Editorial

Obesity Degree and Glycemic Status: Factors That Should Be Considered in Heart Failure

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Heart failure (HF) is associated with serious morbidity and mortality in patients with diabetes who experience more than two-fold the frequency of HF compared with the general population [1,2]. In a study of multi-ethnic comparisons of diabetic patients with HF, which included Korean and Japanese populations, diabetes increased the combined risk of morbidity and mortality in all ethnicities with HF requiring special attention [3]. In addition, because the beneficial effects of novel anti-diabetic agents on cardiovascular mortality and hospitalization due to HF, which are considered critical outcomes in patients with diabetes, have been shown in several cardiovascular outcome trials, HF is considered an important disease that requires proper treatment in diabetic patients [4,5].

Obesity, especially an increase in visceral adipose tissue, is associated with numerous comorbidities including insulin resistance, increased arterial stiffness, hypertension, and atherosclerotic cardiovascular disease [6]. In most studies, an increased risk of HF in obese individuals was reported, however, whether overweight can increase the risk of HF remains unclear [7]. Regarding mortality, a J-curved relationship between body mass index (BMI) and mortality due to HF, termed obesity paradox, was reported in some observational studies, indicating improved survival in overweight and obese people with established HF [8,9].

In this issue of *Diabetes and Metabolism Journal*, Rhee et al. [10] reported an association among obesity degree, glycemic status, and risk of HF using the Korean National Health Screening (KNHS) dataset. This population-based cohort study included 9,720,220 subjects who underwent KNHS and were followed up for 6.3 years for HF. The authors analyzed the risk of HF in participants based on baseline glycemic status and whether this risk was associated with obesity status. Similar to other studies, participants with impaired fasting glucose (IFG) and those with diabetes showed 1.08- and 1.86-fold, respectively, increased risk of HF compared with normoglycemic participants. When the risk was analyzed based on obesity degree and BMI, the underweight group with BMI <18.5 kg/m^2 showed a 1.7-fold increased risk of HF, and those with class II obesity with BMI ≥ 30 kg/m^2 had a 1.1-fold increased risk. Participants who were in the pre-obese range (BMI 23.0 to 24.9 kg/m^2) and class I obesity (BMI 25.0 to 29.9 kg/m^2) showed a lower risk of HF than the reference group (BMI 18.5 to 22.9 kg/m^2). Conversely, the risk analysis of HF based on abdominal obesity determined by waist circumstance (WC) showed a linear risk increment in proportion to the degree of abdominal obesity. However, when these analyses were performed after dividing the participants based on glycemic status, a linear relationship was maintained only in the normoglycemia and IFG group, although a J-shape curve was observed in the diabetes group. Overall, the risk of HF was highest in underweight participants with the longest diabetes duration. The results of the present study provide evidence that abdominal adiposity is important for predicting development of HF and guidelines for the prevention of HF should be emphasized in obese individuals especially with abdominal obesity. In diabetics however, a different approach is needed to establish appropriate WC cutoffs and BMI for pre-

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dicting the risk of HF and better clinical outcomes.

Although BMI calculated using anthropometrics is commonly used to define obesity, it is not representative of excess regional adiposity which potentially has predictive value for incident cardiovascular events and mortality [11]. Recently, Cho et al. [12] confirmed that WC is a better marker than BMI for predicting the incidence of myocardial infarction or ischemic stroke and suggested lower optimal WC cutoff values than currently recommended are needed for the prevention of atherosclerotic cardiovascular disease in the Korean population. Although a greater BMI increased the risk of HF, an increased risk of HF in the obese range was reported in most studies and whether overweight increased the risk of HF is unclear. Based on pooled analysis results from Asia and Pacific studies, the risk of HF mortality among obese individuals was increased; however, association among overweight subjects was not observed [13]. The results of the present study also showed the risk of HF was more prominent in underweight and class II or greater obese participants than in normal weight subjects. In addition, overweight or class I obese subjects had a significantly lower risk of HF than normal weight individuals. As a limitation stated by the authors, whether weight loss is a result of HF or a preceding factor cannot be clearly distinguished. Accurate analysis of body composition measurements using methods such as dual energy X-ray absorptiometry is necessary.

Population-based studies can contribute to the recognition of disease in the general population as well as specific disease groups and improve clinical outcome. Consequently, the results of the present study based on the KNHS have an important clinical significance for the Korean population. Additional prospective studies could provide evidence to establish guidelines for ideal BMI and WC, as well as improved lifestyles, including diet and exercise, to prevent HF and improve prognosis of HF in diabetic, obese, and underweight high-risk subjects.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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