

Discussion**The Influence of Pfannenstiel Incision Scarring on Deep Inferior Epigastric Perforator**

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In this retrospective study, the authors evaluated whether a previous Pfannenstiel incision would change perforator flap anatomy based on the deep inferior epigastric perforator flap. They studied 34 patients from each group (Pfannenstiel incision group vs. control control) over a three-year period. Preoperatively computed tomography (CT) angiography was performed in each patient and the number of perforators (> 1 mm) were counted and used as an end point of the study. They found that there was no statistical difference in the number of perforators in the Pfannenstiel incision group compared with the control group. The authors also found that the Pfannenstiel incisions with history of multiple caesarian sections were not associated with the decreased number of perforators in the deep inferior epigastric artery system. Both study groups have no flap loss and the reconstructive outcome is essentially the same from each group. Based on their study the authors have concluded that a Pfannenstiel scar is not associated with any changes in terms of number of perforators in the deep inferior epigastric artery system. An abdominally based deep inferior epigastric perforator (DIEP) flap appears to be safer even in patients who have had multiple Cesarean sections through pfannenstiel incisions [1].

Whether previous pfannenstiel incisions would change the number of perforators or anatomy of perforators based on the deep inferior epigastric vessels could be a critical decision preoperatively for this unique group of the patients. Obviously if a number of perforators or anatomy of perforators based on the deep inferior epigastric artery system has been altered from a previous Pfannenstiel Cesarean section, the perfusion to the flap based on these perforators can be compromised in a free DIEP flap or even a free transverse rectus abdominis myocutaneous (TRAM) flap. This can be especially true for Asian women since their body size are relatively small and a Pfannenstiel incision may, in theory, compromises to the perfusion of an abdominally based flap such as a free DIEP flap for a breast reconstruction.

Therefore, it is valuable to conduct such an important study to determine whether previous pfannenstiel incisions would have any impact on the perforators based on the deep inferior epigastric vessels in terms of the number of perforators or the anatomy of those perforators.

Before the surgeon performs an abdominally based breast reconstruction, especially a DIEP flap, it is critical he or she is able to find out more information about those perforators prior to the flap elevation [2]. It is true that the number of perforators or anatomy of perforator based on each deep inferior epigastric vessel system may not be the same. It is the surgeon's responsibility to identify the dominant side (left vs. right) before raising a DIEP flap if such a flap can be based on more number of perforators, larger perforators, as well as potentially less intramuscular dissection. For example, use either medial or lateral row perforators and there are two or three sizeable (> 1.5 mm with visible pulsation) on each row. Occasionally, the flap can be based on one large para-umbilical perforator (> 2.5 mm with visible pulsation). Therefore, knowing the detailed information about perforator anatomy would be critical to safely elevate a free DIEP flap. Besides knowing the size and location of the perforator, the flow-status of each selected perforator is much more important than simply the total number of perforators identified preoperatively by CT scan.

Although some surgeons prefer to use the preoperatively CT angiography to evaluate perforator anatomy prior to the breast reconstruction [3], I have found it is quite useful to use a Duplex scan to evaluate the perforators in the lower abdomen (Fig. 1) [4]. This type of study is often done in the operating room, prior to the skin incision. The surgeon could have direct interaction with the vascular technologist and in general the location of a number of important perforators can be identified [5]. In addition, the flow status of each perforator can be assessed. In this way the surgeon can decide which side of the DIEP flap can be raised. Obviously, if two or three large perforators can be identified in either medial or lateral row of the rectus abdominis muscle, a DIEP flap should be elevated in this selected side since more number and bigger size of the perforators with higher flow within this "dominant" side (Fig. 1). With knowing the perforator anatomy in such a detailed fashion, the surgeon can quickly and safely complete an elevation of a DIEP flap. Occasionally, a septocutaneous perforator can be identified and this would make the flap dissection relatively easy. However, there can still be some variations and incidental intra-operative findings during the flap dissection. The surgeon should have to prepare for



Fig. 1. An intraoperative view shows identified perforators from the patient's lower abdomen based on a color Duplex study. All perforators have been mapped but it is obvious that the deep inferior epigastric perforator flap should be chosen from the patient's left side because it is the "dominate" side with 2 or 3 larger perforators in the medial row. In this patient, the inferior epigastric vessels are also identified with the color Duplex study.

those anatomical variations of perforators and make a proper intra-operative judgment in terms of perforator dissection during an elevation of a free DIEP flap.

The authors should be congratulated to conduct such an important study. I believe the findings of this study can be another contribution to the plastic surgery literature because a number of perforators have not been changed significantly in the patients with a Pfannenstiel incision and elevation of a free DIEP or TRAM flap appears to be safe in this unique group of the patients at least based on this retrospective study. However, the conclusion based on the present study may be more meaningful if location of these perforators as well as the size or even the flow status of those perforators can also be evaluated. In addition, since the degree of tissue undermining for each Pfannenstiel incision can be quite different, the surgeon has to be cautious if pa-

tient had a multiple previous Pfannenstiel incisions because occasionally the extent of surgical dissection might have been quite extensive and the inferior epigastric vessels could have been transected. Any lower abdominal or groin incisions should be evaluated carefully since the inferior epigastric vessels could have been transected during an open inguinal hernia repair.

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