Abdominal Based Free Flap Breast Reconstruction: Stratifying Complications with Perforator Numbers

Jenny Wang, Samar Kayfan, Michael Zhou, Sumeet S. Teotia M.D., Nicholas T. Haddock M.D.
Department of Plastic Surgery, UT Southwestern Medical Center Dallas, TX, USA

Background

As autologous breast reconstruction gains popularity amongst breast cancer patients, the Deep Inferior Epigastric Artery Perforator (DIEP) has become the preferred method. Thus, the need arises to optimize DIEP techniques so as to improve patient outcomes and minimize operational morbidities. Single perforator flaps in breast reconstruction have been reported to have increased rates of fat necrosis, particularly in the cases of large flap weight. We were motivated to evaluate our experience and the effect of number of perforators on DIEP flap complications and donor site morbidity.

Methods

199 patients underwent 328 DIEP flaps by two surgeons from 2010 to 2016 at a university hospital. Perforator selection was guided by CT imaging and clinical observation. First, perforator average size was compared among flaps with 1 perforator (n= 110 flaps), 2 perforators (n= 136 flaps), and 3 perforators (n= 82 flaps). Next, flap-related complication rates were compared among the same three perforator groups. Rates of fat necrosis, flap failure, and abdominal bulging were analyzed. In addition, the rate of postoperative abdominal bulge necessitating surgical intervention was compared between cases utilizing multiple perforators and cases utilizing a nerve-preserving type flap harvest.

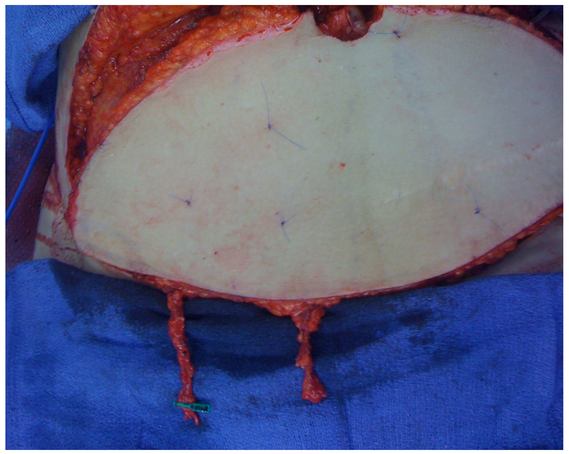

Figure 1. Exposure of the right superficial inferior epigastric artery/vein and the medial right superficial inferior epigastric vein.

Results

Average perforator size significantly decreased as the number of perforators increased (1 perforator = 2.11mm, 2 perforators = 1.80mm, 3 perforators = 1.65mm, p-value = 0.02 and 0.01 for 1 versus 2 perforator flaps and 1 versus 3 perforator flaps, respectively). However, no significant differences were noted in fat necrosis, flap failure, and abdominal bulging rates across perforator groups. Additionally, flap weights were not significantly different across the three groups (Average: 1 perforator-774 grams, 2 perforators-797 grams, and 3 perforators-749 grams). Neither perforator number nor nerve preserving techniques were found to result in significant decreases in abdominal bulge rates.

Figure 2. Before (left) and after (right) mastectomy and autologous DIEP flap breast reconstruction. Patient underwent mastectomy and subsequent reconstruction with DIEP flap on the right breast. Results shown after two years.

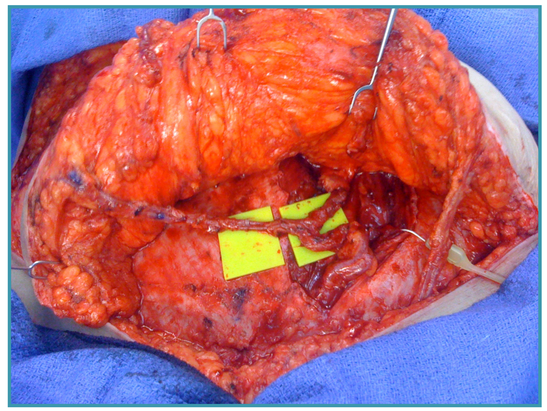

Figure 2. Intra-flap anastomosis shown overlying the abdomen. The right superior inferior epigastric vessels are exposed and anastomosed to the right deep inferior epigastric vessels. Furthermore, the left deep inferior epigastric vessels are exposed and providing perfusion to the flap.

Conclusion

Contrary to other studies, we found that the number of perforators harvested in DIEP flap breast reconstruction was not associated with increase or decrease in flap survival or fat necrosis. This occurrence could be attributed to the surgeons' choosing to proceed with single perforator flaps only when perforator size was adequately large, maintaining consistent blood supply. There was no association among perforator number, utilization of nerve sparing procedures, and abdominal bulge that required subsequent surgical intervention. Despite this, we still cautiously advocate nerve-preserving techniques that may have a subclinical effect.