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EDITORIAL COMMENT

# The elderly are priority candidates for cardiac rehabilitation

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In their article published in this issue of the *Journal*,[1] Marta Braga and colleagues studied a population of 731 coronary patients who completed phase 2 of a cardiac rehabilitation (CR) program in a Portuguese center between January 2009 and December 2016. They aimed to compare the gains resulting from participation in the program in older patients (aged ≥65 years), who accounted for 15.9% of the overall cohort, with those of younger patients (aged <65 years).

Compared to younger patients, the older group were more likely to be male, hypertensive and diabetic and to have a greater waist circumference, while the younger group included more smokers and had higher low-density lipoprotein (LDL) cholesterol and triglyceride levels on admission.

Older patients were more likely to have suffered non-ST-elevation myocardial infarction and to have multivessel disease. There was no significant difference between the groups in severity of left ventricular dysfunction.

Metabolic profile, functional capacity, parameters of cardiac autonomic regulation and quality of life were assessed. The authors found no significant differences between the two groups in the gains obtained and therefore concluded that older patients benefited to a similar extent to younger individuals in these four aspects.

Attesting to the excellence of the program, a reduction of 2-3 cm in waist circumference was observed, which was more marked in older than in younger women (-3.5 ± 3.1% vs. -0.6 ± 6.1%, p = 0.031). This reduction was not accompanied by significant reductions in body weight, which suggests that there had been a positive change in body composition, with an increase in lean mass and decrease in fat mass. This is rarely seen, particularly in elderly age-groups, in CR programs with biweekly sessions lasting less than three months such as those described in this study.

With regard to changes in lipid profile, mean decreases of 37.5 mg/dl and 17 mg/dl, respectively, were seen in LDL cholesterol and triglycerides. The latter may be explained solely by exercise and dietary modification, but the magnitude of the falls in LDL cholesterol could only have been achieved by beginning or increasing lipid-lowering medication, again demonstrating the good quality of cardiological management in this program.

The study has several limitations, which are pointed out by the authors, including those inherent to its retrospective design and the possibility of referral and selection bias, the fact that cardiopulmonary stress testing[2] was not used to obtain a more accurate quantification of functional capacity, and the lack of data on the study parameters after phase 2 of the CR program, which meant that its long-term impact could not be assessed. Two more limitations should be borne in mind: no direct analysis of body composition was carried out, and a questionnaire specific to coronary patients was not used to assess health-related quality of life.

The aim of the study has considerable merit, since elderly patients,[3] particularly older women,[4] who accounted for only 20.7% of the older group, are rarely referred for CR, due to the erroneous but widespread belief that advanced age, whether accompanied by frailty or not, leads to increased risk and fewer benefits. Further evidence for this perception is that only 15.9% of participants in the CR programs in this study, which reflects seven years of activity in a hospital with some of the highest numbers of CR participants in the country, were aged ≥65 years, whereas according to the most recent data from the Portuguese Registry of Acute Coronary Syndromes (ProACS),[5] the mean age of individuals suffering myocardial infarction in Por-

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tugal is 66 ± 13 years and 26% of them are aged over 75 years.

Contradicting this belief, the study by Braga et al. demonstrates yet again[6] that the elderly derive similar benefit from CR to younger individuals. This is an important finding and is further evidence that older as well as younger patients should be referred for CR programs after an acute event such as acute coronary syndrome (ACS) or cardiac surgery or in chronic conditions such as heart failure.

The elderly usually present higher clinical risk due to more severe cardiovascular and metabolic risk factors and a range of associated comorbidities,[7] including frailty, cerebrovascular disease, cognitive decline, heart failure, chronic obstructive pulmonary disease, peripheral arterial disease and locomotor system disorders. They therefore stand to benefit significantly from the reduction in risk derived from participation in a CR program that provides them with regular and individualized exercise, improved disease knowledge and psychosocial support.

However, including older patients in a CR program is a challenge for any center, which will need to make concerted efforts to overcome a variety of barriers.[8,9] These may be related to physicians (reluctance to refer patients for CR and failure to support their participation in a CR program), patients (inconvenience, lack of familiarity with sports, embarrassment at having to wear sports clothes and shoes, the feeling that the program is not designed for them, presence of comorbidities, financial constraints and difficulties with transport), and centers (unevenly distributed and hence unavailable in many parts of the country, inconvenient timetables, and lack of home-based programs with telemonitoring).

The main issue with CR in elderly patients (as also in younger individuals) is how to change behaviors and maintain the healthy lifestyles instilled during the program in the following years.

The study by Braga et al. demonstrates that significant benefits were achieved in soft endpoints (functional capacity, metabolic profile, autonomic nervous system activity and quality of life) after a CR program lasting 2-3 months, but not in reductions in hard endpoints such as reinfarction, hospitalization for heart failure and mortality, which would require a longer study with more patients.

To reduce the risk of these hard endpoints, patients' adherence to a healthy lifestyle and prognosis-changing medication must be sustained for many years.[3] This will be easier to achieve if patients are included in a phase 3 (maintenance) program of indefinite duration, in order to consolidate and maintain the gains obtained in phase 2.

The limitations in Braga et al.'s study pointed out above do not weaken its many valid and interesting conclusions, which are in my opinion valuable due to its appropriate methodology, the quality of the comprehensive analysis they performed, and the large population sample of real-world patients in a high-quality Portuguese CR program.

In the 2013-2014 national survey of CR in Portugal by Conceição Silveira and colleagues,[10] a total of 1927 patients were included in phase 2 programs in 2013, 51.8% of them following ACS. It was estimated that only 8% of Portuguese ACS patients were enrolled in CR programs. This survey, like previous ones, does not provide demographic information on participants, including age or gender, and so it is difficult to determine whether the patient population of Braga et al.'s study is representative of the country as a whole. However, this information will be available in the National Registry of Cardiac Rehabilitation, soon to be launched by the Working Group on Exercise Physiology and Cardiac Rehabilitation (GEFERC) and that will be housed in the National Center for Data Collection in Cardiology (CNCDC).

## Conflicts of interest

The author has no conflicts of interest to declare.

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