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# Association of decrease in carbohydrate intake with reduction in abdominal fat during 3-month moderate low-carbohydrate diet among non-obese Japanese patients with type 2 diabetes

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## Abstract

**Objective:** The effectiveness of a moderate low-carbohydrate diet (M-LCD) has been demonstrated in terms of glycemic control, body weight and serum lipid profiles. We investigated the effect of a 3-month M-LCD on visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT), and examined an association between decrease in carbohydrate intake and reduction in abdominal fat among patients with Type 2 diabetes mellitus (T2DM).

**Methods:** Seventy-six patients (45 men and 31 women; mean age  $\pm$  SD: 59.5  $\pm$  11.1 years) with T2DM were instructed to follow an M-LCD for 3 months. We assessed abdominal fat distribution using computed tomography and macronutrient intakes from 3-day dietary records at baseline and after 3 months.

**Results:** The patients complied well with the M-LCD - %carbohydrate: %fat: %protein at baseline and after 3 months were 51:27:15 and 41:33:18 in men and 54:27:16 and 42:37:19 in women, respectively. VAT and SAT significantly decreased during the 3 months (P for time < 0.001 for both). Decrease in carbohydrate intake (g/day) and %carbohydrate were correlated with decrease (%) in VAT. The correlations were significant in men (Spearman correlation coefficient  $r = 0.469$  for carbohydrate intake (g) and  $r = 0.402$  for %carbohydrate) but not in women ( $r = 0.269$  and  $0.278$ , respectively). The correlations in men remained significant in multiple regression analysis adjusted for age and changes in energy intake.

**Conclusions:** In men, decrease in carbohydrate intake was significantly correlated with VAT loss during a 3-month M-LCD, independently of reduction in energy intake.

**Keywords:** Carbohydrate; Dietary therapy; Low-carbohydrate diet; Subcutaneous adipose tissue; Visceral adipose tissue.

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