Five-year changes in weight and risk of atrial fibrillation in women and men from the Danish diet, cancer, and health cohort

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Background: Overweight and obesity are causal risk factors for atrial fibrillation (AF). (1) Mendelian randomization studies indicated a higher risk of AF with each unit increase in body mass index (BMI). (1) In observational studies, weight gain was associated with a higher risk of incident AF compared to stable weight.(2,3) However, the results are conflicting regarding the association between weight loss and risk of incident AF.(4,5).

Purpose: We aimed to assess the association between five-year changes in weight and absolute and relative rates of incident AF in women and men from the Danish Diet, Cancer, and Health Cohort.

Methods: In the Danish cohort study Diet, Cancer, and Health, participants were invited to attend a recruitment research examination and a second examination 5 years later. Height, weight, and several lifestyle factors were assessed at both examinations. We calculated BMI and BMI changes between first and second examination. BMI changes were categorized into following groups: < -5 kg/m², ≥ -5 to < -2.5 kg/m², ≥ -2.5 to < 2.5 kg/m², ≥ 2.5 to < 5 kg/m², and ≥ 5 kg/m². Diagnoses of AF and comorbidities were retrieved from the Danish National Patient Registry. We used multivariable-adjusted Cox proportional hazards models to assess hazard ratios (HR) of AF according to changes in BMI.

Results: 43,758 participants without prior AF were included in the study. The median age was 62 (25th-75th percentile, 58-66) years and 54% were women. Over 15.7 years median follow-up time 5,312 participants had incident AF. From the first to the second measure, 39,076 (89%) of participants had stable weight, 2,627 (6%) lost weight, and 2,055 (5%) gained weight. The incidence rates of AF per 1,000 person-years were 8.4 (95% CI 8.1-8.6) among participants with stable weight, 12.4 (95% CI 9.6-16.1) among those with weight loss ≥ 5 kg/m², and 15.4 (95% CI 11.7-20.2) among those who gained ≥ 5 kg/m². Diagnoses of AF and comorbidities were retrieved from the Danish National Patient Registry. We used multivariable-adjusted Cox proportional hazards models to assess hazard ratios (HR) of AF according to changes in BMI.

Compared to participants with stable weight, individuals who gained ≥ 2.5 to < 5 kg/m² had a higher hazard of AF (HR 1.24, 95% CI 1.09-1.41). Among participants who gained ≥ 5 kg/m² the rate of AF was also higher compared to stable weight (HR 1.95, 95% CI 1.48-2.56). There was no statistically significant association between weight loss, regardless of degree, and rate of AF. Figure 1 shows the HR of AF by BMI changes from first to second measure compared to stable weight using restricted cubic splines. In sex-stratified analyses, the association between weight gain of ≥ 5 BMI units (kg/m²) and higher AF rate was present for both women and men.

Conclusions: In this cohort study, five-year weight gain was associated with higher long-term risk of AF compared to stable weight. However, we found no associations between weight loss and long-term risk of AF.

Figure 1