Computed Tomographic Angiography-Assisted Vascular Assessment of Internal Mammary Vessels

Julia A. Cook BS[1], Sunil S. Tholpady MD PhD[1,2], Arash Momeni MD[3], Rajiv Sood MD[1], Michael W. Chu MD[1]

[1]Indiana University, Division of Plastic and Reconstructive Surgery
[2]R.L. Roudebush Veterans Administration Medical Center, Division of Plastic & Reconstructive Surgery
[3]University of Pennsylvania, Division of Plastic Surgery

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INTRODUCTION: The internal mammary (IM) vessels are the most common recipient vessels in free flap breast reconstruction. The literature on IM vascular anatomy is limited by small sample sizes, cadaveric studies, or intraoperative changes. The purpose of this study is to assess IM anatomy in the context of vascular comorbidities using computed tomographic angiography (CTA).

MATERIALS AND METHODS: A retrospective review of 110 consecutive CTA studies of female patients was performed. Measurements of vessel caliber, distance of IM vessels to sternum, location of IMV bifurcation, intercostal height, and chest width were analyzed. Patient demographics and comorbidities were also reviewed.

RESULTS: The right IM artery and vein had a significantly larger caliber than the left side in all intercostal spaces ($p = 0.02$ and $p < 0.001$, respectively). A positive, statistically significant correlation was found between both skeletal chest width and BMI with IM vessel caliber at all intercostal spaces, bilaterally ($p = 0.02$, $p \leq 0.05$, respectively). There was no significant difference in IM vessel caliber in patients with hypertension or hyperlipidemia. However, the left IMA at the second intercostal space was significantly larger in diabetic individuals than in non-diabetic individuals ($p = 0.01$). The third ICS was < 1.5 cm in 25% of patients.

CONCLUSION: Understanding the anatomy, bifurcation, and caliber of internal mammary vessels can help preoperative planning of autologous, free flap breast reconstruction. On average, the internal mammary vein bifurcates at third intercostal space; patients with larger chest widths and body mass index had increased internal mammary vessel caliber, and 25% may not be candidate for rib-sparing techniques due to an ICS diameter of less than 1.5 cm.