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Anthropometric indicators of cardiometabolic risk, body composition and functional capacity during inpatient cardiac rehabilitation

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Introduction: Abdominal obesity is a key cardiometabolic risk factor, and waist circumference (WC) and waist-to-height ratio (WHtR) capture it better than body mass index (BMI)[1,2]. In coronary artery disease, central obesity predicts higher mortality, even with normal BMI[3], and waist-based measures reclassify cardiovascular risk beyond BMI[4]. The 2026 ESC Guidelines recommend body composition assessment in all patients undergoing cardiac rehabilitation (CR)[5]. We aimed to assess abdominal obesity, body composition and functional capacity before and after inpatient CR.

Patients and Methods: This prospective study included 50 patients after percutaneous or surgical coronary revascularization, referred to 21-day inpatient CR at Thalassotherapia Opatija. Patients exercised 6 days a week: aerobic training, mostly individualized by ventilatory thresholds (VT1/VT2) from cardiopulmonary exercise testing[5], and elastic-band resistance exercises, with dietitian counselling. On days 1 and 21 we measured weight, WC and hip circumference, and calculated BMI, waist-to-hip ratio (WHR) and WHtR. Body composition was assessed by bioelectrical impedance analysis (BIA; Tanita MC-780MA-N) and functional capacity by the six-minute walk test (6MWT). Sex-specific cut-offs, paired t-test, Wilcoxon signed-rank test, Mann-Whitney U test and Spearman correlation were used.

Results: Patients (39 men, 11 women) were aged 64.0 ± 11.7 years. BMI ≥30 kg/m² was present in 40%, but 98% had WHtR ≥0.5, 94% elevated WHR (≥0.90/≥0.85) and 68% WC ≥102/≥88 cm. Of 10 patients with BMI <25 kg/m², 9 had WHtR ≥0.5. After CR, BMI, WC (104.9 → 101.9 cm), WHR (0.99 → 0.97) and WHtR (0.60 → 0.59) decreased (all $p < 0.001$). The 6MWT distance increased by 61 m (95% CI 46-76; $p < 0.001$), and 72% reached the minimal clinically important difference (25 m)[6]. Women were older (70.7 vs 62.1 years; $p = 0.02$) and walked less at baseline (352 vs 528 m; $p = 0.005$) but improved by 50 m. Body fat percentage and visceral fat rating were unchanged, whereas BIA-estimated muscle mass decreased by 1.4 kg ($p < 0.001$), most of the 1.8 kg weight loss. The 6MWT gain did not correlate with WC or muscle mass change.

Conclusion: Abdominal obesity is almost universal among patients entering inpatient CR, even those with normal BMI, so WC and WHtR should be measured routinely. After three weeks of CR, functional capacity improved and indicators of abdominal obesity decreased. The decrease in estimated muscle mass may partly reflect changes in hydration but argues for individually dosed resistance training and protein intake of 1.2-1.5 g/kg/day to preserve muscle[5].

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