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ABSTRACT SUBMISSION TITLE: *A3 - Evaluating Predictive Value of Anthropomorphic Indices in DIEP Flap Reconstruction Outcomes*

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Abstract Text:

PURPOSE:

Body Mass Index (BMI) has been commonly used to determine appropriateness for surgery. However, it fails to account for variations in lean mass and fat distribution, prompting the development of alternative anthropometric indices such as the Body Roundness Index (BRI), A Body Shape Index (ABSI), Body Adiposity Index (BAI), Conicity Index (CI), Abdominal Volume Index (AVI), Waist-Hip Ratio (WHR), and Waist-Height Ratio (WHtR). The present study evaluates which index best predicts adverse outcomes following deep inferior epigastric perforator (DIEP) flap surgery.

METHODS:

A retrospective cohort study was conducted on patients who underwent DIEP flap breast reconstruction between 2017 and 2023. Patient demographics and comorbidity data were collected. Hip and waist circumference were measured using standardized bony landmarks on preoperative imaging. These measurements, along with height and weight, were used to calculate the various anthropomorphic indices. Primary outcomes included complications requiring intervention, 90-day readmissions, hospital length of

stay (LOS), and total operative time. Univariable and multivariable regression models assessed the predictive utility of anthropometric indices, with statistical significance was set at $p < 0.05$.

RESULTS:

Of the 384 patients, 84 patients (21.9%) experienced complications requiring intervention, while 300 (78.1%) did not. Diabetes was significantly more prevalent in the complication group (15.5% vs. 6.7%, P = 0.010), while age, race and remaining comorbidities were comperable between groups. Complications differed significantly between BMI-based weight classifications (P < 0.001), occurring in 47 (34.8%) obese patients compared to 22 (15.7%) normal-weight patients.

On multivariate regression controlling for age, race, and diabetes, BMI (adjusted odds ratio (OR) =1.09, P < 0.001), BRI (aOR 1.26, P = 0.010), AVI (aOR 1.09, P = 0.01), and WHtR (aOR 88.66, P = 0.02) were significant predictors of overall complications. In addition, BMI (aOR 1.09, P = 0.04), BRI (aOR 1.55, P = 0.01), BAI (aOR 1.13, P = 0.01), AVI (aOR 1.17, P = 0.01), and WHtR (P = 0.01) were significant predictors of 90-day readmissions while BMI (β= 0.13, P = 0.02), BRI (β = 0.14, P = 0.010), AVI (β = 0.17, P = 0.001), WHtR (β = 0.12, P = 0.020), and WHR (β = 0.15, P = 0.01) were significant predictors of LOS. Only AVI significantly predicted longer procedure times (β =0.10, P = 0.01). ABSI and Conicity Index did not significantly predict any outcomes. Compared to BMI, both AVI and BRI demonstrated more robust predictive value for LOS (β = 0.17 and 0.14 vs 0.13 for BMI), and higher likelihoods for 90-day readmissions (aOR 1.17 and 1.55 vs. 1.09 for BMI). In addition, BRI showed a higher likelihood for complications requiring revision (aOR 1.26 vs 1.09 for BMI) while AVI alone predicted longer procedure times (β = 0.01 vs 0.07 for BMI) compared to BMI. These findings underscore the role of body composition and fat distribution in determining surgical risk. While WHtR and WHR also showed predictive value for complications and LOS, their clinical utility may be limited by the narrow range of observed values.

CONCLUSIONS:

BRI and AVI outperformed BMI in predicting complications, 90-day readmissions, and hospital length of stay following DIEP flap surgery, suggesting that incorporating these indices in preoperative assessments could improve risk stratification.