
Waist is associated longitudinally with adiponectin but not with clamp-derived insulin sensitivity in a cohort of adolescents

LJ Rasmussen-Torvik, JS Pankow, DR Jacobs Jr., LM Steffen, AM Moran, J Steinberger, AR Sinaiko, University of Minnesota, Minneapolis, MN

Studies in adults show that central adiposity is strongly associated with circulating levels of adiponectin and insulin sensitivity, two risk factors for type 2 diabetes. However, the timing of the development of these associations is not well understood. In this study longitudinal associations between waist, adiponectin, and insulin sensitivity were examined in a cohort of adolescents. Participants (n= 206) were recruited from the Minneapolis school system and underwent three clinical research center exams at mean ages 13 (visit 1), 15 (visit 2), and 19 (visit 3). Adiponectin was measured in serum. The euglycemic hyperinsulinemic clamp (EHC) was used to measure insulin sensitivity which was calculated as the amount of glucose needed to maintain euglycemia over the final 40 minutes of the clamp, adjusted by lean body mass (M_{LBM}). Adiponectin measured at age 19 was statistically significantly correlated with waist measured at age 13 ($r = -0.23$), waist measured at age 15 ($r = -0.30$) and waist measured at age 19 ($r = -0.35$). Insulin sensitivity measured at age 19 was not significantly correlated with waist measured at age 13, but was significantly correlated with waist measured at age 15 ($r = -0.21$) and age 19 ($r = -0.16$). In linear regression analyses adjusted for sex and ethnicity both waist at age 13 (baseline waist) and change in waist from age 13 to age 19 were predictive of adiponectin measured at age 19. Baseline waist, but not change in waist was also predictive of adiponectin at age 15. Baseline waist and change in waist were not predictive of insulin sensitivity at ages 15 or 19. In conclusion, we found measurements of waist to be predictive of adiponectin but not of insulin sensitivity in this adolescent cohort. The magnitude of the cross sectional and longitudinal associations between waist and adiponectin increased as the participants aged, and, by age 19, was similar in strength to that reported in adults. However, the associations between waist and insulin sensitivity at age 19 were weak or non-significant, unlike associations reported in adults, suggesting the relationship between visceral adiposity and insulin resistance may not develop until later in life.