One stage breast reconstruction following prophylactic mastectomy for ptotic breasts: The inferior dermal flap and implant

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Introduction: Immediate reconstruction following prophylactic mastectomy for larger ptotic breasts is difficult. Tissue expansion in these patients often results in poor cosmetic outcomes. Autologous options may not be possible due to clinical unsuitability or patient choice. Using the inferior dermal flap with implant achieves lower pole fullness and allows a one-stop reconstruction in the larger ptotic breast.

Methods: The inferior dermal flap and implant was performed on ten patients (20 breasts). Average age was 43 (range 36–53). The average BMI was 37 (range 32–43). The distance from nipple to IMF varied from 15 cm to 26 cm. The average implant size was 533 (range 390–620). Complications were minimal with one patient experiencing delayed wound healing at the T-junction and one patient developing inferior pole erythema postoperatively that settled with antibiotics.

Conclusion: The inferior dermal flap and implant provides a one-stop reconstructive option. It is reliable, safe and maintains the breast envelope while giving excellent size, shape and symmetry in the larger ptotic patient.

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Introduction

The efficacy of prophylactic mastectomy for women with a high lifetime risk of breast and/or ovarian cancer due to their family history or for those women known to be carrying a mutation in BRCA1/2 is undisputed.1,4 Uptake rates vary considerably and are dependent on a dedicated multidisciplinary team approach.4 Following assessment at the family history clinic and/or genetic testing women with a high risk of breast cancer (lifetime breast cancer risk, >25%) are given a second genetics appointment followed by a psychological assessment.1–4 If deemed appropriate patients are then referred for prophylactic mastectomy +/− reconstruction. This is in
accordance with UK National Institute for Health and Clinical Excellence. An assessment of the patient including previous surgery, past medical history, body mass index, suitability for all reconstructive options enables the patient and surgeon to discuss the various options available including tissue expander/implant based reconstruction, local flaps +/- tissue expander implants and free flaps. A further discussion with a breast care nurse allows patients to understand the normal pre and postoperative care and recovery following the various reconstructive options.

The use of the inferior dermal flap with implant as a one stage reconstructive option can be performed following prophylactic mastectomy in larger patients with significant ptosis. These patients are often patients with high BMI’s who are relatively unfit and/or unwilling to undergo a more complex form of reconstruction.

Procedure

The most crucial measurement for inferior dermal flap reconstruction with implant is the distance from the nipple to the inframammary fold. Where this distance is 15 cm or greater the technique may be considered as a one stage procedure with implant. The other important measurement is the breast and chest wall width that will determine the implant size.

Where the sternal notch to nipple distance is over 30 cm preservation of the nipple areola complex is not considered appropriate due to the increased risk of nipple areola necrosis and leaving breast tissue in order to maintain vascularity. This is often the case in larger ptotic breasts. The markings of the Wise pattern start with the upper V of the Wise. The lines are drawn as close to the areola as possible and the top of the V is dictated by the width of the areola. The horizontal limbs of the upper line of the Wise pattern are drawn from the lower part of the areola. This distance from the top of the V will dictate the breast envelope and the tension on the closure. Where there is >15 cm from nipple to IMF an 8 cm distance from the top of the V to the horizontal limb is marked. Where there is 20 cm or more from nipple to IMF this distance can be increased to 10 cm.

The lower IMF incision is generally placed higher than the current IMF if possible as it is usual for the ptotic breast to be placed higher on the chest. By increasing the height of the IMF it decreases the amount of eventual dermal flap available and the pros and cons need to be considered in terms of overall size. Raising the IMF also decreases the problems of de-epithelialisation that are encountered at the IMF.

The breast is infiltrated with 20 mls of Marcaine with Adrenaline and 1 L of normal saline. Following completion of the preop markings the dermis overlying the lower portion of the Wise pattern below the areola are de-epithelialised with a scalpel. (Figure 1). The upper part of the dermal flap is then incised through dermis and subcutaneous tissue and the dermal flap raised between the plane of the subcutaneous fat and breast tissue in the normal mastectomy plane with a bovie. This can result in variable thickness of flap between patients depending on the breast tissue plane and is usually around 5 mm thick (Figures 2,3). The flap is raised down to the chest wall in this plane towards the IMF. The breast tissue is now sitting superior to the dermal flap and the mastectomy can be performed as normal through a Wise incision with the bovie. During the mastectomy the flap should be protected with a damp swab. This method provides excellent access for the mastectomy. Following completion of the mastectomy the pectoralis major is raised and the infero-medial attachments of the pectoralis are detached. On the lateral border of the pectoralis the serratus fascial attachments are left intact and the pocket extended to the border of the chest wall.

Haemostasis is performed with bipolar diathermy and then an inflatable sizer is placed in the pocket and the dermal flap positioned over the sizer and attached to the pectoralis muscle using 3.0 monocryl (Figure 3). In each case the dermal flap will be different in terms of thickness of the flaps, length and breadth. The sizer must be completely covered by the dermal flap before the vertical limbs of the Wise can be placed to their new position. A starting volume of 50% of the final estimated implant volume is an appropriate fill at this stage. The T-junction is usually between 10 and 13 cm from the midline depending on chest width. The vertical limbs are temporarily positioned with staples at this point and the sizer inflated with
the patient in the chaired position. A suitable size may be
determined based on the tension of the vertical limbs. This
volume will be larger if the vertical limbs of the Wise
pattern are 10 cm and the dermal flaps $\geq 20$ cm in height.
The original breast width is an important measurement as
the final implant should be slightly less than this. For very
large breasts the measurements should be from 2 cm from
the midline to the anterior axillary line. This will give
a measurement that should correspond to the base width of
the implant.

Once the size has been determined the vertical limbs
can be released and one can check on the position of the
dermal flap. If there is an excess dermal flap in one area the
flap may be repositioned. If there is excess superiorly the
dermal flap should be repositioned superiorly so that there
are no irregularities but also one must make sure that the
dermal flap is not under tension. If there is still an overlap
then the dermal flap may be resected. Trimming of the
subcutaneous tissue should be performed at the point
where the dermal flaps meet the pectoralis muscle and the
thin dermal portion superiorly is the point where the
dermal flap stitches are placed on the pectoralis muscle. In
this way the knots will not be adjacent to the implants. A
horizontal gap between the dermal flap and the pectoralis
should be kept at this stage so that the sizer can be
removed through the gap. A 12.0 drain is inserted into the
new breast pocket after removal of the sizer. The implant
can then be inserted using a strict no touch technique and
then the gap between the dermal flap and pectoralis
muscle closed with 3.0 monocryl. A second drain is placed
above the dermal flap and the vertical limbs repositioned
and closed with 3.0 monocryl and 4.0 monocryl (Figure 4).

Results

Ten patients underwent 20 prophylactic mastectomies and
reconstructions with the inferior dermal flap and implant
one stage reconstruction. See Figures 5, 6. Average age was
43 (range 36–53) and the average BMI was 37 (range
32–43).

The distance from nipple to IMF varied from 15 cm to
26 cm and the breast diameter varied from 15 cm to 22 cm.
The average implant size was 533 (range 390–620). In all cases a moderate height implant was used with either moderate plus or high profile (Mentor Contour Profile). The average sternal notch to nipple distance ranged from 28 cm to 43 cm. In no case were the nipples preserved.

For the first two patients the patients stayed in hospital for one week and had both drains in for two weeks. The remaining patients were discharged on day three with both drains removed at one week. In one case there was delayed healing at the T-junction of the Wise pattern flaps that healed by four weeks. One patient developed an erythema over the inferior portion of the breast six weeks postop that settled with antibiotics. There have been no other complications.

The follow up is average 12 months range 6–24 months. Surgical times for bilateral mastectomies and reconstructions varied from 125 min to 185 min average 155 min.

Discussion

Patients with high BMI’s and unable to lose weight following dietetic advice are a group of patients in whom prophylactic mastectomy only may be performed for oncological reasons. Often these patients have large ptotic breasts and subsequent delayed reconstruction in these patients often gives a suboptimal result and is often not possible. The dermal flap technique is an excellent option for these patients.

Although autologous reconstruction provides a greater chance of having a natural reconstruction especially in the long-term sometimes patients are concerned about recovery time, scars and the impact of surgery. For these patients with ptotic breasts the dermal flap offers an excellent reconstructive result.

With traditional tissue expansion in a submuscular pocket, for the larger breast, expansion of the lower pole is always difficult. Often the expansion not only expands the skin but also into the chest wall. Even with the largest implants in these patients it is difficult to provide adequate size, shape or symmetry. To combat this some authors shown excellent results with artificial dermis and improved the cosmetic issues of the lower pole. The advantage of the dermal flap is that there is more tissue available, it is autologous and is tissue that would have otherwise have been discarded. De-epithelialised dermis has been used in breast reductions and mastectomies to improve blood supply to the skin and dermal grafts have also been described for reconstruction following mastectomy.

Although it was not the intention to provide totally vascularised tissue for coverage it would appear that the majority of the flap remains vascularised. For the first cases almost all the fat was removed from the dermis superiorly after the flaps were raised to give a uniform 1–2 mm thickness. During the fat removal phase the subcutaneous tissue seemed to be vascularised. For the later cases the subcutaneous tissue was not removed and the subcutaneous fat superior to the mastectomy plane was left intact giving an average thickness of around 5 mm. The advantage of leaving the subcutaneous tissue is that it is thicker than dermis alone and gives extra protection for the implant. In the lower pole it also aids projection. It would appear that leaving the subcutaneous tissue does not lead to fat necrosis or infection due to necrosis of the fat. This tissue is undoubtedly random in nature and if the dermal flap is >20 cm one must consider removing some of the flap prior to placement of the sizer. The vascularity of the dermal flap has not been fully assessed, as it was not the author’s intention that this flap would be vascularised. The greater the breast diameter and the lower the IMF to nipple distance the greater the length/breadth ratio and the greater vascularity of the flap that will be maintained either randomly or axially through perforators running along the IMF.

The size of immediate implant can be determined following placement of the sizer and inflation. Often the breast width measurement will give an idea of the range of implants possible. Ideally the implant should be equal to the breast width as for breast augmentation. One can reduce the volume of the implant by decreasing the projection of the implant or increasing the height of the implant. The implant was chosen by the patient’s breast width and a moderate height and moderate/full projection implant placed depending on the thickness of the tissue over the lower pole. For the larger breast the breast width is often unreliable and the anterior axillary line gives a more appropriate lateral landmark. One must also consider that the breast width is narrowed by the Wise pattern.

In this series the inferior dermal flaps and the reconstruction were performed by the same surgeon. The de-
epithelialisation process is more rapid with a scalpel and also safer just above the IMF. The mastectomies are rapidly and easily performed through large access with a bovie. Initially the dermal flaps and mastectomies were performed by the senior surgeon and subsequently combined with experienced oncoplastic trainees allowing simultaneous operating in two teams. Where an oncological surgeon and a reconstructive breast surgeon are performing a combined case it is envisaged that once the reconstructive breast surgeon has raised the dermal flap on one side the oncolgy surgeon would perform the subsequent mastectomy while the reconstructive breast surgeon commence the dermal flap raising on the contra lateral side. Once the oncological surgeon has completed the mastectomy he/she can move on to the contra lateral side following the completion of the dermal flap harvest by the reconstructive surgeon. The reconstructive surgeon can then complete the implant-based reconstruction on the first side and on completion of the mastectomy move to the contra lateral side to complete the procedure with the suturing performed simultaneously.

In this series none of the nipples were preserved due to a combination of patient choice, oncological risk leaving breast tissue in the vascular pedicle and risk of necrosis of the nipple areola complex in the ptotic patient.

In no cases was any disease detected in the pathological specimen and no cases have undergone radiotherapy. It is unclear how much protection the dermal flap reconstruction will give to radiotherapy. It is certainly a simple option in the immediate setting for those that may require subsequent autologous reconstruction in an immediate delayed format.

In one case there was delayed wound healing at the T-junction. This was due to partial dehiscence of the mastectomy flaps at the T-junction. There was no exposure of the implant and the wound healed within four weeks without any problems. The improved vascularity of the dermal flap at this point makes it more reliable in protecting the T-junction than artificial dermis. There have been no problems with IMF malposition and as yet no problems with capsular contracture. Long-term follow up is required to determine the effect of further breast ptosis with time.

This reconstructive option is safe and reliable and provides an excellent option in breast reconstructive surgery. All patients have reported high satisfaction rates with the procedure. Long-term analysis however is required to determine how the dermal flaps will change over time and whether any ptosis correction will be required in the future.

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References


Conflict of interest

There is no conflict of interest or funding involved with this work.