often poor posture and deep grooving from bra straps. Other patients report chronic intertriginous dermatitis in the inframammary fold. Psychological issues such as self consciousness and embarrassment, often made worse by comments and attention by others, are also common. There may be physical inconvenience or immobility affecting quality of life, and difficulty in obtaining properly fitted clothing.

Most women take a long time to come to a decision to undergo surgical reduction, often without the full support of their partner. It is not uncommon to delay surgery for a number of years after the initial consultation. However, once patients have recovered from the surgery and are enjoying the benefits of the surgery, most wish that they had had the operation years earlier. Benefits reported include relief of pain and discomfort leading to increased physical activity and better general health; greatly increased choice and fit of clothes

Table 1. Advantages and disadvantages of different types of breast implants

Type of implant	Advantages	Disadvantages
Silicone gel implants		
	• natural shape and feel • maintain shape in upright posture • maintain shape if ruptured • minimal gel bleed	• capsular contraction may occur • patient concern about silicone
Saline implants		
	• no silicone gel (although shell is made of silicone)	• do not maintain the teardrop shape after implantation • volume of saline in implant decreases with time • possible 'wrinkling' appearance • loses shape quickly if rupture occurs
Adjustable implants		
	• size of implant can be changed by injecting or removing saline • good for patients who are unsure what size implants they want • useful for women who request extremely large implants that cannot be achieved with one surgical procedure (implant can be used as a tissue expander until a second operation is performed)	• subcutaneous valve palpable (may be removed with surgery if change in size no longer required) • valve may be difficult to locate for inflation • same general disadvantages as saline implants
Polyurethane coated silicone implants		
	• currently being evaluated • it is hoped that the polyurethane coating will reduce capsular contracture	

and underwear; improved personal and social life, leading to enhanced relationships with partner or friends; and greatly improved self confidence in all areas of life. The interaction of all these factors leads to improved self image and improved quality of life.[6]

Figure 2a. Capsular contracture following augmentation causing irregularity and asymmetry of the breasts

Figure 2b. Capsular contracture: an implant (left) and thick capsule (right) after removal

Figure 2c. Asymmetry after augmentation with inflatable breast implants due to asymmetric placement of the prostheses

Figure 2d. Ruptured silicone implant on the right side. The erythema in the lower part of the breast is caused by inflammation due to free silicone in the breast parenchyma. The implant was removed at surgery

Surgical procedure

Depending on the size of the breasts, reduction mammaplasty may take several hours. The amount of breast tissue removed ranges from less than 100 g up to 3 kg per breast. Suction assisted lipectomy (SAL, liposuction) is often used to decrease the remaining axillary fold but not on the breast itself. Some surgeons perform reduction mammaplasty with SAL alone but this is not generally recommended. There is concern that SAL may result in significant scarring in the breasts which will be indistinguishable from cancer on subsequent imaging. Further concerns have been raised with the possibility of free radicals forming in the breasts leading to carcinogenesis, especially with ultrasound assisted SAL.

Complications

Complications of breast reduction are not common, occurring in only about 1% of cases. The most common complications of reduction mammaplasty are wound infection and haematoma formation. However, the most significant complication in terms of aesthetics is nipple-areola necrosis. Other complications include fat necrosis, loss of nipple sensation and unsightly scars.

Many large breasted women report decreased nipple sensation preoperatively. Surgery often decreases the level of sensation further, and this can become noticeable postoperatively. It is therefore important to assess nipple sensation preoperatively so patients are made aware of it. Fortunately, there is usually a return of sensation with time, although it may not be complete. Many patients also report hypersensitivity of the nipples in the immediate postoperative period.

Table 2. Side effects of breast augmentation surgery[7,8]

Early complications
- haematoma (1%)
- infection (<1%)
- implant failure (2%)
- pneumothorax (rare)

Late complications
- scar deformity
- capsular contracture
- asymmetry
- breast deformity
- implant malrotation
- deflation or rupture (1% per year)
- rippling and wrinkling (saline implants, 20%)

Unsightly scars range from hypertrophic scars to keloid formation. This problem is more common in the younger age group and in particular those who suffered postoperative wound complications. Silicone dressings are the first line of treatment followed by steroid injections locally. Surgical revision is not usually indicated and should be withheld until the scar has matured. This typically takes at least 1 year. Possible postoperative deformities include:

- asymmetry of the breasts in size and shape: patients should be made aware preoperatively that normal breasts are often asymmetrical and that it is impossible to achieve exact symmetry or bra cup size

Figure 3a, b. Breast augmentation with silicone prostheses: before and after surgery

- nipple malposition: in general, nipple malposition is a result of planning to place the nipples too high. It is much easier to revise nipples higher than to lower them, therefore appropriate preoperative planning is essential
- 'bottoming out': this deformity occurs when the inferior pole of the reduced breast descends, probably due to a loss of support or stretching of the lower breast skin. This skin is pulled tight at the time of the reduction but may stretch later. As a result of this 'bottoming out' there is an upward tilting of the nipple.

Breast lift (mastopexy)

Mastopexy or 'breast lift' is a similar procedure to reduction mammaplasty. The operation, scars and complications are the same, but the amount of tissue removed is minimised.

Figure 4a, b. Breast reduction: before and after surgery

Breast reconstruction

Breast reconstruction should be offered to all patients undergoing mastectomy for breast cancer or the prevention of breast cancer. Consultation with a plastic and reconstructive surgeon may be offered, preferably before definitive breast cancer surgery is performed. Reconstruction may be performed at the same time as the mastectomy or as a delayed procedure.

The timing of breast reconstruction in relation to other oncological treatment must be considered. Reconstruction should be planned so that it does not delay other treatment. The options for reconstruction vary according to the type of adjuvant treatment planned. For example, in patients having radiation therapy following mastectomy the timing of reconstruction in relation to radiation therapy determines the possibility of reconstruction. In

Table 3. Indications, contraindications, advantages and disadvantages of different types of breast reconstruction

	Implant reconstruction	Autologous tissue reconstruction
Indications	• patient choice • slim abdomen • small contralateral breast	• patient choice • large contralateral breast • previous chest wall radiotherapy
Contraindications	• patient declines • large pendulous contralateral breast (although contralateral breast reduction can be considered) • previous chest wall radiotherapy (relative contraindication)	• patient declines • slim abdomen • multiple previous abdominal operations or previous abdominoplasty • underlying vascular disease
Advantages	• short operation time; minimal trauma and quick recovery • no additional scars; implant inserted through mastectomy scar • colour of skin over implant similar to contralateral breast • range of implant sizes available; opportunity to increase or decrease size	• live tissue; natural feel and natural 'droop' • larger size possible than with implant reconstruction • simultaneous abdominoplasty (tummy tuck) as a 'side effect' of breast reconstruction • size of reconstructed breast will change with weight fluctuations
Disadvantages	• expander and implant are artificial; problems of foreign body (eg. infection and capsule formation) • size of implant is fixed; will not change size if patient's weight fluctuates • multiple surgical procedures required • options for size, shape and consistency are limited by the available implants • pain; may lead to removal	• long operation and recovery • extra scars (on abdomen) • damage to rectus muscle leading to bulging • risk of failure of microsurgery or partial flap loss

Figure 5. Breast reconstruction following bilateral mastectomy. Both breasts have been reconstructed with tissue expanders which are in the process of being inflated. These will be changed to permanent breast implants when expansion is complete

some cases the necessity for postmastectomy chest wall radiotherapy may not be obvious until after definitive pathology results are available. If expander/implant reconstruction is planned, it is important to have the expander fully expanded before radiotherapy, as radiotherapy can cause fibrosis of the pectoral muscle making it difficult to expand and compromising the final cosmetic outcome.

As with all breast surgery, it is important for the patient to have realistic expectations of results. Considerable time should be spent before surgery discussing the options, including showing photographs, to ensure that the patient understands what to expect from reconstruction. Most importantly, the patient should understand that the reconstructed breast will not look like a normal breast; rather, the aim of reconstruction is to create a mound on the chest wall that will give shape when clothes are worn without the need for a prosthesis in the bra.

Options for breast reconstruction

Implant reconstruction

Reconstruction using a breast implant (*Figure 5*) may be performed as an immediate or a delayed procedure. It is usually a two-stage surgical procedure:

- stage 1 – insertion of a tissue expander; this is then expanded over a period of 6–12 weeks with injections of saline into a port
- stage 2 – the expander is removed and replaced with a breast implant 3–6 months later.

Figure 6a, b. Breast reconstruction following mastectomy – free DIEP flap: before and after surgery

Figure 7a, b. Subcutaneous mastectomy for gynaecomastia: before and after surgery

Autologous tissue reconstruction

There are several options for reconstruction using autologous tissue:

- transverse rectus abdominus myocutaneous (TRAM) flap
- deep inferior epigastric perforator (DIEP) flap (a modification of the TRAM flap where the rectus muscle is left in situ) (*Figure 6a, b*)
- latissimus dorsi flap, with or without an implant
- the TRAM flap may be performed as a pedicle flap (taking its blood supply with it from the donor site) or as a free flap (vessels are divided and anastomosed microsurgically to new vessels on the chest wall.) The DIEP flap is a free flap.

The indications, contraindications, advantages and disadvantages of different types of breast reconstruction are shown in *Table 3*.

Surgery for gynaecomastia

Gynaecomastia is the presence of palpable glandular breast tissue in men (*Figure 7a*). Men with significant gynaecomastia may request surgery. The main indication for surgery is cosmetic, when gynaecomastia leads to self consciousness or embarrassment. While liposuction is sometimes used to treat gynaecomastia, it may not be successful as the underlying problem is proliferation of glandular tissue rather than fatty tissue. Most breast surgeons therefore recommend subcutaneous mastectomy (*Figure 7b*). This allows the glandular tissue to be excised while the nipple-areolar complex is preserved and the scar hidden in the areolar edge.

Breast surgery for congenital deformities

Breast hypoplasia and breast asymmetry

The aim of surgery for breast hypoplasia (which may be unilateral or bilateral) is to achieve a reasonable breast shape with good symmetry (*Figure 8a, b*). This may require breast augmentation with or without contralateral breast reduction or lift. It may need to be performed in several stages in order to achieve the best results.

Poland syndrome

Patients with Poland syndrome have several deformities involving the chest wall, trunk

Figure 8a, b. Congenital hypoplasia of the breast: before and after surgery

and hand, including asymmetrical breast development. Treatment depends on the extent of the abnormality. In some cases it is only the breast that requires reconstruction (usually with a breast implant), while in other cases the underlying pectoralis major muscle and ribs also require reconstruction.

Tubular breast deformity

Patients with this deformity have a constricted breast base giving the breast a long, narrow 'tubular' appearance. There are often associated abnormalities of the nipple-areolar complex. This deformity is extremely difficult to correct and often requires a combination of surgical releases and tissue expansion before final reconstruction with a breast implant.

Conclusion

This article has discussed a range of cosmetic and reconstructive breast surgical procedures; provided information about what these procedures can achieve; and discussed the indications, contraindications and complications. This will allow the GP to discuss these issues with patients considering these procedures before referral to a plastic and reconstructive surgeon.

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afp CORRESPONDENCE email: afp@racgp.org.au