



Impact of Cardiac Rehabilitation in Patients after Myocardial Revascularization

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Abstract

Cardiac Rehabilitation (CR) and secondary prevention programs are considered among the main indications of ischemic heart disease, including the various methods of myocardial revascularization, either through coronary surgery or angioplasty.

CR is the intervention with the best scientific evidence to contribute to the reduction of morbidity and mortality in ischemic heart disease, particularly after myocardial infarction, but also in coronary artery interventions. Therefore, it is recommended with the highest level of scientific evidence (Class I) by the most important international cardiological organizations.

For surgical patients, rehabilitation begins immediately after surgery with the aim of facilitating the increase of their functional and psychological state.

Patients after coronary angioplasty are considered candidates for a physical exercise program, because this in addition to increasing their functional capacity reduces coronary risk factors and slows progression or decreases the severity of underlying atherosclerosis.

It is confirmed that the comprehensive CR reduces cardiovascular mortality, hospital admissions and increases the quality of life. Such benefits are valid for myocardial revascularization interventions, either by surgical or interventional methods.

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Keywords: Cardiac rehabilitation; Coronary surgery; Coronary angioplasty; Physical training

Abbreviations

IHD: Ischemic Heart Disease; CR: Cardiac Rehabilitation; MI: Myocardial Infarction; PT: Physical Training

Introduction

Cardiac Rehabilitation (CR) and secondary prevention programs are considered an essential part of the comprehensive treatment of patients with cardiovascular diseases and are among the main indications in the presence of the different forms of Ischemic Heart Disease (IHD), including the various methods of revascularization of the myocardium, either by coronary artery surgery or by dilatation or angioplasty of such arteries, by interventional method, with implantation of stents [1].

According to Piepoli et al. [2] as well as the European Association for Cardiovascular Prevention and Rehabilitation, CR is the intervention with the best scientific evidence to contribute to the reduction of morbidity and mortality in IHD, particularly after Myocardial Infarction (MI), but also in coronary artery interventions and stable chronic heart failure [3]. Therefore, CR is recommended, with the highest level of scientific evidence (Class I) in the treatment of IHD by the American College of Cardiology, the American Heart Association and the European Society of Cardiology [4-8], it is also an intervention cost-effective after an acute coronary event and Percutaneous Coronary intervention procedures [2,9-11].

Development

The MI and stable effort angina were the first types of rehabilitated IHD in which satisfactory effects were found in aspects related to quality of life, morbidity and mortality, which were confirmed since the end of the XX Century [12-15]. The development in the last decades of coronary revascularization procedures, both by surgical techniques [16,17] and by interventional methods [18] has led to the instrumentation of secondary prevention techniques and methods of integral

CR in this group of patients. The aim of this paper was to update the methodology and effects of physical exercise as part of a comprehensive CR program in patients after coronary revascularization.

Comparable rehabilitation regimens are indicated for patients after both methods of revascularization. For surgical patients, rehabilitation begins immediately after surgery and once they arrive at the Intensive Care Unit, physiotherapy is initiated with early body mobilization to begin a rehabilitation aimed at facilitating the increase of the patient's functional and psychological state that allows him or her carrying out basic activities once their return to home [19,20].

In patients after coronary surgery Physical Training (PT) programs can differ in relation to cases with MI, for example, in the surgical ones there can be a faster start of the exercises and a more accelerated progress, in the absence of infarction associated. PT programs in surgical patients increase functional capacity by more than 20%, similar to the increase found in MI patients [20,21].

Patients after coronary angioplasty are considered potential candidates to be included in PT programs, as this in addition to increasing their functional capacity, together with the rest of the measures of integral CR, reduces coronary risk factors and slows the progression or decreases the severity of the underlying atherosclerosis; these effects have also been observed in those cases with incomplete revascularization [22]. In addition, in the patients incorporated into CR programs, an earlier decrease and detection of coronary stenosis is proven, by the premature precision of symptoms and functional status, as well as by the periodic performance of ergometric tests, in which it is possible to observe signs of myocardial ischemia [23].

It is proven that PT reduces mortality in patients who underwent myocardial revascularization by coronary angioplasty, which has been attributed to the following mechanisms: favorable effects on coronary risk factors, decreased endothelial dysfunction and risk reduction of re-stenosis and decreased risk of sudden death. It has also been shown that PT improves the lipid profile in these patients, also reduces thrombotic phenomena by reducing fibrinogen levels, among other effects. Schuler et al. [24] have pointed out that with the advent and development of molecular biology some underlying mechanisms such as the bioavailability of nitric oxide and the mobilization and increase in the number of circulating endothelial progenitor cells can be identified. These molecular mechanisms can increase endothelium-dependent vasodilation and coronary flow reserve [25].

PT also produces a persistent increase in parasympathetic tone, as well as an improvement in autonomic dysfunction, thus decreasing the risk of sudden death, which may partly explain the favorable long-term evolution of patients who undergo physical rehabilitation [26].

Several studies have shown that PT not only increases functional capacity and quality of life after angioplasty and stenting, even in patients with additional cardiac dysfunction [27], but also decreases morbidity and mortality [28-31]. A study in Japan conducted in 2009, showed in 2,351 patients that early physical exercise after stenting during coronary angioplasty did not increase the risk of stent thrombosis or complications or signs of ischemia during the first 30 days of evolution [32].

The ergometric test is useful in the evaluation and follow-up of revascularized patients, not only to perform their risk stratification, but also to evaluate their functional capacity and the effectiveness of the revascularization therapeutic procedure performed; also to

determine the training pulse needed to individualize the PT program.

The PT programs prescribed to these patients must comply with the established fundamental principles, including the intensity and type of exercises, which will increase the maximum oxygen consumption, the stroke volume and the cardiac output, with the consequent functional improvement [33,34].

In Cuba, patients have been reported for incorporation into cardiac rehabilitation programs after coronary angioplasty with stent implantation of 34.4% and 94.5% after cardiovascular surgery, which included mainly patients with myocardial revascularization and valvular surgery [32,35]. The tendency to increase the incorporation into integral CR programs of patients who underwent coronary angioplasty with stenting is evident, which is attributed to greater demand and reliability on the part of patients and their treating physicians, towards participation in these programs, as well as towards their well-documented favorable effects [36].

Conclusion

It is now confirmed that the integral CR, which includes the programmed physical exercises, decreases cardiovascular mortality, hospital admissions and increases the quality of life. These benefits are consistent with patients with ischemic heart disease in its different forms of presentation and in myocardial revascularization interventions, either by surgical (coronary artery) or interventional methods (coronary angioplasty with stenting) and are independent of the type of study, its quality or place where it is carried out.

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