Body mass index and its association to cardiovascular outcomes in patients with stable coronary heart disease - experiences from the STABILITY study

Authors:
C Held¹, N Hadziosmanovic², E Hagstrom¹, JS Hochman³, RAH Stewart⁴, HD White⁴, L Wallentin¹, ¹Uppsala Clinical Research Center, Uppsala University, Department of Medical Sciences - Uppsala - Sweden, ²Uppsala Clinical Research Center - Uppsala - Sweden, ³New York University Langone Medical Center - New York - United States of America, ⁴The University of Auckland - Auckland - New Zealand,

On behalf: STABILITY Investigators

Topic(s):
Coronary Artery Disease – Epidemiology, Prognosis, Outcome

Citation:

Funding Acknowledgements:
The original STABILITY study was funded by GlaxoSmithKline

Background
Obesity, assessed as body mass index (BMI), is an established risk factor for development of coronary heart disease (CHD). However, in patients with heart failure and atrial fibrillation there is an "obesity paradox" with better prognosis among obese patients. The association between BMI and cardiovascular outcomes in patients with stable CHD is unclear.

Methods
The prospective STABILITY trial included 15,828 patients with stable CHD with a follow-up of 3 – 5 years (median 3.7) on optimal secondary preventive treatment. BMI and waist circumference were measured at baseline (n=15,785). All cardiovascular outcomes were centrally adjudicated. Associations between obesity indices and outcomes were evaluated by multivariable Cox regression analyses with adjustments for age, sex, study treatment, and clinical risk factors.

Results
Mean age was 64 years and 19% were females. In total, 3250 (20.9%) patients had BMI <25, 6628 (42.8%), BMI >25 and <30 and 5614 (36.3%), BMI >30. Underweight (BMI <18.5) was seen in 79 patients. Most risk markers (diabetes, hypertension, and levels of inflammatory biomarkers and triglycerides) showed a graded association with higher BMI. The frequency of smoking and levels of HDL, GDF-15 and NT-proBNP were higher at lower BMI. Lower BMI was associated with an increased risk of MACE, total and CV death, and heart failure (Figure). Higher BMI was associated with increased risk of the same outcomes and also with MI. BMI was not associated with the risk of stroke. There was no interaction with age, sex, diabetes or type of MI (type 1 vs type 2-5). Associations between waist circumference and outcomes were weaker and not significant in the fully adjusted model.

Conclusion
In patients with stable CHD on optimal secondary prevention BMI had a U-shaped association with the risk of MACE, death, and heart failure and a linear association with the risk of MI. The lowest risk for MACE was seen for BMI between 25 and 30, considered as overweight. The findings do not support current recommendations to achieve an ideal BMI of 20-25 for weight adjustments in patients with CHD.
Abstract:

Body mass index and its association to cardiovascular outcomes in patients with stable coronary heart disease — experiences from the STABILITY study

Authors:

C Held 1, N Hadziosmanovic 2, E Hagstrom 1, JS Hochman 3, RAH Stewart 4, HD White 4, L Wallentin 1

1 Uppsala Clinical Research Center, Uppsala University, Department of Medical Sciences – Uppsala – Sweden, 2 Uppsala Clinical Research Center – Uppsala – Sweden, 3 New York University Langone Medical Center – New York – United States of America, 4 The University of Auckland – Auckland – New Zealand

On behalf: STABILITY Investigators

Topic(s):

Coronary Artery Disease – Epidemiology, Prognosis, Outcome

Citation:

Funding Acknowledgements:

The original STABILITY study was funded by GlaxoSmithKline

Background

Obesity, assessed as body mass index (BMI), is an established risk factor for development of coronary heart disease (CHD). However, in patients with heart failure and atrial fibrillation there is an "obesity paradox" with better prognosis among obese patients. The association between BMI and cardiovascular outcomes in patients with stable CHD is unclear.

Methods

The prospective STABILITY trial included 15,828 patients with stable CHD with a follow-up of 3 – 5 years (median 3.7) on optimal secondary preventive treatment. BMI and waist circumference were measured at baseline (n=15,785). All cardiovascular outcomes were centrally adjudicated. Associations between obesity indices and outcomes were evaluated by multivariable Cox regression analyses with adjustments for age, sex, study treatment, and clinical risk factors.

Results

Mean age was 64 years and 19% were females. In total, 3250 (20.9%) patients had BMI <25, 6628 (42.8%), BMI >25 and <30 and 5614 (36.3%), BMI >30. Underweight (BMI <18.5) was seen in 79 patients. Most risk markers (diabetes, hypertension, and levels of inflammatory biomarkers and triglycerides) showed a graded association with higher BMI. The frequency of smoking and levels of HDL, GDF-15 and NT-proBNP were higher at lower BMI. Lower BMI was associated with an increased risk of MACE, total and CV death, and heart failure (Figure). Higher BMI was associated with increased risk of the same outcomes and also with MI. BMI was not associated with the risk of stroke. There was no interaction with age, sex, diabetes or type of MI (type 1 vs type 2–5). Associations between waist circumference and outcomes were weaker and not significant in the fully adjusted model.

Conclusion

In patients with stable CHD on optimal secondary prevention BMI had a U-shaped association with the risk of MACE, death, and heart failure and a linear association with the risk of MI. The lowest risk for MACE was seen for BMI between 25 and 30, considered as overweight. The findings do not support current recommendations to achieve an ideal BMI of 20–25 for weight adjustments in patients with CHD.