Achieving an Optimal Outcome for Medial Pedicle Vertical Breast Reduction

Lee L.Q. Pu, MD, PhD, FACS

Abstract: Breast reduction is a common procedure performed by plastic surgeons for functional or cosmetic improvement of the breast. However, final outcome can be less satisfactory to patients in terms of the size, shape, symmetry, scarring, or wound healing complications. However, good to excellent outcome after breast reduction can be accomplished by plastic surgeons once they have mastered their technique. The medial pedicle vertical breast reduction has been popularized recently. However, the technique is technically more complex, and the results have been less inconsistent with a learning curve. In addition, the technique has been criticized for a residual deformity in the lower pole of the breast and resulted in a high revision rate. In this article, key components for the medial pedicle vertical breast reduction including patient selection and technical refinements are discussed in details. The author describes his philosophy in patient selection, preoperative and intraoperative markings of the breast, and step-by-step surgical procedures with several technical refinements for the medical pedicle vertical breast reduction. In addition, the pearls for achieving an optimal outcome of such a breast reduction are also discussed.

Key Words: breast reduction, medial pedicle, vertical scar, patient selection, outcome

(*Ann Plast Surg* 2014;73: S57–S62)

Breast reduction can be performed for either functional or cosmetic reason. Besides several functional improvements for back, neck, and shouldering pain and diminishing skin rashes under the breast, 4 primary goals to achieve optimal size, shape, symmetry, and scaring should be applied to each type of breast reduction. For example, the size of the breasts after breast reduction has been desirable and in proportion to the patient body habit. The shape after breast reduction should be cosmetically pleasing and long lasting. Although the exact symmetry may be hard to achieve, most women do desire more symmetrical result after breast reduction. It is also quite desirable to have minimal scarring after any type of breast reduction, especially for certain races of women.

A classic inverted "T" inferior pedicle technique is still the most commonly performed breast reduction procedure in North America. However, there are a number of long-term problems after this type of breast reduction, such as unsightly scar and bottoming-out shape of the breast. Because of these 2 obvious long-term undesirable outcomes of the inverted "T" inferior pedicle breast reduction, plastic surgeons have made great efforts to search for a better breast reduction technique to improve overall long-term outcome after breast reduction for women with macromastia.

Vertical breast reduction was campaigned by Lejour from Belgium, but the procedure has been popularized by Hall-Findlay from Canada recently.[1–3] However, the medial pedicle vertical breast reduction has been criticized by many plastic surgeons especially in North America for its inconsistent cosmetic outcome and higher revision rate after such a breast reduction surgery.[4–7] In addition, the learning curve for medial pedicle vertical breast reduction appears to be longer because many intraoperative adjustments should be performed by the surgeon so that the final outcome after medial pedicle breast reduction can be cosmetically acceptable.

In this article, the author describes his preferred technique to perform the medial pedicle vertical breast reduction. He emphasizes on patient selection for this breast reduction procedure as well as several technical refinements so that an optimal outcome after such a breast reduction can be achieved. A case example's also included to demonstrate the long-term outcome after the medial pedicle vertical breast reduction from the author's clinical series.

Patient Selection

Just like any other plastic surgical procedures, patient selection is critical to the success of the medial pedicle vertical breast reduction. It is the author's opinion that medial pedicle vertical breast reduction is not indicated for all patients. In general, younger women with good breast skin condition (no stretch marks) and reasonably well-maintained round shape of the breast are the good candidates for this type of breast reduction (Fig. 1). The overall amount of breast tissue reduction may not be a critical issue, although the average weight of this type of breast reduction is usually between 300 and 500 g. The distance between the nipples to the inframammary fold of the breast should be less than 12 cm for such a breast reduction. Table 1 summarizes the general indications for the medial pedicle vertical breast reduction in the author's practice.

Special Considerations for Medial Pedicle Vertical Breast Reduction

The pedicle receives the blood supply from the perforators of the internal mammary vessels. These, perforators in general provide robust blood supply to the pedicle, so necrosis of nipple-areolar complex is rare after such a breast reduction as long as the adequate width of the pedicle is maintained (Fig. 2). Unlike the classic inverted "T" inferior pedicle technique, the medial pedicle vertical breast reduction does require some special considerations. For example, the new nipple position should be placed "low" during the preoperative marking because the vertical technique in general does have a tendency to place the nipple too high and to make more upper pole fullness somehow after such a breast reduction. Therefore, the surgeon should pay attention to avoid high ride nipple and to inform the patient about the temporary appearance of the breast postoperatively.

The new inframammary fold should be placed higher than the actual inframammary fold so that the distance between the nipple and the inframammary fold can be shortened. This distance can be shortened further by a running subcuticular closure. However, the distance between the nipple and the new inframammary fold will never be 5 to 6 cm as after the classic inverted "T" inferior pedicle breast reduction. Very often, it will be about 7 to 8 cm so that an optimal shape of the breast after reduction can be maintained.

The management of the excess tissue in the lower pole of the breast can be critical to the success of the medial pedicle vertical

Received April 1, 2014, and accepted for publication, after revision, April 8, 2014.
From the Division of Plastic Surgery, University of California, Davis, Sacramento, CA.
Presented at the Third World Congress for Plastic Surgeons of Chinese Descent, Xian, China, October 12–14, 2012
Conflicts of interest and sources of funding: none declared.
Reprints: Lee L.Q. Pu, MD, PhD, Division of Plastic Surgery, University of California at Davis, 2221 Stockton Blvd., Suite 2123, Sacramento, CA 95817, USA. E-mail: lee.pu@ucdmc.ucdavis.edu.

ISSN: 0148-7043/14/7301-S057
DOI: 10.1097/SAP.0000000000000255

FIGURE 1. A typical good candidate for the medial pedicle vertical breast reduction. In general, patients should be relatively young with good breast skin condition and reasonably well-maintained shape of the breast.

breast reduction. The surgeon should pay attention to this important issue and develop some strategy or technique to properly handle the extra tissue in this location (Table 2).

Preoperative and Intraoperative Markings

The marking of the medial pedicle vertical breast reduction should have 2 essential components. One would be marking while the patient is in an upright position, and the other would be marking while the patient is in supine position, commonly under general anesthesia. The new nipple position should be determined first. However, unlike the classical inverted "T" inferior pedicle breast reduction, the new nipple position should be set at a level for 1 to 2 cm below the level of inframammary fold to avoid high ride nipple position after this type of the breast reduction. The circle around the new nipple position is marked with a Wise-pattern marker used by the author. This would make the diameter of the circle about 40 mm. The level of the new inframammary fold is determined to be about 2 cm above the actual inframammary fold. After this, the medial and lateral borders of the resection are marked by rotating the breast both medially and laterally in reference to the midline of the breast (Fig. 3).

While patient is in the supine position, the nipple-areola complex is marked with either a 38- or a 42-mm cookie cutter. The pedicle is then designed with the pedicle width between 6 and 8 cm depending on the size of the breast that the surgeon wants to achieve after breast reduction. It is important to leave at least a centimeter wide breast tissue away from the proposed upper border of the nipple-areolar complex to avoid "cutting" into it (Figs. 4A and B). After the pedicle is marked, the new circle of the proposed nipple-areolar complex and also the medial and lateral markings of the proposed resected area in the breast are tested for easy approximation without tension.

TABLE 1. Good Candidates for Medical Pedicle Vertical Breast Reduction

Younger and healthy women (not for all women)
Good breast skin condition (no stretch marks)
Reasonably maintained breast shape (still round, no grade 3 ptosis)
Moderate-sized breast reduction (less than 500 g)
Relatively short distance from nipple to inframammary fold (less than 12 cm)

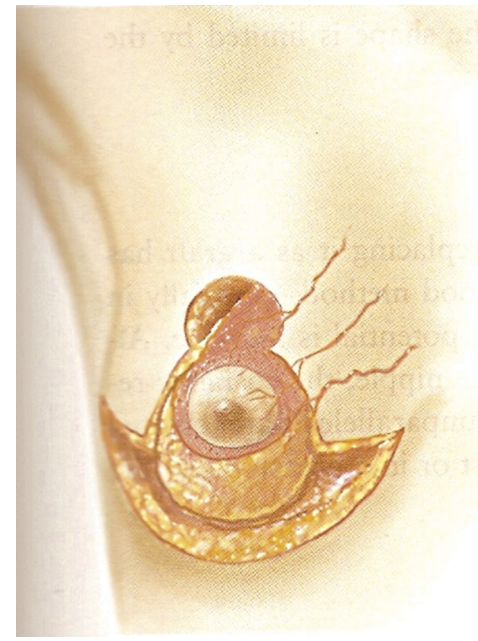

FIGURE 2. A schematic diagram showing the blood supply to the medical pedicle (with permission from Taylor and Francis Group LLC Books).

Surgical Technique

For the medial pedicle vertical breast reduction, the area of de-epithelization over the pedicle is much smaller than the classic inverted "T" inferior pedicle breast reduction. Therefore, the de-epithelization can be quickly performed over the pedicle with either knife or scissors as preferred by the surgeon (Fig. 5).

The lower portion of the breast tissue below the pedicle along with skin is resected first. The resection can be quickly performed down to the base of the breast. The resection should be performed with attention to preserve more tissue in the medial aspect of the breast. The superior portion of the breast tissue above the pedicle along with the skin is excised accordingly, and the medial pedicle can be then elevated. Attention should be made to ensure that the pedicle has adequate bulk of the breast tissue in terms of width and thickness so that an adequate blood supply can be maintained to the nipple-areolar complex. Additional resections of the breast tissue should be performed further both laterally to remove excess breast tissues and superiorly to remove some deep breast tissues so that the pedicle can be rotated into the new position without too much tension (Fig. 6). Very often, the pedicle can be debulked further to make its inset easier. As compared with the classic inverted "T" inferior pedicle technique, the resection of the breast tissues can be performed relatively fast.

TABLE 2. Special Considerations for Medical Pedicle Vertical Breast Reduction

Place new nipple position "low"
Good blood supply to the pedicle
Create new but higher inframammary fold
More intraoperative adjustments
Shorten vertical distance during closure
Manage "excess" tissue in the lower pole
Temporary upper pole fullness
There is a learning curve

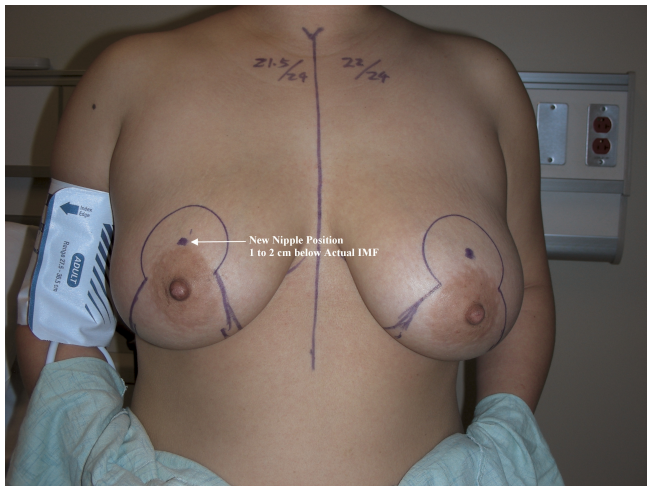

FIGURE 3. Preoperative marking of the medial pedicle vertical breast reduction. Please note that the new nipple position should be 1 to 2 cm below the level of inframammary fold (IMF) depending on the amount of reduction.

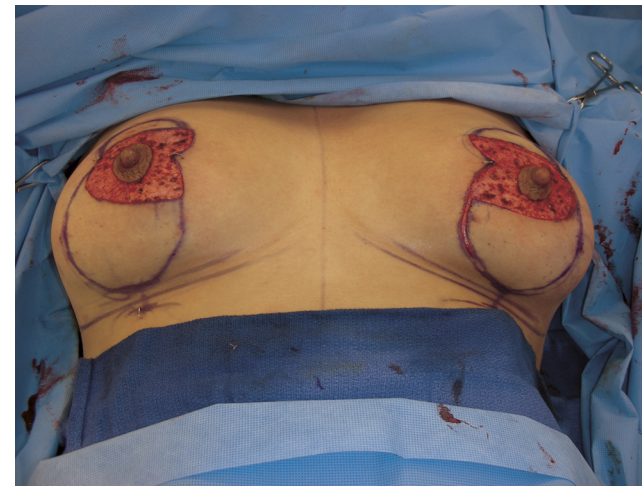

FIGURE 5. Intraoperative view showing the completion of de-epithelization over the pedicle.

The closure of the breast after inset of the pedicle can also be performed relatively faster. Once the new nipple-areolar complex circle is approximated with a 2-0 Polydioxanone suture, the pedicle can be rotated into the new position, and the nipple-areolar complex can be quickly approximated to adjacent breast skin with skin staples. The medial and lateral pillar closure is then performed with 2-0 Polydioxanone sutures in an interrupted fashion. In general, only 3 sutures are needed to approximate the medial and lateral pillars. After both medial and lateral pillars are closed, the skin can be approximated with skin staples. At this point, the position of the new inframammary fold can be determined. The excess breast tissue in the lower pole of the breast located at the lower end of the vertical incision is identified and marked (Fig. 7). Both breasts are then judged for their symmetry in terms of the size, shape, and projection while the patient is maintained in an upper right position. The excess tissue marked in the lower pole of the breast can be managed successfully with aggressive defatting, followed by placement of a purse string suture with 3-0 Monocryl suture to evenly fold excess skin together (Fig. 8). The vertical incision is usually closed in 2 layers. Deep dermal layer is approximated with several simple interrupted 3-0 Monocryl sutures, and the final skin closure is performed with 3-0 Monocryl sutures in the subcuticular fashion. During the vertical skin closure, some additional shortening can be achieved for the vertical distance.

It has been the author's goal that the final closure after the medial pedicle vertical breast reduction has to look good on the operating room table. If for some reason there is more excess tissue in the lower pole of the breast and the closure in the lower pole of the breast with aggressive defatting and purse string suture does not appear to be satisfactory, an "L" shape or a short inverted "T" skin incision can be added at this point so that the appearance of the closure in the lower pole of the breast can be improved because more lower pole excess tissue of the breast can be removed in this way. However, adding an L shape or inverted "T" incision may only be indicated for larger breast reduction or when 1 side of the breast is much larger than the other side (Fig. 9).

Postoperative Care and Management of Complications

It is the author's preference that the sterile tips are placed tightly at the lower pole of the breasts to flatten the closure in this area. The rest of the incision will also be covered with sterile tips, and a surgical bra is applied to the patient. The patient will wear a surgical bra for 2 to 3 weeks until the incision has healed and will then convert to the new bra without an under wire. No drains are used for this type of breast reduction in author's practice. This is in contrast to the inferior pedicle breast reduction where the drains are routinely placed for 24 hours. The medial pedicle vertical breast reduction is frequently performed by the author in an outpatient setting.

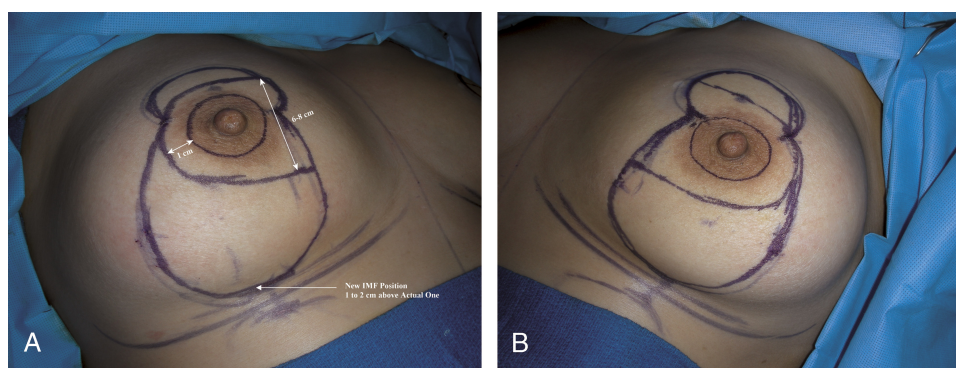

FIGURE 4. A and B, Intraoperative marking of the pedicle as well as the new level of IMF. Please note that the new level of IMF after should be 1 to 2 cm above the actual level of IMF depending on the amount of reduction.

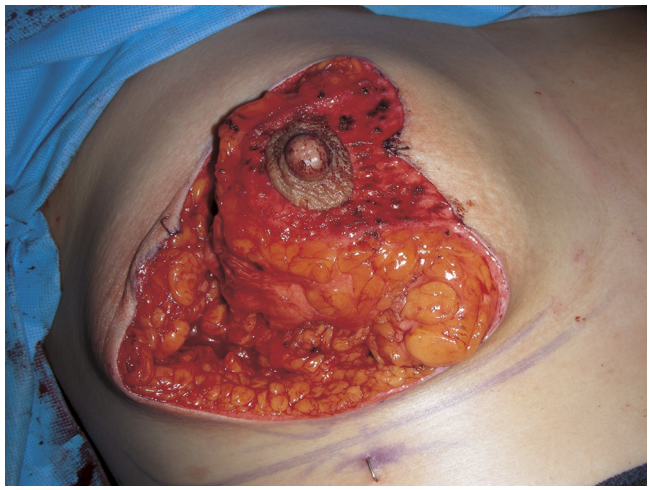

FIGURE 6. Intraoperative view showing the completion of the right breast resection before the pedicle inset and vertical closure.

In general, the complications after this type of breast reduction are much less common. One relatively common complication after the medial pedicle vertical breast reduction is delayed wound healing in the purse string area. Depending on one's healing potential and degree of defatting that is performed, the patient may develop some skin necrosis in the area. This kind of complication usually just requires prolonged local wound care and can be managed in the office with proper dressing changes. No reoperation is ever required. Occasionally, the patient may develop a hematoma or seroma just like after any type of breast reduction surgery. These complications can be managed accordingly with evacuation of hematoma or seroma in the office or in the operating room.

The surgical revision to excise additional excess tissue and to improve the contour in the lower pole of the breast has been rare in the author's practice because the excess tissue in the lower pole of the breast has been managed with aggressive defatting and purse string skin closure in the operating room. In general, the purse string closure site heals quite well, and the scar can become more flat and less visible during longer time follow-up.

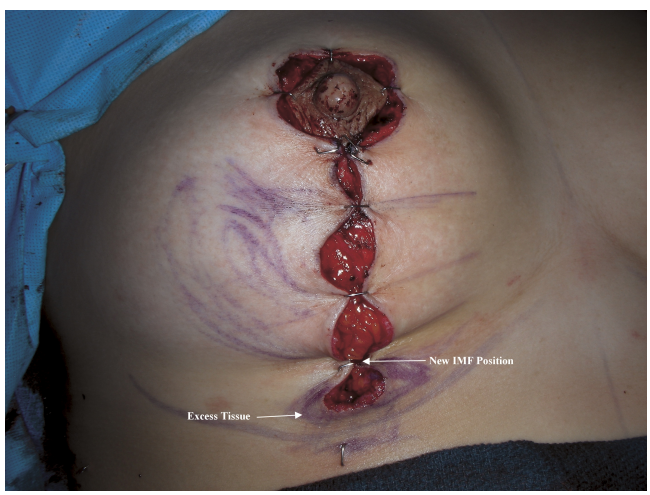

FIGURE 7. Intraoperative view showing the temporary completion of the pedicle inset and vertical closure. In this breast, the new IMF is determined, and the excess tissue in the lower pole of the breast is outlined.

FIGURE 8. Intraoperative view showing the completion of the closure. Please note that the excess subcutaneous tissue in the lower pole of the breast is removed via defatting, and the excess skin is approximated via purse string suture. In this way, the contour of the lower pole after surgery appears to be satisfactory.

Case example

The patient was a 38-year old white woman with some breast asymmetry who desired to have breast reduction for symptomatic macromastia (Figs. 10A–C). Because of her good skin condition and well-maintained shape of the breast, she was offered a medial pedicle vertical breast reduction (Fig. 11). Her surgery went well, and the total amount of breast tissue removed from her right breast was 475 g and from the left breast was 330 g. Her postoperative course was quite uneventful; the patient had a primary healing of all incisions.

FIGURE 9. Intraoperative view showing the immediate results after bilateral medial pedicle vertical breast reductions in the same patient. Please note that the contour of the lower pole for both breasts appears to be satisfactory on the operating room table.

FIGURE 10. A–C, Preoperative view of the patient who was selected for the medial pedicle vertical breast reduction.

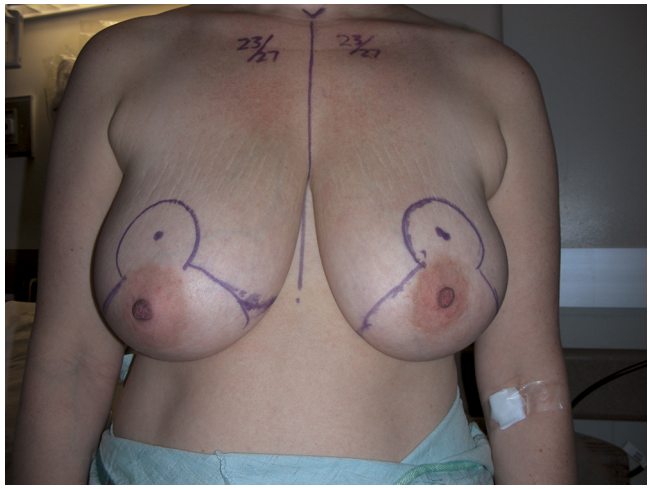

FIGURE 11. Preoperative view showing the preoperative marking of the breasts for the patient.

Both patient and surgeon are quite happy about the overall outcome with functional improvement during her follow-up (Figs. 12A–D).

DISCUSSION

The medial pedicle breast reduction, if performed properly with good patient selection and the refined surgical techniques especially for the management of excess tissue in the lower pole of the breast, can provide each patient with very satisfactory outcome both functionally and cosmetically.[3–6] The patient selection, special considerations of the breast reduction technique, preoperative and intraoperative markings, and the intraoperative excursion and postoperative care as well as the management of the complications are all essential components so that an optimal outcome after the medial pedicle vertical breast reduction can be achieved.

It had become clear that the medial pedicle vertical breast reduction may not be good for every patient.[4,8,9] It has been the author's experience that the patient selection can be the first critical element to ensure the success of such an operation. The author believes that unlike that described by others,[1–3,10,11] the medial pedicle vertical

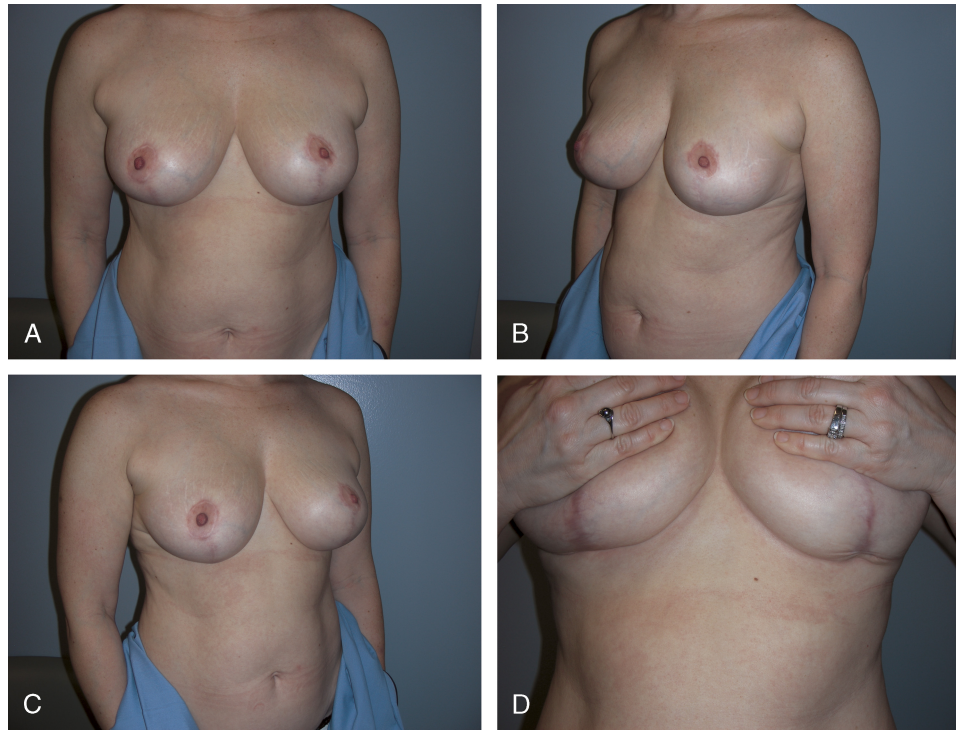

FIGURE 12. A–D, Results at 14-month follow-up.

breast reduction can only be indicated for certain patients who are relatively at a younger age but most importantly with a good skin condition of the breasts. Although this group of the patients may also have enlarged breasts, the shape of their breasts is basically maintained with no skin stretch marks. The distance between the nipple and the inframammary fold should be less than 12 cm, and their body mass index is nearly in the normal range besides their enlarged breasts. For patients who are relatively older and with poor skin conditions of their breasts and with almost an elongated shape of their breasts, the classic inverted "T" inferior pedicle breast reduction could provide these patients with much more predictable results, although extended scarring and bottom out appearance can still be the problems after this type of breast reduction.

The author would agree with others that there is a learning curve to perform the medial pedicle vertical breast reduction.[4,5] It is the author's opinion that the surgeon should be able to master one technique of breast reduction first and then gradually evolve to perform the medial pedicle vertical breast reduction. A number of intraoperative decisions by the surgeon can be critical to ensure an optimal outcome. It is important to be able to remove excess breast tissue in the lower pole of the breast right below the "new" inframammary fold. The excess amount of tissue should be identified first, and a careful defatting procedure can be performed to remove subcutaneous tissue in this location. A purse string suture can then be placed to fold the skin under the "new" inframammary fold. If the amount of excess tissue below the "new" inframammary fold appears to be more extensive and an "L" shape skin incision or a short inverted "T" skin extension can be added to remove more excess tissue in this location, so the contour of the lower pole after vertical skin closure can be acceptable.[4,9,12] The conventional liposuction can also be performed in the area under the "new" inframammary fold to remove excess adipose tissues under the skin as proposed by Hall-Findlay[3] and others.[7]

The management of complications is also critical to ensure an optimal outcome after the medial pedicle vertical breast reduction.[6,8] In the author's practice, the delayed wound healing in the skin purse string area may occur in about 20% of the patients. The management of these minor wounds would require more patient reassurance and prolonged local wound care. In general, such a wound would heal within 2 to 3 weeks, and no further scarring in the area is observed. Obviously, if the prominent scar is developed in this area or the contour of the lower breast appears to be less satisfactory to the patient or the surgeon, revision surgery can easily be performed in the office under local anesthesia. However, this kind of revision surgery has been very rare in the author's practice.

CONCLUSIONS

With proper patient selection, several refinements of the surgical technique, and proper management of postoperative complications, the medial pedicle vertical breast reduction can be performed safely and effectively with functional improvement and a pleasing long-term cosmetic result. The overall complications of this type of operation are less common compared with ones after the inferior pedicle inverted "T" breast reduction. Unfortunately, there is a learning curve to perform the medial pedicle vertical breast reduction. Nevertheless, such a breast reduction represents an evolving and promising technique for selected patients with micromastia. There is no doubt in the author's mind that this type of breast reduction will gradually replace the inferior pedicle inverted "T" technique for women who are good candidates for such a breast reduction.

REFERENCES

1. Lejour M, Abboud M. Vertical mammaplasty and liposuction of the breast. *Plast Reconstr Surg*. 1994;94:100–114.
2. Hall-Findlay E. A simplified vertical reduction mammaplasty shortening the learning curve. *Plast Reconstr Surg*. 1999;104:748–759.
3. Hall-Findlay E. Vertical breast reduction with a medially-based pedicle. *Aesthet Surg J*. 2002;22:185–194.
4. Karp NS. Medial pedicle/vertical breast reduction made easy: the importance of complete inferior glandular resection. *Ann Plast Surg*. 2004;52:458–464.
5. Chen C, White C, Warren S, et al. Simplifying the vertical reduction mammaplasty. *Plast Reconstr Surg*. 2004;113:162–172.
6. Spector J, Kleinerman R, Culliford A, et al. The vertical reduction mammaplasty: a prospective analysis of patient outcomes. *Plast Reconstr Surg*. 2006;117:374–381.
7. Akyurek M. Contouring the inferior pole of the breast in vertical mammaplasty: suction-assisted lipectomy versus direct defatting. *Plast Reconstr Surg*. 2011;127:1314–1322.
8. Adham M, Sawan K, Lovelace C, et al. Unfavorable outcomes with vertical reduction mammaplasty: part II. *Aesthet Surg J*. 2013;31:40–46.
9. Rinker B. Lowering revision rates in medial pedicle breast reduction by the selective addition of "inverted-T" technique. *Aesthetic Plast Surg*. 2013;37:341–348.
10. Lista F, Ahmad J. Vertical scar reduction mammaplasty: a 15-year experience including a review of 250 consecutive cases. *Plast Reconstr Surg*. 2006;117:2152–2165.
11. Neaman K, Armstrong S, Mendonca S, et al. Vertical reduction mammaplasty utilizing the superomedial pedicle: is it really for everyone? *Aesthet Surg J*. 2012;32:718–725.
12. Kuran I, Tumerdem B. Vertical reduction mammaplasty: preventing skin redundancy at the vertical scar in women with large breasts or poor skin elasticity. *Aesthet Surg J*. 2007;27:336–341.