DOI 10 26724/2079-8334-2023-3-85-153-156
UDC 616.12-007.2-089-003

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MANAGEMENT OF PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING IN THE EARLY POSTOPERATIVE PERIOD

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The purpose of the study was to develop the recovery protocol for patients with coronary artery disease undergoing coronary artery bypass graft. Of the 132 patients, 30 patients received isolated coronary artery bypass graft, 30 patients – mitral valve prosthesis, and 72 patients underwent concomitant coronary artery bypass graft + mitral valve surgery. The rehabilitation program, including physical and psychological therapy, started from the first postoperative day and continued throughout the hospital stay. Of the 132 operated patients, 37 (28 %) had an adequate mental state, 95 (72 %) patients had significant mental changes including neurosis (20 cases), anxiety-depressive state (49 cases), hypochondria (19 cases), hysteria (7 cases). Through the individual approach and medical treatment, 121 (91.7 %) patients had an adequate mental state on days 12–14 postoperatively. The implementation of rehabilitation programs including physical and psychological therapy accelerates the convalescence period and return to normal life of early post-coronary artery bypass graft patients.

Key words: coronary heart disease, coronary artery bypass grafting, rehabilitation.

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ЛІКУВАННЯ ПАЦІЄНТІВ, ЩО ПЕРЕНЕСЛИ КОРОНАРНЕ ШУНТУВАННЯ, У РАНЬОМУ ПІСЛЯОПЕРАЦІЙНОМУ ПЕРІОДІ

Метою дослідження було розробити протокол відновлення пацієнтів з ішемічною хворобою серця, які перенесли аортокоронарне шунтування. Зі 132 хворих 30 пацієнтам виконано ізольоване аортокоронарне шунтування, 30 пацієнтам – протезування мітрального клапана, а 72 пацієнтам виконано супутню операцію аортокоронарного шунтування + операцію на мітральний клапан. Програма реабілітації, що включає фізичну та психологічну терапію, розпочиналася з першого дня післяопераційного періоду та тривала протягом усього перебування у стаціонарі. Зі 132 прооперованих хворих у 37 (28 %) був адекватний психічний стан, у 95 (72 %) хворих були значні психічні зміни, що включають неврози (20 випадків), тривожно-депресивні стани (49 випадків), іпохондрію (19 випадків), істерію (7 випадків). Завдяки індивідуальному підходу та медикаментозному лікуванню на 12–14 добу після операції у 121 (91,7 %) пацієнта було досягнуто адекватного психічного стану. Реалізація реабілітаційних програм, що включають фізичну та психологічну терапію, прискорює період одужання та повернення до нормального життя на ранніх післяопераційних стадіях у пацієнтів, які перенесли аортокоронарне шунтування.

Ключові слова: ішемічна хвороба серця, аортокоронарне шунтування, реабілітація.

Coronary heart disease (CHD) is the leading causes of mortality in developed countries. According to the data, it annually claims the lives of more than 2.5 million of population globally, which more than one third of them are people of middle age [3]. In recent years, significant progress has been made in the management of this disease. The landscape has changed considerably since the inception of surgical coronary artery revascularization.

An important achievment in the treatment of the ischemic heart disease was the perfroming of direct surgical myocardial revascularization, which is also referred to as coronary artery revascularization or coronary artery bypass grafting (CABG), which considerably improves the quality and the life expectancy of patients, and reduces the risk of developing of possible complications of the disease [9]. The prognosis of patients who have undergone CABG operation depends on a number of circumstances. The first is the “technical” features of the performed surgical intervention (for example, autoarterial bypass grafting compared to autovenous grafting is characterized by better patency of grafts and a lower risk of repeated complications of coronary artery disease) [5]. The second is the presence of concomitant diseases before the operation (previous myocardial infarction, diabetes mellitus, heart failure, age, etc.) [2]. Third, the better managament and preventing of early possible complications of CABG (atrial fibrillation, heart failure, venous thrombosis and thromboembolism, mediastinitis, infections etc.), prevention of further progression of atherosclerosis and ischemic heart disease [10]. For this purpose, along with the necessary medical treatment, physical psychological therapy of patients should be carried out, aimed at a earlier recover and return to the normal life [3, 10]. Cardiac rehabilitation is a complex intervention that seeks to improve the functional capacity, wellbeing and health-related quality of life of patients with heart disease [13]. Future research priorities include strengthening the evidence base for cardiac rehabilitation in other indications, including heart failure with preserved ejection fraction, atrial fibrillation and congenital heart disease and after valve surgery or heart transplantation, and evaluation of the implementation of sustainable

and affordable models of delivery that can improve access to cardiac rehabilitation in all income settings. The duration of hospital stay and recoveryfollowing cardiac surgery is 10–14 days [12].

The purpose of the study was to develop the recovery protocol for patients with coronary artery disease undergoing coronary artery bypass graft.

Materials and Methods. The study included 132 patients with CHD. 119 (90.15 %) were men and 13 (9.85 %) were women. Patients age ranged from 35 to 70 years (mean age was 51.8±7.01 years).

Of the 132 patients, 71 (53.8 %) had a history of myocardial infarction, of which 67 (94.4 %) were male and 4 (5.6 %) were female. Depending on the ethiology of the disease, 30 patients received isolated CABG, 30 patients – mitral valve prosthesis, and 72 patients underwent concomitant CABG + mitral valve surgery. We usually perform mitral valve surgery throught the left atrium, after the completion of coronary anastomoses and complete it just before removing the clamp from the aorta. According to the number of the bypasses, 1 vessel bypass was performed in 14 (10.6 %) patients, 2 vessel bypass in 21 (15.9 %) patients, 3 vessel bypass in 86 (65.2 %) patients and 4 vessel bypass in 11 (8.3 %) patients.

In the postoperative period, all the patients received comprehensive care including standard medical treatment and rehabilitation activities. Numerous tests were used to assess the function of the coagulation system, including activated partial thromboplastin time, prothrombin time, international normalized ratio, platelet count.

Medical treatment was carried out strictly individually for each specific patient, taking into account the severity of the clinical condition and sensitivity to drugs. The scheme of medical treatment in our study included drugs in following dosage: aspirin (300 mg/day), clopidogrel (75 mg/day), beta-blockers (intravenously), at a dosage 0.05 mg/kg/min (maximum maintenance dose 0.2 mg/kg/min), carvedilol (25 mg/day), angiotensin-converting enzyme inhibitors (ACEI: enalapril, 10 mg/day).

Descriptive statistical methods (mean, standard error, frequency, percentage) were used while evaluating the study data. A Student t-test was used for comparisons between two groups of normally distributed quantitative variables, and a Mann-Whitney U-test was used for comparisons between two groups of non-normally distributed quantitative variables. Statistical significance was accepted as $p<0.05$.

Results of the study and their discussion. In our patients undergoing CABG and CABG + mitral valve reconstruction surgery, the early medical treatment included aspirin, clopidogrel, beta-blockers, angiotensin-converting enzyme inhibitor. Depending on the nature of the pathology, we performed isolated CABG surgery on 30 patients, mitral valve replacement on 30 patients, and concomitant CABG + mitral valve surgery on 72 patients. Starting from the first day after surgery, aspirin was prescribed. In this group, 3 patients had symptoms of neurological disorder, which attenuated or disappeared with the conservative medical treatment prescribed by a neurologist. In addition to aspirin 121 (91.7 %) patients received cardioselective beta blocker – esmolol (intravenously). In 11 (8.3 %) patients with systolic dysfunction of the left ventricle, carvedilol was prescribed. In 35 (26.5 %) patients with reduced left ventricle function (ejection fraction <50 %), with concomitant arterial hypertension in the early postoperative period, intravenous ACEI were used (enalapril).

For patients undergoing CABG (1^{st} group) on the first postoperative day and patients undergoing CABG + mitral valve surgery (2^{nd} group) on the second postoperative day raised the head of the bed to put the patient in half-sited position; on the 2^{nd} and 3^{rd} postoperative days for patients of 1^{st}, 2^{nd} groups respectively, was allowed to perform simple exercises for the arm and leg. On the 3rd and 4th postoperative days, patients of 1^{st} and 2^{nd} groups were allowed to get out of bed and sit on the chair for 5–8 minutes. In the subsequent 2–3 days, the number of independent moving activities from bed to chair increased from 3 to 4 times for both group of patients. Breathing exercise 1^{st} group patients performed starting from the 4th day, 2^{nd} group patients from the 5th day. Starting from the $7–8^{th}$ day, the patients were accompanied by walks along the corridor. In the following days, patients were allowed to gradually increase physical activity. On the 10–14 days, they performed 50 to 100 meters of walking. At the same time, they performed self-monitoring of the pulse at rest, immediately and 3–5 minutes after exercise. The frequency and velocity of walking was determined on the basis of the patient's well-being and hemodynamics. Initially, the patient recommended walking up to 45–50 meters per minute, then 50–60 m/min.

On the 2^{nd} to 5^{th} days of postoperative period, 105 (79.5 %) of the 132 patients had astheno-neurotic syndrome, and only 27 (20.5 %) patients had an adequate mental status. Through the appropriate use of medical treatment, 121 (91.7 %) patients had an adequate mental state on days 12–14. The mortality rate was 8.3 % (11 patients).

The frequent combination of mental disorders of the depressive spectrum and cardiovascular diseases is one of the most urgent problems of modern medicine, because not only physical, but also mental problems aggravate the rehabilitation period after CABG [8, 11]. 95 (72 %) patients in our study had significant mental changes. Kudria IP, et al with the purpose to identify and assess the effectiveness of various psychodiagnostic methods in treatment of depressive disorders in patients with acute myocardial infarction. They observed 73 patients: 44 patients who underwent urgent coronary angiography with subsequent stenting of the infarct-related coronary artery and 29 patients who received only drug therapy. According to results obtained, the patients with acute myocardial infarction after urgent coronary angiography with stenting of the infarct-dependent artery were more likely to have mild and moderate depression according to the Beck scale compared to patients who received only conservative medical treatment. The reverse pattern is observed for moderate and severe depression. 68.2 % of patients with acute myocardial infarction after interventional intervention and 62.1 % on the background of conservative treatment according to the Zung scale showed depression of various degrees of severity, mostly mild. In our study, after comprehensive care including standard medical treatment and rehabilitation activities 121 (91.7 %) patients had an adequate mental state on days 12–14 [8].

Analysis of our data showed that cardiac rehabilitation is a very important factor of positive outcomes after all cardiac incidents including situation after cardiac surgery. The similar statement was noted by Teslenko YV, et al, who studied rehabilitation potential in patients with myocardial infarction according to a mathematical model that included indicators of hospital mortality, myocardial reperfusion, anxiety and depression, myocardial contractility, comorbidity and prehospital physical activity. The authors revealed that individual rehabilitation program according to the level of rehabilitation potential contributed to the early expansion of the physical exercise mode to the ward mode in patients of the experimental group for 2.83±0.13 days compared with 3.57±0.14 days in the control group. Thus, it is obvious, that patients that have undergone myocardial infarction require inclusion in the treatment program of cardiac rehabilitation as a component of secondary prevention [14]. The patients of our study were the persons with various degree of myocardium ischemia, so, the statement mentioned above is just for patient after CABG.

Despite significant improvement in cardiovascular outcomes, patients undergoing CABG remain at risk for recurrent adverse ischemic events and other cardiovascular outcomes (coronary revascularisation, stroke, cardiac death, etc.). Paquin A, et al, in their review summarized the most recent evidence in pharmacological preventive therapies addressing the residual cardiovascular risk in patients who have undergone CABG. The authors indicated that the role and the choice of enhanced antiplatelet/anticoagulation/lipid/glucose-modulating therapies following CABG should be better defined [9]. Actually, the common drug treatments after CABG include aspirin, clopidogrel, beta-blockers, angiotensin-converting enzyme inhibitors [4, 6]. All groups above were used in our work and demonstrated positive impact on outcomes.

Physical therapy of patients following the CABG has been shown to have beneficial effects, which began as early as in the first days of the postoperative period. The patients underwent gymnastics and massage while receiving drug treatment [1]. We have developed referral recovery programs for patients after the CABG, which give the opportunity to a following doctor to appoint an individual course of treatment using the hospital technical equipment [12, 13].

Secondary prevention through comprehensive cardiac rehabilitation has been recognized as the most cost-effective intervention to ensure favourable outcomes across a wide spectrum of cardiovascular disease, reducing cardiovascular mortality, morbidity and disability, and to increase quality of life. The delivery of a comprehensive and 'modern' cardiac rehabilitation programme is mandatory both in the residential and the out-patient setting to ensure expected outcomes[2]. A previous study by Kamlesh et al, investigated the effect of a cardiac rehabilitation program on Quality of Life (QoL) and physiological parameters after CABG surgery. They reported that the QoL of their patients improved after the cardiac rehabilitation program [7].

Borzou SR, et al in conclusion of their work noted that the implementation of the first phase of the cardiac rehabilitation program not only augmented self-efficacy in regard to independent daily activities but also lessened the need for the second phase of the program among our post-CABG patients [5].

Preoperative psychological preparation have positive effects on postoperative outcomes and gaining importance for cardiac surgery. Psychological rehabilitation of patients following the CABG is extremely necessary, since due to extensive chest trauma, which is a source of pain, postoperative cerebral hypoxia, causing functional disorders of the nervous system [11].

Conclusion

Long-term studies of the implementation of various rehabilitation programs for patients undergoing CABG suggest that they contribute to a more complete and rapid improvement in cardio-respiratory function and return to normal life. However, although the beneficial effect of CABG is indisputable, there is an obvious inconsistency between the clinical and functional status of patients and the social significance of surgery, because the disability rate after surgical treatment is still unreasonable. In this regard, to study the effectiveness of existing rehabilitation programs, as well as the development of novel programs remain an important task for the future. Considering the effectiveness of cardiac surgery in the treatment of coronary artery disease, it's necessary to review the existing protocols for establishing disability groups and monitoring the implementation of individual rehabilitation programs for patients after CABG at the outpatient department.

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Стаття надійшла 18.07.2022 р.