

Evidence Discussion (BR 3.1)

The American College of Radiology (ACR) Appropriateness Criteria state that either MRA abdomen and pelvis with and without IV contrast and CTA abdomen and pelvis with IV contrast are usually appropriate for preoperative planning in patients undergoing DIEP flap breast reconstruction.² Studies have found CTA mapping results in a shorter operative time when compared with no mapping in cases of breast reconstruction with free-tissue flap transfer (e.g., with Deep Inferior Epigastric Perforator (DIEP) flaps).¹

In contrast, routine use of CTA chest to evaluate for recipient vessels (often the internal mammary vessels) is not indicated. This is because a number of studies have found that the anatomy and course of these vessels is largely consistent, and that there is good concordance between surgical and radiological findings – either with ultrasound or CTA.³ CTA, however, carries with it significant risks, including contrast nephrotoxicity and allergic reactions, and the significantly higher risk of radiation exposure in the chest than in the abdomen.⁴ As such, many surgeons will use hand-held Doppler ultrasound either pre- and/or intra-operatively to evaluate recipient vessels. In certain circumstances, such as with previous surgery and/or radiation that would be expected affect the candidacy of potential recipient vessels, preoperative CTA of the chest may be considered.

As pedicled flaps, by definition, do not require a microvascular anastomosis and are not disconnected from their blood supply, there is no current evidence to support routine preoperative imaging in these patients. A recent study evaluating the use of preoperative CTA in patients undergoing pedicled TRAM flap reconstruction found that there was no significant difference in terms of operative time nor flap loss in patients who had a preoperative CTA compared those who did not.⁵

References:

1. Wade RG, Watford J, Wormald JCR, et al: Perforator mapping reduces the operative time of DIEP flap breast reconstruction: A systematic review and meta-analysis of preoperative ultrasound, computed tomography and magnetic resonance angiography. *J Plast Reconstr Aesthet Surg* 71:468-477, 2018
2. ACR: Imaging of Deep Inferior Epigastric Arteries for Surgical Planning (Breast Reconstruction Surgery). ACR Appropriateness Criteria, 2022
3. Murray ACA, Rozen WM, Alonso-Burgos A, et al: The anatomy and variations of the internal thoracic (internal mammary) artery and implications in autologous breast reconstruction: clinical anatomical study and literature review. *Surgical and Radiologic Anatomy* 34:159-165, 2012
4. Rozen WM, Alonso-Burgos A, Murray AC, et al: Is there a need for preoperative imaging of the internal mammary recipient site for autologous breast reconstruction? *Ann Plast Surg* 70:111-5, 2013
5. Fong A, Park HS, Ross DA, et al: Preoperative planning of unilateral breast reconstruction with pedicled transverse rectus abdominis myocutaneous (TRAM) flaps: a pilot study of perforator mapping. *Gland Surg* 12:366-373, 2023