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Obesity and the risk of myocardial infarction in 27â€^000 participants from 52 countries: a case-control study

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Summary

Background

Obesity is a major risk factor for cardiovascular disease, but the most predictive measure for different ethnic populations is not clear. We aimed to assess whether markers of obesity, especially waist-to-hip ratio, would be stronger indicators of myocardial infarction than body-mass index (BMI), the conventional measure.

Methods

We did a standardised case-control study of acute myocardial infarction with 27â€^098 participants in 52 countries (12â€^461 cases and 14â€^637 controls) representing several major ethnic groups. We assessed the relation between BMI, waist and hip

circumferences, and waist-to-hip ratio to myocardial infarction overall and for each group.

Findings

BMI showed a modest and graded association with myocardial infarction (OR 1.44, 95% CI 1.32–1.57 top quintile vs bottom quintile before adjustment), which was substantially reduced after adjustment for waist-to-hip ratio (1.12, 1.03–1.22), and non-significant after adjustment for other risk factors (0.98, 0.88–1.09). For waist-to-hip ratio, the odds ratios for every successive quintile were significantly greater than that of the previous one (2nd quintile: 1.15, 1.05–1.26; 3rd quintile: 1.39; 1.28–1.52; 4th quintile: 1.90, 1.74–2.07; and 5th quintiles: 2.52, 2.31–2.74 [adjusted for age, sex, region, and smoking]). Waist (adjusted OR 1.77; 1.59–1.97) and hip (0.73; 0.66–0.80) circumferences were both highly significant after adjustment for BMI ($p < 0.0001$ top vs bottom quintiles). Waist-to-hip ratio and waist and hip circumferences were closely ($p < 0.0001$) associated with risk of myocardial infarction even after adjustment for other risk factors (ORs for top quintile vs lowest quintiles were 1.75, 1.33, and 0.76, respectively). The population-attributable risks of myocardial infarction for increased waist-to-hip ratio in the top two quintiles was 24.3% (95% CI 22.5–26.2) compared with only 7.7% (6.0–10.0) for the top two quintiles of BMI.

Interpretation

Waist-to-hip ratio shows a graded and highly significant association with myocardial infarction risk worldwide. Redefinition of obesity based on waist-to-hip ratio instead of BMI increases the estimate of myocardial infarction attributable to obesity in most ethnic groups.



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