

Obesity and the Risk of Heart Failure

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An article is reviewed which demonstrates that obesity is associated with an increase in the relative risk of heart failure ranging from 1.8 to 5.6 depending on the degree of obesity and gender, even when other known risk factors for heart failure are excluded. The most reasonable conclusion is that there are one or more mechanisms where obesity results in heart failure that have not yet been recognized.

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This article reports the finding in a community-based study that obesity is an independent risk factor for heart failure (HF).¹ This risk is independent of age, sex, smoking status, alcohol consumption, valve disease or diabetes mellitus. It occurs in women with even modest amounts of obesity, and it increases proportionately with the amount of obesity for both men and women.

I found this article interesting for several reasons. Many studies have reported a difference in mortality with respect to gender where females tolerate obesity better than males. This study found no overall gender difference for the risk of HF as an independent risk factor. Also, there is an ongoing debate as to what the health risks are with obesity. In other words, if an overweight individual does not develop disorders known to be associated with being overweight (eg, diabetes, hypertension or elevated lipids) do they still have increased morbidity and/or mortality? And, is this observed increase only with morbid obesity or with lesser amounts of obesity?

DESIGN

This study is part of the Framingham Heart Study. There were 6495 individuals ini-

tially selected for the cohort. After exclusion for a number of reasons including age <30 years, body mass index (BMI) <18.5 kg/m², heart failure on entry, incomplete data, and lack of follow-up (only 2 for this last category), there were 5881 participants left with a mean age of 55, and approximately equal proportions by gender (54% females) were followed for an average of 14 years.

Continuous follow-up for cardiovascular events was used for the duration of the study. The primary event or target outcome was the first episode of heart failure. Criteria for the diagnosis of heart failure were sufficient to exclude false positives.

The statistical analysis was extensive. BMI was used both as a continuous variable and categorically. Categorical definitions were normal (BMI 18.5–24.9 kg/m²), overweight (BMI 25.0–29.9 kg/m²), and obese (BMI ≥30 kg/m²). Obesity was also studied as groups: 30–34.9 kg/m², 35–39.9 kg/m² and ≥40 kg/m². Time was used as a variable to increase the statistical power of the analysis. Other risk variables were considered to avoid unaccounted for bias. These included base-line age, cigarette smoking, gender, alcohol use, valve disease, hypertension, diabetes melli-

Table 1. Relative Risk of Heart Failure

Category	BMI (kg/m ²)	Relative Risk (95% confidence limits)	
		Women	Men
Overweight	25–29.9	1.5 (1.1–2.0)	1.2 (0.9–1.6)*
Obesity			
Group 1	30–34.9	1.6 (1.1–2.4)	1.8 (1.2–2.7)
Group 2	35–39.9	3.4 (2.1–5.7)	2.8 (1.4–5.9)
Group 3	≥40	5.6 (2.5–12.4)	See comment†

* The confidence interval lower limit is less than 1.0 (not statistically significant).

† Sample size was too small to report for males with BMI ≥40 kg/m².

tus, elevated total serum cholesterol, and myocardial infarction.

RESULTS

The frequency of obesity (16%) was about the same in men and women. During the follow-up period (average 14 years), 496 individuals had an observed onset of heart failure.

Using BMI as a continuous variable, the increase in risk of heart failure was 5% for men and 7% for women for each increase of 1.0 kg/m² in the BMI. The categorical relative risk is displayed in Table 1. Note that the reference risk is 1.0 for the control group (BMI 18.5 to 24.9 kg/m²). While the increased risk is statistically significant, it would appear to be marginal for lower degrees of obesity.

There was insufficient data for men with a BMI of ≥40 kg/m².

COMMENTS

An editorial in the same issue of the *New England Journal of Medicine* makes several insightful comments.² It has been recognized that obesity is a risk factor of other conditions that lead to HF, eg, myocardial infarction, hypertension, diabetes mellitus, and in extreme obesity, left ventricular hypertrophy. For this reason, obesity is frequently excluded as a risk factor for an outcome to avoid counting it twice (both as a risk factor and the condition it caused). This study demonstrates that even when these “intermediate” conditions are excluded, obesity still increased the relative risk of HF. The most reasonable conclusion is that there are one or more mechanisms where obesity results in HF that have not yet been recognized. If the previously unrecognized mechanism of development of HF can be determined, then treatment may be possible. Also, the more recently recognized metabolic syndrome was not accounted for as a risk factor. Regarding public health planning, this study supports the recognition of obesity as a risk factor for HF and consequently any associated increase in morbidity and mortality.

REFERENCES

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