1359

Cardiorespiratory Fitness Status And Risk Of Mortality Among Obese Female Us Veterans

Labros S. Sidossis[1], Immanuel Babu Henry Samuel[2], Alexandra Foscolou[1], Christina Katsagoni[1], Joshua E. McGee[1], Charles Faselis[3], Jonathan Myers, FACSM[4], Peter Kokkinos, FACSM[1]. [1]*Rutgers University, New Brunswick, NJ.* [2]*The Henry Jackson Foundation for the Advancement of Military Medicine, Bethesda, MD.* [3]*Veterans Affairs Medical Center, Washington, DC.* [4]*Veterans Affairs Palo Alto Health Care System, Palo Alto, CA.* (Sponsor: Peter Kokkinos, FACSM)

PURPOSE: It has been suggested that cardiorespiratory fitness (CRF) is associated with favorable health outcomes independent of comorbidities, including obesity. However, relatively few studies have assessed the association between CRF and mortality risk in obese women. Thus, in the present work we aimed to assess the relationship between CRF and risk of mortality among obese women.
METHODS: Female (N=39,556) US Veterans completed a symptom-limited exercise treadmill test (ETT) between 1999-2020 using the Bruce Protocol. Of those 28,681 were classified as obese based on body mass index (BMI) ≥30.0 kg/m^{2}criteria. We established four CRF categories based on age-specific quartiles of peak metabolic equivalents (METs) achieved: Least-Fit (n=8,005), Low-Fit (n=12,475), Moderate-Fit (n=4,905) and High-Fit (n=3,296). Multivariate Cox models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) for death events across CRF categories.
RESULTS: During the follow-up period (median=8.0 years), 1,174 women died (48.1 events/10,000 person-years of observation). Body weight in those within the Least-Fit CRF category was significantly higher when compared to women in the High-Fit category (90±17 vs. 78±11 kg, p<0.001). After adjustments for age, race, hypertension, diabetes, smoking status, major adverse cardiovascular event, breast or lung cancer and heart failure, mortality risk was 18% lower for each 1-MET increase in exercise capacity (HR: 0.82, 95% CI: 0.79-0.84). When CRF categories were considered, comparisons to the Least-Fit category (referent) revealed a progressive decline in risk with higher CRF status. Specifically, mortality risk was 32% lower for Low-Fit women (HR: 0.68, 95% CI: 0.62-0.76), 55% lower (HR: 0.45, 95% CI: 0.38-0.53) for Moderate-Fit, and 68% lower (HR: 0.32, 95% CI: 0.26-0.41) for those in the High-Fit category.
CONCLUSIONS: In obese women, CRF was inversely associated with mortality risk and followed a dose-response pattern. These findings support the concept that adequate physical activity that leads to increased CRF is protective against premature mortality in obese women.

1360

Effects Of Weight Loss And Aerobic Exercise Training On Lipoprotein-insulin Resistance (lpir) Score

Emily Grammer[1], Joshua McGee[1], Taylor Brown[1], Marie Clunan[1], Anna Huff[1], Briceida Osborne[1], Laura Matarese[1], Walter Pories[1], Joseph Houmard, FACSM[1], Robert Carels[1], Mark Sarzynski, FACSM[2], Damon Swift[1]. [1]*East Carolina University, Greenville, NC.* [2]*University of South Carolina, Columbia, SC.*

PURPOSE: To illustrate the connection between lipoprotein-insulin resistance index (LPIR) scores and a combined weight loss and aerobic exercise intervention.
METHODS: Thirty sedentary overweight and obese adults (Age: 46.2±10.7 yrs.; Weight: 95.4±12.6 kg; BMI: 34.4±3.3 kg/m^2) completed a 10-week OPTIFAST weight loss program and supervised aerobic exercise training program to achieve clinical weight loss (≥7% body weight). The OPTIFAST program involved consuming meal-replacement products totaling ~800 kcals per day and weekly classes on behavior modification and nutrition. The weekly aerobic exercise volume was 300 MET min and increased by 50 MET min each week until 700 MET min per week was reached. Plasma blood samples were analyzed via nuclear magnetic resonance (NMR) spectroscopy (LabCorp, Burlington, NC) at baseline and follow-up, and LPIR score was calculated through the summation of selected lipoprotein parameters and then scaled 0-100 (most to least insulin sensitive).
RESULTS: Participants had significant reductions in weight (9.9%) (-8.4, CI [-9.5, -7.4] kg), % fat mass (-2.1, CI [-2.7, -1.4] %), and waist circumference (-7.7, CI [-9.3, -6.2] cm), but no change in peak oxygen uptake (0.02, CI [-0.03, 0.1] L/min) was observed after the intervention. Additionally, there were significant reductions in LPIR score (-12.1, CI [-17.1, -7.1]), insulin (-8.9, CI [-14.3, -3.7] uIU/mL), and glucose (-11.2, CI [-13.9, -8.5] mg/dL), along with significant decreases in blood lipid levels: triglycerides (-27.2, CI [-42.8, -11.6] mg/dL), and lipoproteins: very-low-density lipoprotein (-5.5, CI [-8.7, -2.4] mg/dL) and low-density lipoprotein (-7.9, CI [-14.1, -1.8] mg/dL). Changes in LPIR were associated with changes in triglycerides (r=0.41, *p*=0.025). No significant associations were observed between changes in LPIR and body composition, fitness, or blood pressure changes (*p*>0.05).
CONCLUSIONS: LPIR improved following an OPTIFAST program with aerobic exercise, suggesting a reduction in T2DM risk independent of traditional glycemic measures. Future research should investigate how to maintain improvements in LPIR during weight maintenance.

1361

One Bout Of Resistance Exercise Does Not Interfere With Metformin Antidiabetic Actions In Individuals With Metabolic Syndrome

Alfonso Moreno-Cabañas, Juan Fernando Ortega, Felix Morales-Palomo, Miguel Ramirez-Jimenez, Laura Alvarez-Jimenez, Ricardo Mora-Rodriguez. *University of Castilla-La Mancha, Toledo, Spain.*

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disease with increasing incidence and prevalence. T2DM is characterized by hyperglycemia due to defective secretion and/or insulin action. Amelioration of the hyperglycemic peaks (G_{PEAKS}) that occur after meal ingestion, is a therapeutic target in T2DM. A bout of aerobic exercise helps metformin to reduce those peaks (Ortega et al., 2020). However, it is unclear if a bout of resistance exercise also shows positive interactions with metformin.
PURPOSE: To determine the separated and combined effects of metformin and one bout of resistance exercise on glycemic control and insulin sensitivity in individuals with metabolic syndrome, prediabetes/T2DM.
METHODS: 14 adults with BMI of 32.1±4.1 kg·m^{-2}, insulin resistance (HOMA-IR 3.6±1.4) and poor glycemic control (HbA1c 6.9±0.9 %) under chronic metformin treatment (1561±470 mg·day^{-1}) were recruited. Participants underwent four 72-h experimental trials in a random counterbalanced order: 1) maintaining their habitual metformin treatment (MET); 2) replacing metformin treatment by placebo (CON); 3) placebo plus one resistance training bout (EX+CON), and 4) metformin plus one resistance training bout (MET+EX). We used intermittently scanned glucose monitoring during 72 h in every trial to obtain interstitial fluid glucose area under the curve (G_{AUC}) and the percentage of measurements over 180 mg·dL^{-1} (%G_{PEAKS}). Insulin sensitivity (i.e., HOMA-IR index) and insulin-like growth factor (IGF-1) concentrations were assessed in an overnight fast blood sample, on the second day of each trial.
RESULTS: G_{AUC} and %G_{PEAKS} were lower in MET+EX and MET than in CON (all P<0.05). IGF-1 was higher in CON than in MET (P=0.018) and decreased with resistance exercise in EX+CON (P=0.043).
CONCLUSION: A bout of resistance of exercise in patients with diabetes and prediabetes does not attenuate metformin effects on glycemic control. Therefore, resistance exercise does not seem to interfere with metformin treatment and could be recommended even for diabetic medicated individuals.

1362

Reevaluating The Role Of Obesity In Healthcare Outcomes

Stephanie Ta[1], Lizbeth Ortiz[1], Lewis E. Jacobson[2], Jonathan M. Saxe[2], Cynthia Villalobos[1], J. Mark VanNess[1], Courtney D. Jensen[1]. [1]*University of the Pacific, Stockton, CA.* [2]*St. Vincent Hospital, Indianapolis, IN.*

More than 130 million Americans visit emergency departments each year. Between 1996 and 2009, there was a 13-fold increase in documentation of obesity as the principal diagnosis. Fewer than 25% of these patients meet ACSM recommendations for aerobic and resistance exercise, and no more than a third are counseled on exercise behavior. For exercise counselling to become standard practice, we must improve the nature of reporting.
PURPOSE: To examine how obesity is documented in a clinical setting and estimate its effect on patient outcomes.

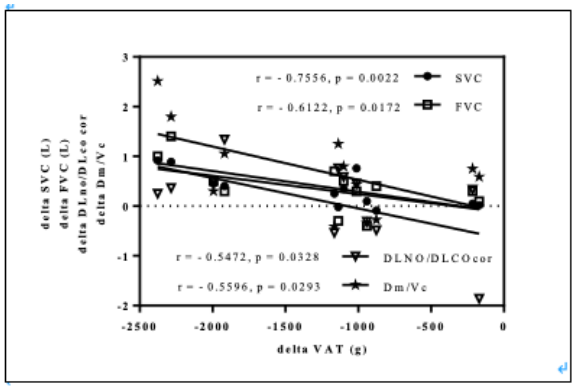
METHODS: We conducted a chart review of two patient samples over a 4-year period (2012-2015). Both samples were drawn from a single institution; 768 were treated at the trauma center (TC) and 2,106 were treated at the emergency department (ED). All patients in both samples were between 15 and 85 years of age and had a Glasgow Coma Scale score ≥ 14. We evaluated obesity reporting and the consequences of obesity on patient outcomes using logistic, linear, and negative binomial regressions as appropriate.
RESULTS: In both samples, documenting of obesity increased each year ($p < 0.001$). In the TC group, 3.3% of patients were documented as obese in 2012, 9.4% in 2013, 30.0% in 2014, and 24.3% in 2015. In the ED sample, 1.1% of patients were documented as obese in 2012, 7.0% in 2013, 29.6% in 2014, and 34.0% in 2015. In 2014 and 2015, when reporting was sufficient, obese patients had lower oximetry ($p = 0.020$), higher heart rate ($p = 0.010$), higher systolic ($p = 0.006$) and diastolic ($p = 0.027$) blood pressure, more myocardial infarctions ($p = 0.014$), and higher rates of hypertension ($p = 0.007$) and diabetes ($p < 0.001$). Controlling or age, sex, and injury severity, patients categorized as obese cost $31k more to the patient ($p = 0.005$) and $16k more to the hospital ($p = 0.002$). Holding sex and age constant, the odds of experiencing a myocardial infarction were 3.1-fold higher in obese patients ($p = 0.006$) and the odds of being diagnosed with diabetes were 3.0-fold higher ($p < 0.001$).
CONCLUSIONS: Obesity is a strong predictor of patient outcomes in both trauma and emergency medicine. These findings delineate the obesity trends in patient samples and emphasize the importance for obesity interventions using information from clinical settings. Physicians are well-positioned to emphasize exercise guidelines to patients.

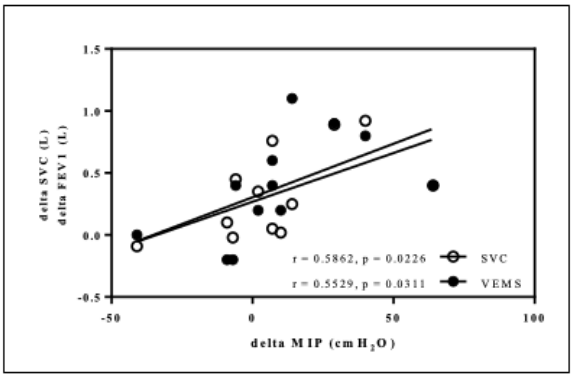
1363

Impact Of Bariatric Surgery On Respiratory Function And Maximal Aerobic Capacity

NA ZHOU. *Yunnan BOYA Hospital & Free University of Belgium, Kunming & Brussels, China.*

PURPOSE: Obesity has adverse effects on physical fitness and respiratory function. Limited studies have shown that aerobic capacity and respiratory function including lung function and respiratory muscle strength have improved after bariatric surgery (BS), but some indicators were still controversial. The aim of this study was to evaluate the impact of BS on respiratory function and aerobic capacity.
METHODS: 29 obesity subjects were matched with 29 health controls. Body composition determined by dual-energy X-ray absorptiometry, respiratory muscle strength measurements, lung function and cardiopulmonary exercise testing on cycling were performed. Within the obesity subjects 13 underwent BS and were re-tested 6 months after BS.
RESULTS: Obese subjects had higher body weight, accompanied with more visceral fat, lean mass (LM), but lower specific VO_2peak, SVC, FVC, FEV1, DL_{CO} and Vc corrected by hemoglobin and MEP. Weight loss six months after BS, the specific VO_2peak, SVC, FVC, FEV1, VA and Dm were improved. The specific VO_2peak, weekly global and moderate activity time postoperative were still lower than the control group. There was negatively relationship between the changes in VAT and the changes in the indicators of respiratory function (SVC, FVC, DLNO/DLCO, Dm/Vc), and positively correlation between the changes in MIP and the changes in SVC, FVC.
CONCLUSIONS: Bariatric surgery increased the aerobic capacity, and reduced the visceral fat which directly improved the lower lung function and respiratory endurance with unchanged ventilation effectiveness.The reduction of visceral fat post-operative directly benefited the improvement of lung function, including lung diffusion. The increase in diaphragm strength after BS promotes the improvement of lung function.





1364

The Effect Of Processed Food Intake On Insulin- And Exercise-induced Glucose Uptake In Overweight And Obese Subjects

Julia Matzenbacher dos Santos[1], Madison Wade[1], Sandra A. Benite-Ribeiro[2], Paul Reneau[1]. *[1]Fairmont State University, Fairmont, WV. [2]Federal University of Jatai, Jatai, Brazil.*

PURPOSE: Type 2 diabetes (T2D) is considered one of the leading causes of death worldwide. In addition to physical inactivity and obesity, established risk factors for T2D, chemical contaminants consumed in processed food might also contribute to the development of T2D. The aim of this study was to investigate the role of processed food intake on glucose transport induced by insulin and insulin plus exercise.
METHODS: Seven obese and overweight (BMI 38± 13.5 Kg/m2), non-diabetic subjects participated in two separate test sessions. Both sessions required subjects to be fasted for 3-hrs prior to participating. Fasting blood glucose measurements were taken before the testing began. Maltodextrin (50 g) in 8 ounces of water was consumed and after 30 min, subject's blood glucose was measured. On the day “Exercised”, subjects ran for 30-min on a treadmill, and velocity was adjusted to 75 % max heart rate. Lastly, blood glucose measurements were collected again at the 60- and 75-min protocol marks (just after exercise and 15 min later). On day “Rested”, subjects completed the same process except for the 30-min run. Instead, participants were asked to remain seated and complete an International Physical Activity Questionnaire (IPAQ) and an 8-questions questionnaire to processed food intake.
RESULTS: Following the consumption of Maltodextrin (30-min) on the resting and exercise day, blood glucose increased significantly compared to the test's beginning. On the 60-minute, blood glucose was lower on the exercised day than the rested day being 89.1 vs. 131.1 mg/Dl, respectively ($p<0.05$). There was a positive correlation between blood glucose clearance (calculated by the subtraction of blood glucose levels at 30 min to at 60 min) on the rested day with processed food intake ($r=0.79$). No correlation was found between blood glucose clearance on exercised and processed food intake. Also, no correlation was found between blood glucose clearance or processed food intake with IPAQ and BMI.
CONCLUSIONS: These findings go against our initial hypothesis that processed food intake decreased the capacity to decrease blood glucose levels after sugar intake. However, aerobic exercise effectively accelerates blood glucose clearance supporting the hypothesis that exercise would have a synergetic effect on insulin-induced glucose uptake.