REVASCULARIZED CORONARY PATIENTS: BENEFIT OF CARDIAC REHABILITATION PROGRAM

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REZUMAT

Obiectiv: Evaluarea profilului de risc cardiovascular al pacientului coronarian la 16 luni post revascularizare miocardică (PCI+CABG). Material și metodă: Am evaluat profilul de risc cardiovascular, complianța la măsurile de profilaxie secundară și atingerea ţintelor la coronarienii revascularizați incluși în studiul EuroAspire III România, în funcție de participarea sau nu la programul comprehensiv de recuperare cardiovasculară (PR+/PR-). Rezultate: Post revascularizare miocardică, pacienții coronarieni au prezentat un profil de risc cardiovascular marcat. Comparând variabilele analizate, post intervențional și la 16 luni de la inițierea măsurilor de profilaxie secundară, am înregistrat o ameliorare semnificativă a parametrilor glicemici și hemodinamici (p<0,05). LDL colesterolul a scăzut semnificativ față de momentul inițial, deși la 16 luni de la revascularizare, valoarea lui absolută nu atingea recomandarea de ghid. Indicația de includere în programul de recuperare a fost făcută pentru 31% din grup, iar complianța a fost de 19%. Pacienții incluși în programul de recuperare au atins ţintele conform recomandărilor de ghid pentru modificarea foarte înaltă. Riscul cardiometaabolic și cel hemodinamic sunt menținute de neatingerea valorilor ţintă conform recomandărilor ghidului de prevenire cardiovasculară. Conclusii: Dar și complianța la un program structurat de recuperare cardiovasculara rămân la un nivel subliminal. Doar pacienții din lotul PR+ au cunoscut o ameliorare semnificativă a riscului cardiovascular. Cuvinte cheie: recuperare cardiovasculară, prevenție secundară, revascularizare miocardică.

ABSTRACT

Objective: Evaluating the cardiovascular risk profile in revascularized coronary patients after myocardial revascularization (PCI+CABG). Material and methods: We evaluated the cardiovascular risk profile, the compliance to the secondary prevention measures and reaching the guidelines targets in revascularized coronary patients included in EuroAspire III Romania. Patients were divided in two groups depending on their adherence to the cardiac rehabilitation program (CRP+/CRP-). Results: After myocardial revascularization, the epidemiological risk profile of analyzed group indicated an increased frequency of cardiovascular risk factors. Comparing the analyzed variables baseline and 16 months intervention, we observed a significant improvement for blood fasting glucose and hemodynamic parameters (p<0,05). LDL cholesterol declined significantly from baseline, although the absolute value was far from the guidelines recommendation. 31% of integral group received the indication for participating to CRP. Compliance for the whole group was about 19%. Patients from CRP+ group reached the recommended guideline targets for cardiometabolic and hemodynamic profile in a higher proportion comparing to non-participants (p<0,05, OR<1). No significant statistic differences were noticed between the two groups regarding blood fasting glucose and anthropometric parameters (p>0,05, OR>1). Conclusion: After myocardial revascularization, coronary patients presented an increased prevalence of cardiovascular risk factors. This high cardiometabolic and hemodynamic risk was maintained due to the inability to achieve the targeted values recommended by 2007 ESC prevention guidelines. Indication as well as compliance to a structured cardiac rehabilitation program remains at a suboptimal level. Only patients from CPR+ group registered a significant improvement of cardiovascular risk. Key Words: cardiac rehabilitation program, secondary prevention, revascularized coronary patient

INTRODUCTION

Cardiovascular disease (CVD) is the major cause of premature death and contributes substantially to the escalating costs of healthcare.\(^1\)

Myocardial revascularization has become a common modality in treating patients with coronary heart disease (CHD). Revascularization procedures (PCI/CABG) insure the saving of ischemic myocardium but does not influence the risk and the evolution of atherosclerotic process.
One of the main objectives of cardiovascular prevention is to slow the progression or to induce the regression of atherosclerotic disease in order to reduce cardiovascular morbidity and mortality to improve quality of life and increase the chances of a longer life expectancy.\(^2\)

EuroAspire I and II have demonstrated that lifestyle and risk factors management are far from the optimal level in revascularized coronary patients and a considerable potential in risk reducing still exist, pointing out the necessity for expanding and implementing the secondary prevention measures in an organized cost efficient manner.\(^3\)

Our main objective was to assess if revascularized coronary patients included in a comprehensive cardiac rehabilitation program improved their cardiovascular risk profile comparing to non-participants.

**MATERIAL AND METHODS**

We evaluated the cardiovascular risk profile, the compliance to secondary prevention measures and reaching the guideline goals in 463 consecutive revascularized coronary patients (PCI - percutaneous transluminal coronary angiography with stent implant/CABG-coronary artery by-pass grafting), retrospectively identified from hospital discharge lists and diagnostic registers, included in EuroAspire III Romania project. The starting date for identification was not less than 6 months and not more than 3 years prior to the expected date of interview.

Patients were divided in two groups according to their participation into CRP (cardiac rehabilitation program).

In order to evaluate the cardiovascular risk profile, we analyzed baseline and 16 months intervention: antropometric parameters (body mass index - BMI, waist circumference - WC), cardiometabolic parameters (blood fasting glycemia - BFG, serum triglyceride - TG, total cholesterol - TC, high density lipoprotein - HDL and low density lipoprotein – LDL), respectively hemodynamic parameters: (systolic blood pressure - SBP and diastolic blood pressure - DBP). Biochimic parameters were expressed in mg/dl. We notice that biological evaluation techniques were up to the standards.

We used the questionnaire method in order to quantify the compliance to lifestyle change measures recommended during the CRP.

**Statistics**

Variables were expressed as medium value + standard deviation; percents were calculated. Using t test for parametric variables and \(\chi^2\) test for categoric variables subgroup comparison was validated; \(p<0.05\) was considered statistically significant. Statistic analysis was performed using the Epi Info 6 (version 6.04d) program.

**RESULTS**

We selected a total of 463 revascularized coronary patients (74% men, 26% women) with an average age of 61+9.68 years; interventionally revascularized patients predominated versus surgical revascularized ones (69.3% versus 30.7%, \(p<0.05\)).

Baseline, the epidemiological risk profile of analyzed group indicated an increased frequency of traditional risk factors (3:4 patients were hypertensive, 1:4 patients had diabetes, 2:5 patients had a BMI>30kg/m\(^2\) and more than a half did not achieved the recommended lipid targets) respectively of non modifiable risk factors (family history of premature coronary heart disease in grade I relatives and age over 55 years old for men and 65 for women), as seen in Figure 1.

Comparing the analyzed variables, baseline and 16 months of sustained intervention, we observed a significant improvement for blood fasting glucose and hemodynamic parameters (\(p<0.05\)). The primary lipid target, LDL cholesterol, declined significantly from baseline, but the absolute value (109.62 + 44.66mg/dl) obtained after the initiation of secondary prevention measures, was far from the current guidelines.
recommendation. The amount of HDL cholesterol (40.84+8.69 mg/dl) and triglycerides (163.69+100 mg/dl) remains inadequately controlled, not providing long-term vascular protection, as seen in Table 1.

Table 1. Patients characteristics.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>After 16 months intervention</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>60.28+7.68</td>
<td>61.48+9.68</td>
<td>0.04</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>29.73+4.67</td>
<td>29.43+4.30</td>
<td>0.2</td>
</tr>
<tr>
<td>WC (cm)</td>
<td>101.9+11.21</td>
<td>100.5+9.21</td>
<td>0.4</td>
</tr>
<tr>
<td>SBP (mmHg)</td>
<td>147.21+25.92</td>
<td>143.52+22.09</td>
<td>0.01</td>
</tr>
<tr>
<td>DBP (mmHg)</td>
<td>84.20+11.26</td>
<td>82.46+11.96</td>
<td>0.02</td>
</tr>
</tbody>
</table>

After the revascularization procedure, a number of 144 patients (29.16% CABG patients and 70.83% PTCA patients) were recommended for CRP, but only 61% of them were compliant to this program and benefited from reinforced secondary prevention measures; we mention that the rest of the patients have not received any indication for participating in a cardiac rehabilitation program. (Fig. 2) Surgical revascularized patients adhered to this program in a higher proportion and were more responsive to the secondary prevention measures than those with PTCA (30% versus 14%, p<0.05).

We used the questionnaire method in order to quantify the compliance to secondary prevention measures that patients benefited during the rehabilitation program, presented in Table 2.

Comparing the targets achievement between patients included in the cardiac rehabilitation program versus non-participants, statistical analysis showed a significant decrease for the lipid and hemodynamic parameters (p<0.05; OR<1).

There were no statistically significant differences between the two groups for anthropometric parameters and blood fasting glucose (p>0.05; OR>1), as seen in Table 3.

Table 2. Secondary prevention measures applied in CRP.

<table>
<thead>
<tr>
<th>Secondary prevention measures</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational materials</td>
<td>12</td>
<td>13.63</td>
</tr>
<tr>
<td>Instructional health promotion sessions</td>
<td>23</td>
<td>26.13</td>
</tr>
<tr>
<td>Smoking cessation</td>
<td>36</td>
<td>40.90</td>
</tr>
<tr>
<td>Diet modification/weight control</td>
<td>81</td>
<td>92.04</td>
</tr>
<tr>
<td>Supervised program of physical activity</td>
<td>88</td>
<td>100.0</td>
</tr>
<tr>
<td>Stress reduction and relaxation methods</td>
<td>27</td>
<td>30.68</td>
</tr>
</tbody>
</table>

DISCUSSIONS

The rationale for an active approach to the secondary prevention of coronary heart disease is based on two key points: the progression of atherosclerosis relates strongly to lifestyles and risk factors modifications have been shown to reduce cardiovascular mortality and morbidity, particular in revascularized coronary patients. 3,4

In our study, after revascularization intervention, coronary patients presented a high cardiovascular risk profile due to increased prevalence of cardiovascular risk factors and to the inability to reach the targeted values recommended by current guidelines.

EuroAspire I and II showed a great prevalence of cardiovascular risk factors and a poor lifestyle intervention in revascularized coronary patients. 5

Since the results of our study suggested that cardiovascular targets are reached in a small proportion at 1.4 years after revascularization, there is a strong need for reinforcing secondary prevention measures; this point of
view is emphasized even more in anterior studies as much as in recent guideline of cardiovascular prevention.

EuroAspire III project results were recently published and demonstrated that in Romania, a limited number of patients with coronary heart disease were included in a the complex cardiac rehabilitation program with associated supervised physical activity. Results were similar to the ones obtained by the majority of European countries.6-8

Patients from our study included in CRP reached the targeted values according to the recommended guideline for LDL-cholesterol, HDL-cholesterol, serum triglyceride, fasting glycemia and blood pressure in a higher proportion than those who did not participate to CRP.

Similar results were found by Joep Perket al., who suggested that lipid and hemodynamic profile improvement in revascularized coronary patients was directly related to patient’s participation in CRP, independent of their prescribed pharmacological treatment.9-12

Clinical data demonstrated that revascularized coronary patients who performed supervised physical training were more responsive to secondary prevention measures, respectively weight control and drug treatment. Usually these preventive measures are not sufficiently implemented in the first phase of the rehabilitation program following revascularization.13-14

In our study, although there was a substantial improvement in cardiometabolic management of patients included in CRP, the majority of patients did not achieve the recommended goals.

We also observed that surgically revascularized coronary patients presented a greater availability to join the CRP, comparing to PTCA patients. Data from the literature are appropriate to our results. Interventionally revascularized patients minimize the severity of acute cardiovascular event and are less motivated to change their lifestyle comparing to those with CABG. Barriers responsible for the poor implementation of secondary prevention measures (from pharmacological treatment to cardiovascular rehabilitation program) are mainly represented by short-term hospitalization, lack of information and education of patients, respectively lack of social support.15-16

Considering that a lot of lifestyle change components contributed to cardiovascular risk profile improvement, all revascularized coronary patients must benefit from a professional multidisciplinary, prevention and rehabilitation program that addresses all aspects of lifestyle together with effective management of risk factors and appropriate prescribing of cardioprotective medication.

CONCLUSIONS

After revascularization procedures, patients with coronary heart disease remain at high cardiovascular risk.

Cardiometabolic and hemodynamic risk is maintained due to the inability to reach the targeted values that are recommended by the 2007 ESC prevention guideline.

Indication and also compliance to structured cardiac rehabilitation program after revascularization remains at a suboptimal level.

Sustained secondary prevention interventions, improved the cardiometabolic risk profile in revascularized coronary patients included in CRP, even through the guidelines targets are far from being achieved.

The data are similar with real life cardiovascular risk management and highlighted that it is a strong need to intensify preventive intervention in secondary care.

The comprehensive cardiovascular rehabilitation program is probably the most efficient approach for reducing cardiovascular risk and long term management of revascularized coronary patients.

REFERENCES