Analysis of the Deep and Superficial Inferior Epigastric Arteries Using Computed Tomographic Angiography: Relation to Abdominal Wall Thickness and Body Mass Index

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**Purpose:** Preoperative CT angiography (CTA) can be used for surgical planning for breast reconstruction utilizing free tissue transfer from the abdomen. Recent studies support a correlation between CTA and intraoperative vascular findings resulting in efficient and predictable operations and a higher chance of using flaps that maintain abdominal wall integrity such as superficial inferior epigastric artery (SIEA) or deep inferior epigastric artery (DIEA) perforator flaps. We report an anatomical study of the course and caliber of the DIEA and SIEA in a cohort of women, including the relationship of perforator caliber to abdominal wall anatomy.

**Methods:** Radiology records from January 2007 to May 2012 were searched. One-hundred four patients who underwent preoperative CTA were identified. Measurements included: SIEA and SIEV’s distance from midline and arterial caliber, DIEA entry into the rectus muscle, caliber at takeoff from the external iliac artery, perforator caliber, site of entry at the rectus sheath, and abdominal wall thickness (AWT). Locations were recorded as x and y coordinates relative to the umbilicus (x axis) and the pubic symphysis (y axis). Statistical comparisons were made between perforator size and AWT, BMI, and number of perforators within each hemi-abdomen.

**Results:** The SIEA was visualized unilaterally in 19 patients and bilaterally in 14 patients. The SIEA was on average 6.8±1.1 cm from midline and 25% of ASIS to ASIS and 1.4 mm in diameter proximally. The SIEV was on average 6±1.3 cm from midline and 22% of ASIS to ASIS. Most large caliber perforators (>2mm) were within a 6 cm radius of the umbilicus. Number of perforators per hemi-abdomen inversely correlated with mean arterial diameter (single perforator, 19±0.1 mm vs four perforators, 17±0.1 mm, p=0.03) as well as AWT and BMI.

**Conclusions:** This study adds insight to the anatomic configuration of the abdominal circulation, and the novel finding of the inverse relationship between number and caliber of perforators to AWT and BMI. The caliber and course of the vessels are predictable and related to number of perforators and abdominal girth. This may offer insight to the increased rate of ischemic-based complications including fat necrosis in patients with elevated AWT.

![Figure 1. Right DIEA entry](image1.png)  ![Figure 2. Left DIEA entry](image2.png)