Cardiovascular events in metabolically healthy obese. A nationwide cohort study

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Background: Obesity is a risk factor for cardiovascular disease (CVD) and has been increasing globally over the past 40 years in many countries worldwide. Metabolic abnormalities such as hypertension, dyslipidemia and diabetes mellitus are commonly associated and may mediate some of the deleterious effects of obesity. A subset of obese individuals without obesity-related metabolic abnormalities may be classified as being "metabolically healthy obese" (MHO). We aimed to evaluate the associations among MHO individuals and different types of incident cardiovascular events in a contemporary population at a nationwide level.

Methods: From the national hospitalization discharge database, all patients discharged from French hospitals in 2013 with at least 5 years or follow-up and without a history of major adverse cardiovascular event (myocardial infarction, heart failure [HF], ischemic stroke or cardiovascular death, MACE-HF) or underweight/ malnutrition were identified. They were categorized by phenotypes defined by obesity and 3 metabolic abnormalities (diabetes mellitus, hypertension, and hyperlipidemia). In total, 2,953,816 individuals were included in the analysis, among whom 272,838 (9.5%) were obese. We evaluated incidence rates and hazard ratios for MACE-HF, cardiovascular death, myocardial infarction, ischemic stroke, new-onset HF and new-onset atrial fibrillation (AF). Adjustments were made on age, sex and smoking status at baseline.

Results: During a mean follow-up of 4.9 years, obese individuals with no metabolic abnormalities had a higher risk of MACE-HF (multivariate-adjusted hazard ratio [HR] 1.22, 95% confidence interval [CI]: 1.19–1.24), new-onset HF (HR 1.34, 95% CI 1.31–1.37), and AF (HR 1.33, 95% CI 1.30–1.37) compared with non-obese individuals with 0 metabolic abnormalities. By contrast, risks were not higher for myocardial infarction (HR 0.92, 95% CI 0.87–0.98), ischemic stroke (HR 0.93, 95% CI 0.88–0.98) and cardiovascular death (HR 0.99, 95% CI 0.93–1.04). In the models fully adjusted on all baseline characteristics, obesity was independently associated with a higher risk of MACE-HF events (HR 1.13, 95% CI 1.12–1.14), of new-onset HF (HR 1.19, 95% CI 1.18–1.20) and new-onset AF (HR 1.29, 95% CI 1.28–1.31). This was not the case for the association of obesity with cardiovascular death (HR 0.96, 95% CI 0.94–0.98), myocardial infarction (HR 0.93, 95% CI 0.91–0.95) and ischemic stroke (HR 0.93, 95% CI 0.91–0.96).

Conclusions: Metabolically healthy obese individuals do not have a higher risk of myocardial infarction, ischemic stroke or cardiovascular death than metabolically healthy non-obese individuals. By contrast they have a higher risk of new-onset HF and new onset AF. Even individuals who are non-obese can have metabolic abnormalities and be at high risk of cardiovascular disease events. Our observations suggest that specific studies investigating different aggressive preventive measures in specific subgroups of patients are warranted.