GUIDELINES

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Letters

Optimizing Perforator Selection: A Multivariable Analysis of Predictors for Fat Necrosis and Abdominal Morbidity in DIEP Flap Breast Reconstruction

Sir:

It was with great pleasure that we read the interesting article by Hembd et al.[1] entitled "Optimizing Perforator Selection: A Multivariable Analysis of Predictors for Fat Necrosis and Abdominal Morbidity in DIEP Flap Breast Reconstruction," and we congratulate the authors on their thoughtful study. With the persistent efforts to reduce perfusion-related complications and donor-site morbidity, abdominally based free flaps have improved tremendously, and the deep inferior epigastric artery perforator (DIEP) flap has become the most common form of autologous breast reconstruction. Because the DIEP flap is elevated with only a few perforators, its perfusion relies on perforator characteristics. Therefore, perforator selection needs to be cautious, taking into account several aspects, including size, location, and spacing of the perforators. Needless to say, it would be convenient to harvest dominant sizable perforators for better flap perfusion.

Basically, we are used to always choosing the largest perforator. When the dominant perforator is greater than or equal to 3 mm in diameter on angiographic computed tomography, harvesting of a flap based on this single perforator is planned and performed if it is sufficiently large and has visual pulsation intraoperatively (Fig. 1). When no perforators 3 mm or larger are identified, elevating multiple perforator-based DIEP flaps is planned using relatively large perforators. Intraoperatively, the hypothetical perforators are compared for size and visual pulsation, and two or three notable perforators are chosen that are less restricted by their

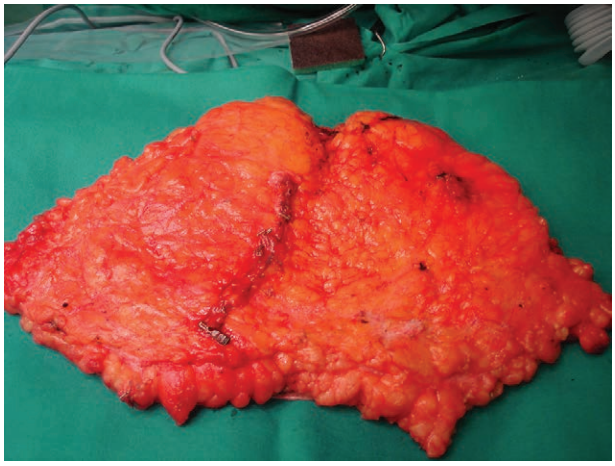

Fig.1. Intraoperative photograph of a single-perforator DIEP flap (medial row perforator).

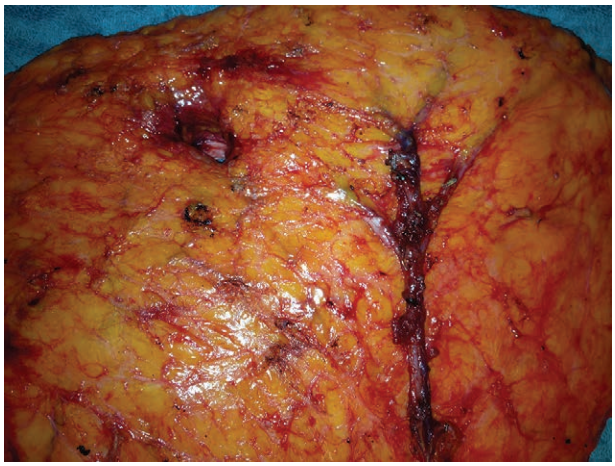

Fig. 2. Intraoperative view of a three-perforator DIEP flap (medial and lateral row perforators).

location and row (Fig. 2). Ideally, if small perforators are found near the main pedicle and are derived from the same row with the selected ones, they are incorporated in the flap. After performing the microvascular anastomosis, we inset the flap, and the entire Hartrampf zone IV is discarded and variable portions of zone II and III are removed until bright red bleeding is seen. In contrast, all flaps performed by the authors were single DIEP hemiflaps for either bilateral or unilateral breast reconstruction. In this way, bearing in mind that lateral row perforators are usually limited to the hemiabdomen, we can explain the reduced odds of fat necrosis for lateral row perforators with consequent better perfusion, because their location results in a more central location compared with medial row–based flaps.

Furthermore, we would like to remember that vertical location and spacing of the perforators are also important for the outcomes of DIEP flap breast reconstruction. Saint-Cyr et al.[2] recently found that flaps based on perforators placed eccentrically in the upper portion could have higher risks of perfusion-related complications, including fat necrosis, compared with flaps with concentric perforators or perforators located in multiple parts. It is known that perfusion of a single perforator can easily capture adjacent perforasomes by means of linking vessels.[3] Given that those linking vessels are usually directed perpendicular to the midline and follow a transverse direction in the lower abdomen, perforasomes in DIEP flaps can be expanded transversely, but their extension might be limited in the vertical direction. It can be assumed that perforators located eccentrically in the cephalic portion of the flap might not provide sufficient perfusion to the distal caudal portion of the flap. Therefore, the caudal portion of the flaps might not be nourished sufficiently by the eccentrically and cranially located perforator, leading to the high risk of developing fat necrosis. For these reasons, when the dominant perforator is located eccentrically, inclusion of additional perforators in the caudal portion of the flap might be convenient for reducing the risk of fat necrosis. Moreover, flaps based on lateral row perforators showed a significantly higher rate of overall perfusion-related complications compared with those based on the medial row or both rows. In conclusion, the authors are to be congratulated for their multivariable analysis that elucidated the predicting factors for fat necrosis and abdominal morbidity, optimizing outcomes in patients undergoing DIEP flap breast reconstruction.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of their communication.

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Reply: Optimizing Perforator Selection: A Multivariable Analysis of Predictors for Fat Necrosis and Abdominal Morbidity in DIEP Flap Breast Reconstruction

Sir:

We thank the authors for sharing their experience, their approach to perforator selection, and the poignant comments regarding our article[1] that aimed to identify factors that correlate with fat necrosis and abdominal morbidities in deep inferior epigastric artery perforator (DIEP) flap breast reconstruction. Our results, which showed that perforator row, total flow rate (a surrogate for perforator diameter transformed by the Poiseuille equation), and flap size all had significant and independent effects on fat necrosis, support their described algorithm, which considers the role of both size and anatomical location of perforators.

Moreover, we agree with their insightful comments regarding the idea that medial row perforators are likely more eccentric in our specific cohort that only included hemiabdominal flaps (no abdominal tissue contralateral to the midline for a single pedicle). This is indeed a possible anatomical explanation for the increased odds of fat necrosis when the flap was based on only the medial row. We would also hypothesize that including the medial row would improve perfusion in an extended DIEP flap (inclusion of contralateral zones III/IV), particularly if not using a double-pedicled flap design.

Including only DIEP hemiabdominal flaps, however, provided a standardized perfusion zone for a given single pedicle, and thus limited the potential confounding effect of including variable amounts of contralateral abdominal tissue in our analyses on fat necrosis. It is also germane in the growing percentage