Obesity and kidney function decline in 60-80 years old state-of-the-art drug-treated post-myocardial infarction patients

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Introduction

The prevalence of overweight and obesity has increased to epidemic proportions and is globally ranking in the top 5 risk factors for death.[1] Obesity is associated with accelerated decline of kidney function in the general population, kidney transplant and dialysis patients.[2] Obesity may promote kidney damage through both hemodynamic and hormonal effects. Accelerated kidney function decline is associated with increased morbidity and mortality. Little is known about the effect of obesity on kidney function decline in stable post-myocardial infarction (MI) patients, prompting us to investigate this relation.

Methods

This prospective cohort study is a follow-up of the Alpha Omega Trial; 2,410 post MI-patients with optimal pharmacotherapeutical treatment, aged 60-80 years (79% men, 18% diabetes), were followed for 40 months. We assessed serum cystatin C (cysC) at baseline and after 40 months.[3,4] We estimated $eGFR_{cysC}$ with the CKD-EPI equation. We used body mass index (BMI) and waist circumference (WC) measured at baseline as an index of adiposity and defined obesity as a BMI ≥30 kg/m^2. We assessed the effect of BMI and WC on $eGFR_{cysC}$ decline by multivariate linear regression. Results were stratified for sex.

Objective

To study the relation of overweight and obesity with the rate of kidney function decline in older state-of-the-art drug treated post-myocardial infarction (MI) patients.

Results

At baseline patients had a mean (SD) BMI of 27.7 (3.6) kg/m^2, 23% were obese. The baseline mean (SD) $eGFR_{cysC}$ was 81.5 (19.6) ml/min/1.73m^2. Annual mean (95%-CI) $eGFR_{cysC}$ decline was -1.33 ml/min/1.73m^2.

We found that both BMI (Figure 1) and WC (not shown) were associated with higher kidney function decline (Table 2). After adjustment for age, sex, smoking, alcohol-use and education level, we found:

- for every 5 kg/m^2 increment of BMI an additional annual $eGFR_{cysC}$ decline of -0.28 ml/min/1.73m^2 (21%).
- for every 10 cm increment of WC an additional annual $eGFR_{cysC}$ decline of -0.21 ml/min/1.73m^2 (16%).
- obese compared to normal weight patients had an extra 23% yearly $eGFR_{cysC}$ decline of -0.30 ml/min/1.73m^2.

We found no evidence for effect modification between sex and BMI or WC with regard to kidney function decline.

Table 1: baseline characteristics.

	n = 2,410
Age, years	68.9±5.4
Men, no. (%)	1914 (79.4)
Smoking, no. (%)	384 (15.9)
BMI, kg/m^2	
Men	27.5±3.3
Women	28.4±4.6
Waist circumference, cm	
Men	102.5±9.1
Women	96.4±11.6
Diabetes, no. (%)	444 (18.4)
Anti-hypertensive drugs, no. (%)	2097 (87.0)
Glucose lowering drugs, no. (%)	315 (13.1)
Lipid modifying drugs, no. (%)	2076 (86.1)
Anti-thrombotic agents, no. (%)	2353 (97.6)
Baseline $eGFR_{cysC}$, ml/min/1.73m^2	81.5 (19.6)

Displayed as Mean ± SD or percentage

Table 2: Effect of baseline body mass index and waist circumference on yearly cystatin C based kidney function decline in post-myocardial infarction patients, for men and women separately.

	Annual $eGFR_{cysC}$ decline mean (95%-CI), total n = 2,410	Annual $eGFR_{cysC}$ decline mean (95%-CI), men n = 1,914	Annual $eGFR_{cysC}$ decline mean (95%-CI), women n = 496
Mean annual $eGFR_{cysC}$ decline	-1.33 (-1.46 to -1.21)	-1.45 (-1.59 to -1.31)	-0.89 (-1.21 to -0.58)
Per 5 kg/m^2 increment of BMI			
Crude	-0.20 (-0.38 to -0.02)	-0.27 (-0.48 to -0.06)	-0.15 (-0.49 to 0.19)
Model 1	-0.29 (-0.46 to -0.11)	-0.36 (-0.57 to -0.15)	-0.16 (-0.50 to 0.18)
Model 2	-0.28 (-0.46 to -0.10)	-0.35 (-0.56 to -0.14)	-0.21 (-0.56 to 0.14)
Per 10 cm increment of WC			
Crude	-0.24 (-0.37 to -0.11)	-0.20 (-0.35 to -0.05)	-0.19 (-0.47 to 0.08)
Model 1	-0.21 (-0.34 to -0.08)	-0.22 (-0.37 to -0.06)	-0.20 (-0.47 to 0.08)
Model 2	-0.21 (-0.34 to -0.08)	-0.21 (-0.37 to -0.06)	-0.22 (-0.50 to 0.05)

Model 1: adjusted for four randomized treatment groups (3 dummy variables), age, and sex.
Model 2: model 1, additionally adjusted for lifestyle variables; smoking (yes/no), alcohol use (yes/no), level of education.

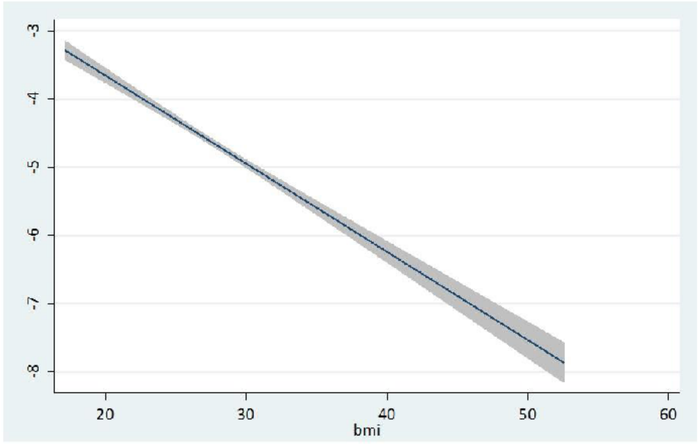

Figure 1: linear relation with 95% confidence interval between BMI (X-axis) and $eGFR_{cysC}$ decline in 40 months (Y-axis).

Conclusion

We found that both body-mass index and waist circumference had a progressive relation with decline in kidney function in stable post-MI patients.

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