

Body weight, body size and early cardiovascular disease

Epidemiological studies using Swedish registries

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i Sahlgrenska universitetssjukhuset/ lokal Arvid Carlsson, Medicinaregatan 3, den 27 maj, klockan 09.00 (deltagande via länk, för länk kontakta annika.rosengren@gu.se).

av Christina Lundberg

Fakultetsopponent:

Professor Mai-Lis Hellénus

Karolinska Institutet, Sverige

Avhandlingen baseras på följande delarbeten

- I. Lundberg CE, Ryd M, Adiels M, Rosengren A, & Björck L. Social inequalities and trends in pre-pregnancy body mass index in Swedish women.
Under review.
- II. Lundberg CE, Adiels M, Björck L, & Rosengren A. Young women, body size and risk of atrial fibrillation.
European Journal of Preventive Cardiology 2018;25(2):173-180.
- III. Björck L, Lundberg CE, Schaufelberger M, Lissner L, Adiels M, & Rosengren A. Body mass index in women aged 18 to 45 and subsequent risk of heart failure.
European Journal of Preventive Cardiology 2020;27(11):1165-1174.
- IV. Persson CE, Björck L, Lagergren J, Lappas G, Giang KW, & Rosengren A. Risk of heart failure in obese patients with and without bariatric surgery in Sweden – a registry-based study.
Journal of Cardiac Failure 2017;23(7):530-537.
- V. Lundberg CE, Björck L, Adiels M, Lagergren J, & Rosengren, A. Risk of myocardial infarction, ischemic stroke, and mortality in patients who undergo gastric bypass for obesity compared with non-operated obese patients and population controls.
Under review.

**SAHLGRENKA AKADEMIN
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Abstract

Background: Obesity is a known risk factor for cardiovascular morbidity and mortality, as well as for atrial fibrillation and heart failure. While overweight and obesity have become increasingly more common in Sweden and worldwide during the past decades, there have also been an increase of some cardiovascular diseases (CVD) among men and women younger than 45 years old in Sweden. Significant weight loss has several beneficial effects on these conditions. Bariatric surgery has shown to induce great weight loss and to improve cardiac function.

Aims and methods: The aim of this thesis was to investigate trends in mean body mass index (BMI), overweight and obesity in young women during past decades. There to, we sought to estimate the impact of body size, body weight and obesity on the risk of early CVD and mortality in young women and in obese patients with and without surgical treatment for obesity, and compare that risk with the Swedish total population. All studies included in this thesis are population-based trend- and cohort-studies, and are based on data from Swedish national registries. In Study I–III, the study populations were derived from the Medical Birth Register and included all women in Sweden who gave birth between 1982 and 2014. In Study IV–V, the Patient Register was used to create cohorts including all individuals diagnosed with obesity, with and without bariatric surgery, between 2000 and 2011 and between 2001 and 2013. Logistic regression models were used to analyze the relationship between BMI and socioeconomic status. To analyze the relationship between BMI, obesity, obesity surgery and morbidity and mortality in CVD, Kaplan-Meier curves, Cox regression, Poisson regression, and logistic regression were applied.

Results: The incidence of obesity has significantly increased among young women since 1982. This increase was observed in all levels of education and in all counties in Sweden. An increased body weight and body size early in life is strongly associated with an increased risk of early heart failure and atrial fibrillation among women. There was a linear relationship between BMI measured early in life and an increasing risk of developing early heart failure, starting already at BMI 22.5–25, among women. The risk of heart failure and acute myocardial infarction (AMI) was markedly reduced among patients with a diagnosis of obesity who had undergone obesity surgery compared with patients with a diagnosis of obesity who had not undergone such surgery. Within 3 years of follow-up, they also had a reduced risk of cardiovascular-related and all-cause mortality, but not during 3–10 years of follow-up. Obesity surgery did not seem to affect the risk of developing ischemic stroke to the same extent. Compared with the total population, patients with a diagnosis of obesity who have undergone obesity surgery have the same risk of AMI during 10 years of follow-up. They also had a similar risk of developing ischemic stroke during the first three years, after which the risk increased again.

Conclusions: Given the strong associations identified between an elevated body size and BMI early in life and increased risk of atrial fibrillation and heart failure, along with increased risk of heart failure, AMI, and premature death among patients with obesity, the illuminated increase in obesity among young first-time-mothers will most likely cause a rise in serious health problems in Sweden the following decades.

Keywords: epidemiology, body mass index, obesity, bariatric surgery, gastric bypass, cardiovascular disease, mortality

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