PREOPERATIVE CT-ANGIOGRAPHY IN AUTOLOGOUS BREAST RECONSTRUCTION

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Background: CT-angiography (CTA) has been introduced as a means of evaluating arterial anatomy and vascular integrity prior to free autologous breast reconstruction. There is limited published data, however, regarding the incidence, indications, and impact of preoperative CTA (pCTA) on procedural and flap outcomes. *Methods:* Retrospective review was performed of all autologous microsurgical breast reconstruction procedures at a single academic center between January 2004 and July 2014. Univariate analysis of patient, procedural, and flap characteristics was performed and a logistic regression model was configured to assess for factors associated with ischemia-related complications. *Results:* There were 1,110 microsurgical flap reconstructions performed in 778 patients by 3 surgeons at our institution during the study period. Overall, 11.4% of patients underwent pCTA; frequency increased from 0 to 35.7%. Patients who underwent pCTA had significantly higher body mass index ($P = 0.041$), and more coronary artery disease ($P = 0.022$), prior abdominal surgery ($P = 0.004$), and bilateral reconstruction ($P = 0.015$). No statistically significant difference between groups was found with respect to flap characteristics or operative time. Multivariate analysis revealed that although pCTA was associated with a lower incidence of ischemia-related complications (complete or partial flap loss or fat necrosis) (OR, 0.57, 95% CI, 0.32 to 1.02), this did not reach statistical significance ($P = 0.058$). *Conclusions:* Use of pCTA has increased dramatically at our institution since it was first incorporated into the reconstructive surgical planning process in 2008. Given the expense, radiation exposure, and borderline impact on ischemia-related flap complications, surgeons should selectively consider pCTA as an adjunct to their surgical planning algorithm. © 2016 Wiley Periodicals, Inc. Microsurgery 00:000–000, 2016.

Perforator flap breast reconstruction has gained popularity over the past decade as a means of providing excellent aesthetic results with less donor site morbidity than muscle-based flaps.[1] Success of the reconstruction, however, relies upon accurate assessment of highly variable abdominal wall vasculature for flap design and harvest, prompting some surgeons to incorporate the use of CT Angiography (CTA) during the preoperative planning process. Benefits of preoperative (pCTA) for perforator assessment include excellent reproducibility, high-resolution, potential for 3D reconstruction, widespread availability, and high sensitivity and specificity.[2–5] Previous studies have reported significantly shorter operative times following pCTA as well as fewer subsequent flap complications.[2,6–9] Inherent risks of CTA are associated with iodinated contrast, ionizing radiation, and the potential for misinterpretation.[10–12]

There are limited published data regarding the frequency, indications, and impact of pCTA on outcomes; optimal criteria for obtaining pCTA in planning perforator flap breast reconstruction have not yet been established. As such, this study aims to evaluate the frequency in ordering pCTA for perforator flap planning, to determine patient characteristics most frequently referred for CTA, and to assess whether pCTA decreases ischemia related flap outcomes.

METHODS

Data Collection

Retrospective review of a prospectively maintained database was performed for all autologous microsurgical breast reconstruction procedures performed at a single academic center between January 2004 and July 2014. Collected data included patient characteristics, flap characteristics, and outcomes, as well as pCTA with the indication, "preoperative planning." Of note, patients who did not have pCTA did not have any alternative preoperative imaging for perforator evaluation. Patient characteristics included age, body mass index (BMI), coronary artery disease (CAD), hypertension, diabetes mellitus, previous breast surgery, previous abdominal surgery, current tobacco use, unilateral versus bilateral reconstruction, and primary surgeon; surgery characteristics were preoperative radiation, immediate versus delayed reconstruction, flap weight, and flap type; and flap outcomes including take-back to the operating room (OR), complete or partial flap loss, fat necrosis, and OR time. Institutional Review Board approval was obtained to maintain the prospective database for this study.

Age was determined as of the date of surgery. Previous breast surgery was defined as any prior operative procedure requiring a skin incision and involving the affected breast; core biopsies were not included. Previous

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