

Adipocyte Size, Adipose Tissue Fibrosis, Macrophage Infiltration and Disease Risk Are Different in Younger and Older Individuals with Childhood and Adulthood Onset Obesity

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Objectives: The timing of obesity onset and age have been shown to affect the risk of obesity-related comorbidities, although the impact of each of these factors on markers of adipose tissue function remains unclear. The aim of this study is to determine whether differences in regional adipose tissue characteristics vary with age and age of obesity onset, and whether these differences are associated with the markers of cardiometabolic health.

Methods: Adipose tissue samples were from 80 female bariatric surgery candidates who were classified by age of obesity onset and age into 4 groups: 1) younger adults (<40 y) with childhood-onset obesity (< 18 y) (Childhood-Young); 2) younger adults with adulthood-onset obesity (>18 y) (Adulthood-Young); 3) older adults (>55 y) with childhood-onset obesity (Childhood-Old); and 4) older adults with adulthood-onset obesity (Adulthood-Old). Adipocyte diameter, adipose tissue fibrosis and macrophage infiltration were determined

in subcutaneous (SAT) and visceral adipose tissue (VAT). Clinical parameters were obtained from participants' medical records.

Results: Visceral adipocyte size in the Childhood-Young group was the smallest of all the groups. Age affected visceral infiltration of M1-like cells in both older groups, whereas onset, specifically childhood-onset, was related to visceral infiltration of M2-like cells in the Childhood-Old group. Fibrosis accumulation in SAT and VAT varied with age and onset, particularly in the Childhood-Old group having the lowest fibrosis levels. Markers of cardiometabolic health (fasting glucose, glycated hemoglobin, total, HDL- and LDL-cholesterol and triglyceride concentrations) were positively and well associated with adipose tissue characteristics of the Childhood-Old group but not of the Adulthood-Young group.

Conclusions: Older adults with childhood onset obesity, who had the greatest duration of obesity exposure, were particularly vulnerable to the cardiometabolic effects associated with perturbations in adipose tissue characteristics. These results, suggest that age and age of obesity onset may have independent and cumulative effects on obesity pathology.

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