OBSERVATIONS

Changes in Serum Adiponectin Concentrations Correlate With Changes in BMI, Waist Circumference, and Estimated Visceral Fat Area in Middle-Aged General Population

Adiponectin was identified as an adipocytokine in the human adipose tissue cDNA library. It has antiatherosclerotic and antidiabetic properties in experimental studies, and its blood levels are low in obesity, diabetes, cardiovascular diseases, and metabolic syndrome. Several studies have reported that weight reduction in massively obese subjects is associated with a rise in serum adiponectin (APN) concentration (1–3). However, the relationship between changes in APN and BMI, waist circumference (WC), and visceral fat accumulation (VFA) in general population has not been reported. The present study investigated 1-year change in APN (ΔAPN) in relation to changes in BMI (ΔBMI), WC (ΔWC), and estimated visceral fat area (ΔeVFA) in middle-aged general population.

The study subjects were 2,024 middle-aged Japanese (1,619 men [45.7 ± 10.4 years] and 405 women [45.6 ± 9.3 years], mean ± SD) who were employees of Amagasaki city office and had undergone annual health checkup in both 2004 and 2005 and were not taking any medications for diabetes, hypertension, or dyslipidemia. The study was approved by the human ethics committee of Osaka University, and a signed informed consent was obtained from each participant. Height, weight, and WC were measured in standing position. BMI was calculated as weight in kilograms divided by the square of height in meters. WC at umbilical level was measured with a nonstretchable tape in late expiration while standing (in cm). VFA was estimated noninvasively by bioelectrical impedance analysis (BIA) (4). Briefly, the voltage recorded at the flank to the flow of current between the umbilicus and the back correlates significantly with VFA and is not influenced by subcutaneous fat. We reported previously that VFA estimated by BIA correlates significantly with that determined by computed tomography (4). APN was measured using latex particle–enhanced turbidimetric assay (5). ΔAPN correlated negatively with ΔBMI, both in men ($r = -0.256$, $P < 0.0001$) and women ($r = -0.223$, $P < 0.0001$) and with ΔWC in men only ($r = -0.191$, $P < 0.0001$), but no correlation was found in women ($P = 0.097$), and ΔAPN correlated negatively with ΔeVFA in both men ($r = -0.189$, $P < 0.0001$) and women ($r = -0.121$, $P = 0.015$).

APN is likely influenced by genetic and environmental factors. It has been reported that APN is associated with single nucleotide polymorphisms in adiponectin gene. The present study demonstrated that changes in body fat, i.e., reduction in BMI, WC, and eVFA, correlated with a rise in APN in middle-aged general population, which to our knowledge is the first such report. We used BIA to evaluate VFA in the present study, and further research on both visceral and subcutaneous fat areas measured by computed tomography scan is needed to clarify the effects of visceral and subcutaneous adiposity on APN.

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