

How to Avoid Nipple Necrosis in Lifting and Reduction Mammoplasties

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ABSTRACT

Partial or complete nipple areolar complex (NAC) necrosis following breast reduction mammoplasties is an overwhelming complication for both the plastic surgeon and the patient. Its reported incidence vary from 2% for full-thickness necrosis to 11% for superficial epidermolysis. Early identification and management of NAC vascular insufficiency is important in order to avoid total NAC loss. The Total Posterior Pedicle breast reduction technique described by Richard Moufarrege in 1982 consists of dissecting the skin away from the breast tissue offering free access to all breast quadrants. This technique is known for its preservation of the breastfeeding function, for its conservation of the nipple erogenous sensation, and for its low rate of long-term complications such as pseudoptosis. In this article, we demonstrate that the Moufarrege Total Posterior Pedicle has an absolute secure blood supply to the NAC and no risk of NAC necrosis.

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1. INTRODUCTION

Lifting and breast reduction mammoplasties are known to be associated with a significant risk of partial or complete necrosis of the nipple areolar complex (NAC) (1). Classically, traditional techniques of mammoplasty always had a risk of necrosis of the NAC. Considering the studies on millions of cases, necrosis is a very inherent constancy in this surgery (2). The incidence of this serious complication ranges between 2% and 10 %, depending on the technique used and the performed surgery (1,3). In this context of ubiquitous risks in a procedure where necrosis stands as a Damocles sword over the head of surgeons, the author of the Moufarrege Total Posterior Pedicle has proven his technique to completely eliminate the risk of NAC necrosis.

2. PHYSIO-ANATOMY

Breast vascularization emanates from multiple sources and could be detailed as follows (4).

Skin vascularization:

The skin vascularization is completely independent from the rest of the gland. It is starting from this knowledge that comes the principle of undermining the skin without consequence;

this is seen in total mastectomies and in the Moufarrege Total Posterior Pedicle mammoplasty (5). Skin blood supply comes from a network of subcutaneous arteries and veins; there are obviously some frail connections between this skin blood supply and the gland (6). In other words, if the gland had to take a part of its vascularization from the subcutaneous network, this wouldn't constitute more than 3-5 % of its total vascularization (4).

Gland vascularization:

It comes from two main sources and a third accessory source:

- The most important source of vascularization of the gland comes from the perforators and constitute around 80% of its vascularization (fig.1).
- The second source of less importance is the thoraco-dorsal network that supplies the gland by its superior-lateral aspect or Tail of Spence. It constitutes around 15% of the gland's vascularization.
- The third source of much less importance comes from the vascular connections with the subcutaneous network, which constitutes 3-5 % of the gland's vascularization (fig.2).

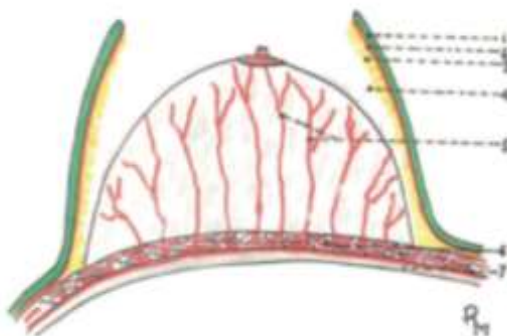


Fig.1: The two systems of vascularization in the breast. 1. Skin 2. Subcutaneous vessels 3. Subcutaneous fat 4. Tiny connections between the two vascular systems 5. Intrinsic vascularization originating from the perforators 6. Thoracic muscles 7. Rib



Fig.2: Schematic transverse section showing perforating vessels and their radial distribution in the breast. Note the poor horizontal connections.

3. VASCULAR ANATOMY OF THE NAC (NIPPLE-AREOLAR COMPLEX) IN EACH TYPE OF PEDICLES:

Superior pedicles (superior-medial and superior-lateral):

The superior pedicles usually rely on a subdermal plexus to supply the NAC with blood. Here, the supero-lateral pedicle has a big advantage over the superior-medial pedicle thanks to the blood flow emanating from the Thoraco-dorsal artery. Including breast tissue in the pedicle could add an improved

contribution of the thoraco-dorsal network (7) (fig.3). Knowing that the latter provides around 15 % of the whole breast vascularization, we can evaluate the blood supply maintaining the NAC alive somewhere between 5 and 10 % of what it should be in a non-operated breast NAC (4). The superior-medial pedicle has less chance to be enriched by the blood flow provided by the thoraco-dorsal artery. This latter thus could be the least rich in term of irrigation for the NAC (fig.4).

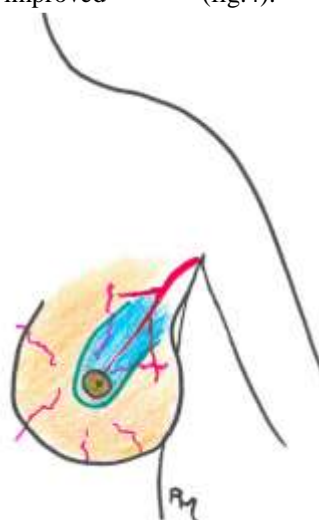


Fig.3: The superior-lateral pedicle is marked in blue. Note the contribution of the thoraco-dorsal artery.



Fig.4: The superior-medial pedicle is marked in blue. No contribution of the Thoraco-dorsal network

The Pitanguy-type superior pedicle is probably the richest, irrigation wise, of all superior pedicles, having its base wider than the two latter, and taking advantage of the random flap irrigation provided by the tiny subcutaneous blood vessels network, in addition to a fraction of the thoraco-dorsal artery

blood supply (4) (fig.5). Be that as it may, surgeons who decide to perform their mammoplasty with a superior pedicle must be very prudent with the way they place their tissues. They should avoid kinking of the pedicle in order to avoid depriving the NAC from an already weak blood supply

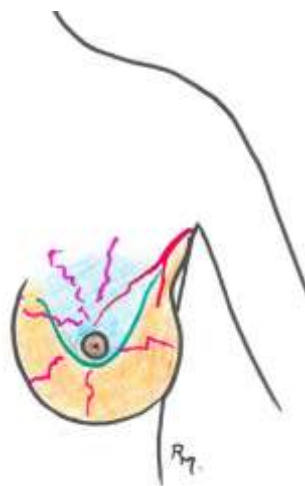


Fig.5: The Pitanguy superior pedicle is marked in blue.

If we consider as 100 % the nipple blood supply in a non-operated breast, we would expect blood supply in upper pedicles as follow: 5% in the pure random pedicle (the superior-medial one); 10 to 12 % in superior-lateral pedicle thanks to the participation of the thoraco-dorsal network; and up to 15 % in the Pitanguy-type superior pedicle taking advantage from the random flap as well as the Thoraco-Dorsal network (4).

Posterior Septal pedicle:

The nipple-areola complex is vascularized by a network of vessels that come from the perforators. This septal pedicle

contains a certain number of the perforators system, and its width will depend on the operating surgeon and the way the technique is applied (9). Roughly we can evaluate the proportion of the vessels participating in the vascularization of the nipple in this pedicle as presenting 10 to 20 % of the whole perforating vascular system (5). This latter is known to provide around 80% of the vascularization of the whole gland (fig.6). We thus can evaluate the nipple blood supply coming from that septal Pedicle as 8 to 16 % of the normal nipple blood supply in non-operated breasts.

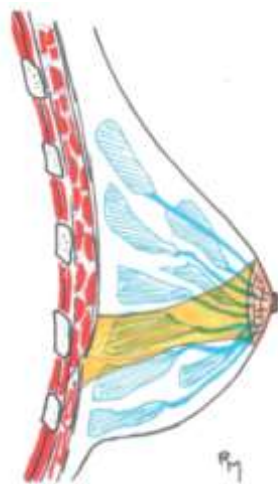


Fig.6: The posterior septal pedicle.

Inferior Pedicles

McKissock

Created in 1973, the McKissock double pedicle in which the inferior part is the most important constitutes 15% of the total remaining gland after reduction. The superior part of the pedicle, in our opinion, doesn't contribute to any vascular supply of the gland (5) (Fig. 7). This inferior pedicle drains

arteries emanating from the perforators which, in turn, are branches of the internal mammary artery. Considering that the perforators provide around 80% of the whole breast vascularization in non-operated breasts, we can conclude that the vascular supply included in McKissock pedicle constitutes around 12 to 13 % of the initial blood supply of the nipple in non-operated breasts.

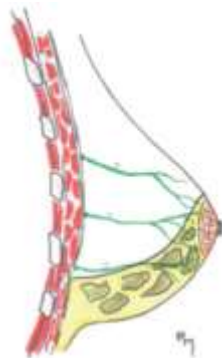


Fig.7: McKissock inferior pedicle

Robbin

In 1979, Robbin modified the McKissock pedicle, increasing its size to 25% of the volume of the remaining breast, giving

a vascular capacity for the nipple areolar complex of 25% of the perforators, which is 20% of the normal vascularization of the nipple before the surgery (5) (fig.8).

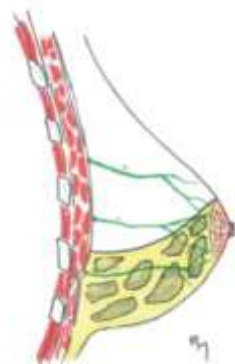


Fig.8: Robbin Inferior Pedicle

Moufarrege Total Posterior Pedicle

The Moufarrege Total Posterior Pedicle preserves the totality of the remaining gland in the pedicle, and the pedicle receives all the perforators except the external extremity of the breast (10). Sculpturing the Total posterior pedicle is performed

according to an aztec pyramid keeping its base wide, thus allowing the pedicle to contain the majority of the perforators (fig.9). We can estimate the vascularization of the Nipple areolar complex to around 70% to 75 % of the pre-operative blood supply. This gives the capacity to the pedicle to insure

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a very important, if not absolute, security for the nipple survival (5). **On a total number of 10,000 operated breasts**

with the Moufarrege Total Posterior Pedicle we had no one single nipple-areola complex necrosis.

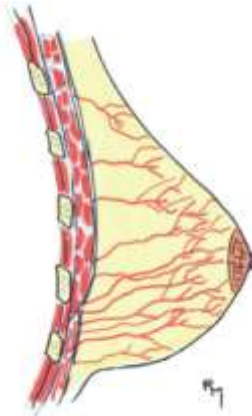


Fig.9: The Moufarrege Total Posterior Pedicle.

4. DISCUSSION

If we consider the nipple-areola complex blood supply in non-operated breasts as 100%, we can state that the vascular supply of the nipple after surgery will be:

- 1.- 5% in the pure random pedicle (the superior-medial one);
- 2.- 10 to 12 % in superior-lateral pedicle.
- 3.- up to 15 % in the Pitanguy-type superior pedicle.
- 4.- 8 to 16 % in Septal Posterior pedicles.
- 5.- 12 to 13 % in McKissock pedicle.
- 6.- 20 % in Robbins pedicle.
- 7.- and finally **70 to 75 % in the Moufarrege Total Posterior Pedicle.**

It is thus not surprising, considering these levels of remaining vascularization of the nipple after surgery, to have an impressive incidence of necrosis in the above 6 first types of pedicles varying from 2 to 10%.

5. CONCLUSION

Only the mammoplasty with the Moufarrege Total Posterior Pedicle can, if well executed, eliminate all risks of necrosis of the nipple.

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