Comparison of Bioelectrical Impedance Analysis and Computed Tomography for Body Composition Changes in Asian Obese Patients after Bariatric Surgery

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BACKGROUND & PURPOSE

- The accuracy of BIA in obese patients has been controversial
- To validate the use of BIA in detecting body composition changes, especially for visceral fat, before and after bariatric surgery using CT as a reference method

MATERIALS & METHODS

- Retrospective study
- 48 Korean patients with a BMI of ≥ 35, or ≥ 30 with metabolic comorbidities who underwent bariatric surgery
- BIA and CT evaluation before and 6 months after the operation
- Skeletal muscle index (SMI) and visceral fat index (VFI), variables corrected for height, were compared between BIA and CT

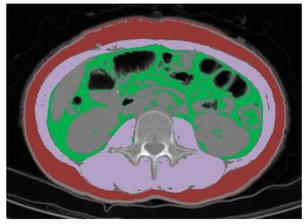


Fig 1. CT cross-sectional image
Red: subcutaneous fat
Pink: skeletal muscle
Green: visceral fat

RESULTS

- Significant decreases in VFI and SMI values in both BIA and CT perioperatively (all p<0.001)
- Greater VFI change compared to SMI in both modalities
- VFI % decrease underestimated in BIA due to underestimation of pre-op VFI values in BIA

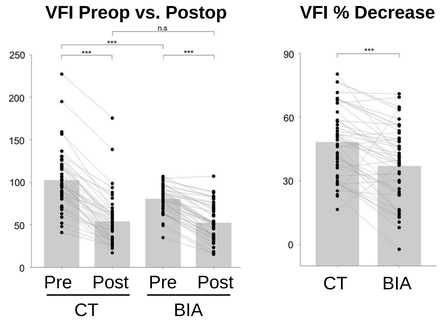
Table 1. % Decrease in CT and BIA

CT	
SMI (cm^2/m^2)	**10.4% (-8.8-27.0)**
VFI (cm^2/m^2)	**48.2% (16.5-80.2)**
BIA	
SMI (kg/m^2)	**10.3% (-5.0-26.5)**
VFI (cm^2/m^2)	**36.9% (-2.3-70.9)**

Table 2. Correlations

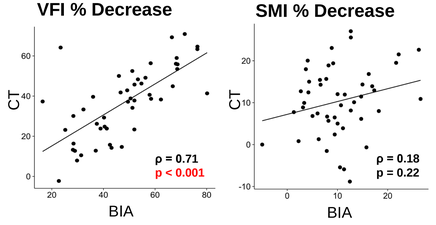
	VFI	SMI
Preop	ρ = 0.35 p = 0.01	ρ = 0.67 p < 0.001
Postop	ρ = 0.62 p < 0.001	ρ = 0.84 p < 0.001
% Decrease	ρ = 0.71 p < 0.001	ρ = 0.18 p = 0.22

Fig 2. Comparison of VFI change in CT and BIA



- Preop and postop VFI and SMI were significantly correlated
- But % decrease was significantly correlated in VFI only

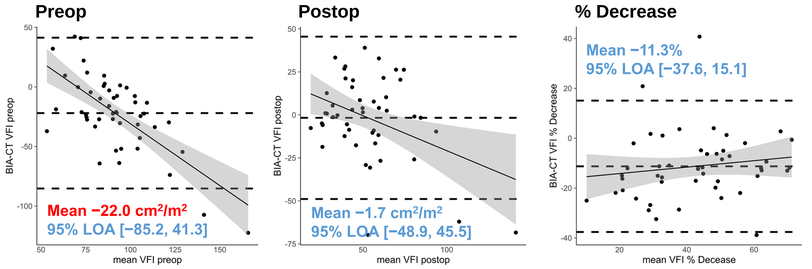
Fig 3. Correlations of % Decrease of VFI and SMI



RESULTS (Cont')

- BIA underestimated VFI, with a greater degree of underestimation in patients with higher VFI
- Negative slope with statistical significance in the preop (p < 0.001) and postop (p = 0.006) Bland-Altman plots
  ➔ greater underestimation in BIA with increasing VFI
- Preop underestimation of VFI in BIA (mean -22.0 cm^2/m^2)

Fig 4. Bland-Altman Analysis (BIA-CT)



CONCLUSION

- Despite the underestimation of BIA in measuring visceral fat, BIA VFI was associated with CT VFI
- SMI values showed significant correlations before and after surgery, but not with the percent decrease
- BIA can be a reliable tool for measuring body composition, especially for visceral fat, after bariatric surgery