

Use of Vein Grafting to Overcome Stenosis of Deep Inferior Epigastric Artery

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Computed tomography (CT) analysis can facilitate abdominal flap harvest when there is aberrant anatomy in the deep inferior epigastric (DIE) system. Many patients undergoing breast reconstruction have some history of abdominal or pelvic surgery, including Caesarean section, liposuction, anterior approaches for spine surgery, or open appendectomy. The resulting vascular stenosis or occlusion can be identified on preoperative imaging and reconstructed with vein grafting if perforator anatomy to the DIE system is preserved, thus avoiding extra-abdominal flap harvest in the large-breasted bilateral reconstruction patient with an otherwise formidable bank of abdominal tissue (Fig. 1).¹ (See figure, Supplemental Digital Content 1, which shows the Axial CT section of right DIEA with the presence of contrast within cranial pedicle. <http://links.lww.com/PRSGO/B880>.) (See figure, Supplemental Digital Content 2, which shows the axial CT section of right DIEA with void of contrast in pedicle at this level. <http://links.lww.com/PRSGO/B881>.) (See figure, Supplemental Digital Content 3, which shows the axial CT section of right DIEA with the presence of contrast within caudal pedicle. <http://links.lww.com/PRSGO/B882>.)

Although extra-abdominal donor sites do exist, thigh scar placement, stacked breast reconstruction, and/or intraoperative repositioning may be necessary to replace mastectomy volumes when abdominal tissues cannot be harvested. Arguably, these advanced reconstructive options require greater time and morbidity when compared with a vein graft harvest and anastomosis. In consideration of this reality, but also for the purposes of perforator selection and surgical planning, experienced breast reconstruction surgeons routinely order preoperative CT angiography.¹

Vein grafts have been used as a salvage option when intraoperative difficulties are encountered, such as for intraflap anastomosis to augment arterial perfusion or venous drainage in cases of superficial dominant flap circulations or bipedicle flaps, perforator injury or inadequacy, vessel injury, and short pedicles at the time of inset. Technically, it is important to reverse valved donor veins before anastomosis to avoid flow against valved systems. When additional donor sites are not preferred, harvest from redundant banks of vein within the operative field may be advisable. Contralateral unused DIE or superficial inferior epigastric vessels (artery or vein) within the abdominal field or the lateral thoracic or thoracodorsal branches within the mastectomy pocket can be used.^{2,3} Longer vein grafts can be harvested from the extremities such as the dorsum of the foot or the saphenous systems.⁴ (See figure, Supplemental Digital Content 4, which shows the pedal vein and lesser saphenous vein graft harvest. <http://links.lww.com/PRSGO/B883>.)

Before planning for vein graft harvest, collateral pedicles (such as the deep circumflex iliac, superficial inferior epigastric, superficial circumflex iliac, and intercostal vessels) should be interrogated. In the case of a long-standing stenotic pedicle, collateral vasculature may become dominant in the flap. Intraoperative perfusion assessment can be performed by applying a temporary vascular clamp before dividing vessels. Depending on flap lie, it may also be more practical to select alternative recipient vessels, such as the cephalic vein turn-down or the thoracodorsal system, than to proceed with longer vein grafts.⁵ These options should be considered before committing to vessel harvest outside the surgical site.

In summary, for cases where pedicle discontinuity exists, a vein graft can be planned to add the pedicle length necessary to permit abdominal flap harvest as long as the dominant perforators are in line with a healthy segment of pedicle. To clarify, this article does not advocate taking patients to surgery for DIEP flap categorically when aberrancies in the deep inferior epigastric system exist, but an appropriate discussion and planning can be undertaken with the patient, in particular when large volume transfers or bilateral reconstructions are planned.

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Received for publication October 4, 2021; accepted November 3, 2021.

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Plast Reconstr Surg Glob Open 2022;10:e4021; doi: 10.1097/GOX.0000000000004021; Published online 12 January 2022.

Disclosure: The authors have no financial interest in relation to the content of this article.

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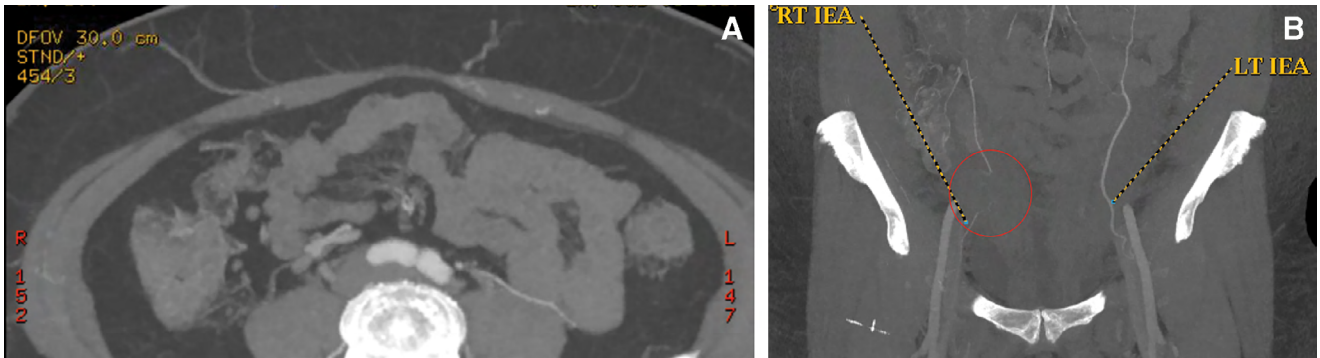


Fig. 1. CT showing DIEA flow void, the so-called DIEA interruptus. A, Large, peri-umbilical perforators are noted on CT angiography. B, Anteroposterior view showing stenosis in the right inferior epigastric artery. This patient went on to have successful bilateral autologous breast reconstruction from the abdomen with 1000 gram flaps using vein grafts from the dorsum of the foot to replace the stenotic segment of the DIE artery.

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