Sarcopenic obesity and insulin resistance: application of novel body composition models

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Sarcopenic Obesity (SO) is characterized by the co-occurrence of high adiposity (HA) and low muscle mass (LM)[1] and it has been linked to insulin resistance, inflammation and increased cardio-metabolic risk[2,3]. This cross-sectional study investigated the association between markers of insulin sensitivity and SO defined using three novel body composition definitions: 1) body composition phenotypes; 2) truncal fat mass/appendicular skeletal mass ratio (TrFM/ASM) load-capacity; 3) fat mass/fat free mass ratio (FM/FFM) load-capacity[4,5].

314 participants (18–65 years) were included. Body composition was assessed by dual-energy-X-ray absorptiometry and stratified into four body composition phenotypes: Low Adiposity- High Muscle mass (LA-HM), High Adiposity- High Muscle mass (HA-HM), Low Adiposity- Low Muscle mass (LA-LM) and High Adiposity- Low Muscle mass (HA-LM). Subjects were also stratified into three centile groups: <15th, 15th-84th and ⩾85th centile groups for TrFM/ASM and FM/FFM load capacity definitions[4,5]. Glucose tolerance was assessed using a 2-hour oral glucose tolerance test (OGTT) and insulin sensitivity was calculated using the Matsuda Index[6].

Lower insulin sensitivity was observed in the HA-LM ($p < 0.001$), as well as in the ⩾85th centile groups of the TrFM/ASM ratio ($p < 0.001$) and the FM/FFM ratio ($p = 0.001$). HA-LM and ⩾85th centile group of the TrFM/ASM ratio showed significantly higher ($p < 0.001$) HbA1c concentrations compared to the other phenotypes.
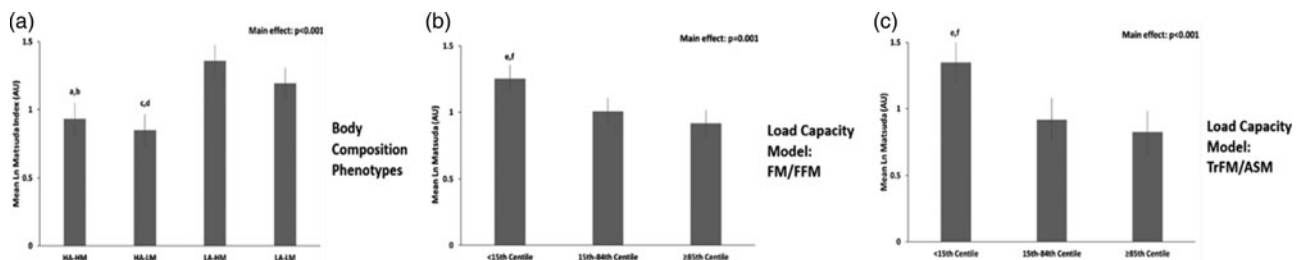

Fig. 1. Differences in the Matsuda Index in subjects stratified by body composition phenotypes (**a**), FM/FFM ratio centile load capacity (**b**) and TrFM/ASM ratio centile load capacity models (**c**). The variable was log transformed as it was not normally distributed. Data were showed as mean ± standard error of mean. Post-hoc analysis ($p < 0.05$): a: HA-HM vs LA-HM; b: HA-HM vs LA-LM; c: HA-LM vs LA-HM; d: HA-LM vs LA-LM; e: <15th Centile vs 15th-84th Centile; f: <15th Centile vs ⩾85th Centile. Note: HA-HM: High Adiposity High Muscle; HA-LM: High Adiposity Low Muscle; LA-HM: Low Adiposity High Muscle; LA-LM: Low Adiposity Low Muscle; FM Fat Mass; FFM: Fat Free Mass; TrFM: Truncal Fat Mass; ASM: Appendicular Skeletal muscle Mass; AU: Arbitrary Units.

SO defined by both four body composition phenotypes and TrFM/ASM definitions showed a good association and a better prediction of insulin resistance.

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