

## THE DYNAMICS OF QUALITY OF LIFE INDICATORS DURING SURGICAL REVASCULARIZATION OF MYOCARDIUM

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Coronary heart disease (CHD), being one of the most common cardiovascular diseases, has a negative impact on patients' quality of life. The purpose of the work was to study the dynamics of quality of life indicators in patients with CHD during surgical revascularization of myocardium depending on the presence or absence of old myocardial infarction. 68 patients with CHD were examined, including 57 (83.8%) patients with old myocardial infarction (old MI) and 11 (16.2%) patients in the absence of old MI. There was a statistically significant improvement in quality of life, both in the physical and psychoemotional spheres, in patients with stable coronary heart disease including those with a history of myocardial infarction. No effect of old MI on quality of life in patients after myocardial revascularization surgery was observed.

**Keywords:** CHD, quality of life, myocardial revascularization

**Authors contribution:** Shereshneva MV — conducting a survey, collecting materials, tables creating and description, writing a text. Ilyin MV — consulting on research, statistical calculations, writing a text.

**Compliance with ethical standards:** this study was approved by the Ethics Committee of the Yaroslavl State Medical University. Voluntary informed consent was obtained for each participant. The survey for the adult population was conducted on a voluntary basis.

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## ДИНАМИКА ПОКАЗАТЕЛЕЙ КАЧЕСТВА ЖИЗНИ ПРИ ПРОВЕДЕНИИ ХИРУРГИЧЕСКОЙ РЕВАСКУЛЯРИЗАЦИИ МИОКАРДА

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Ишемическая болезнь сердца, будучи одним из самых распространенных сердечно-сосудистых заболеваний, оказывает негативное влияние на качество жизни пациентов. Целью работы было изучение динамики показателей качества жизни больных ИБС при проведении хирургической реваскуляризации миокарда в зависимости от наличия или отсутствия постинфарктного кардиосклероза. Обследованы 68 больных ИБС, в том числе 57 (83,8%) пациентов с постинфарктным кардиосклерозом (ПИКС) и 11 (16,2%) больных в отсутствие ПИКС. У пациентов со стабильной ишемической болезнью сердца, в том числе при наличии инфаркта миокарда в анамнезе, наблюдалось статистически значимое улучшение качества жизни, как в физической, так и в психоэмоциональной сферах. Установлено отсутствие влияния ПИКС на качество жизни пациентов после операции реваскуляризации миокарда. Пациент должен активно быть вовлечен в поиск оптимальной в его индивидуальном случае стратегии улучшения прогноза и качества жизни, что сопряжено с определенными этическими проблемами выбора.

**Ключевые слова:** ИБС, качество жизни, реваскуляризация миокарда

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Cardiovascular diseases are not only the leading cause of death worldwide. They also significantly worsen the quality of human life. Being one of the most common cardiovascular diseases, coronary heart disease significantly limits mobility of patients including limitations of self-service. Comorbidity makes a certain negative contribution to quality of life in patients with CHD [1]. Depressive and anxiety disorders occur more commonly in patients with CHD than in a population [2]. Meanwhile, increased anxiety provokes angina attacks and intensifies ischemia.

Quality of life means a wide specter of parameters associated with physical activity, capacity for labor, social interactions, self-service, emotional stability, absence or

presence of discomfort, including the one associated with the disease. To reflect common satisfaction, the term HRQoL (health-related quality of life) assessing the effect of a disease or disability on a human well-being is used in clinical practice. To study patients' quality of life as the subjective parameter, the survey method is applied. Short-Form 36 (SF-36) is a standard survey reflecting general well-being in the physical (physical health, PH) and psychoemotional (psychic component, MH) spheres. Complexity and non-specificity, i. e., the capacity to assess parameters in different pathologies, belong to its advantages.

It is demonstrated that coronary artery bypass grafting (CABG) does not only improve the prognosis and decrease

**Table 1.** Dynamics of mental (MH) and physical (PH) health indicators in patients with CIHD ( $n=11$ )

Indicator	V1	V2	$p$
MH, scores	39.2 (34.7; 42.6)	49.3 (37.8; 52.9)	0.004
PH, scores	31.4 (25.2; 38.3)	41.1 (36.1; 49.9)	0.0001

**Table 2.** Dynamics of mental (MH) and physical (PH) health indicators in patients with IHD and old MI ( $n=57$ )

Indicator	V1	V2	$p$
MH, scores	39.3 (36.2; 44.7)	48.4 (38.9; 53.2)	0.0017
PH, scores	34.6 (26.4; 39.1)	41.1 (36.1; 48.2)	<0.0001

**Table 3.** Influence of the presence of old MI on the values of mental (MH) and physical (PH) health parameters in patients with CHD ( $n=68$ )

	Multiple-R	Multiple-R <sup>2</sup>	Adjusted-R <sup>2</sup>	F	$p$
B1 SF36 (MH)	0.13	0.017	-0.003	0.84	0.36
B1 SF36 (PH)	0.24	0.058	0.038	2.96	0.09
B2 SF36 (MH)	0.0028	0.01	-0.020	0.0003	0.98
B2 SF36 (PH)	0.105	0.01	-0.009	0.53	0.46

a number of anginal attacks, but also results in a significant improvement of overall quality of life, both short-term and long-term [3].

Though revascularization by means of CABG is currently a routine intervention, it is accompanied with certain risks of post-operative complications and mortality [4]. The factors influence on the subjective perception by a patient of relevant intervention and potential improvement of quality and life expectancy, and promote development of anxiety in perioperative period. Some patients have difficulties after a surgery as well; they mention their dissatisfaction with life quality [5].

The purpose of the study was to examine the dynamics of life quality parameters in patients with CABG while performing surgical myocardial revascularization depending on the absence or presence of old MI.

## MATERIALS AND METHODS

68 patients with CABG aged 38 to 76 years old ( $58.7 \pm 8.8$  years in average) were examined, including 55 men and 13 women, who were admitted to the department of heart surgery of the Yaroslavl Regional Clinical Hospital to perform coronary artery bypass surgery. The diagnosis of CHD is confirmed by the results of a clinical study, stress tests, coronary angiography.

The patients were divided into groups depending on whether there was a history of acute myocardial infarction: 57 (83.8%) patients had old myocardial infarction (old MI), 11 (16.2%) of patients had no old MI (CIHD or chronic ischemic heart disease).

The SF-36 survey was used to examine the parameters of quality of life. It was designed to capture general well-being and degree of satisfaction with life activity influenced by the state of health. The SF-36 has 36 items grouped in dimensions: physical functioning, role activities, bodily pain, general health, vitality, social functioning, emotional condition and mental health. The higher is the index (from 0 to 100), the better is the estimate according to the selected scale. The indices are used to provide the mental (MH) and physical (PH) health components [17]. Considering the decrease of life quality during the postoperative period, the examination was done prior to the surgery (V1) and at 6 months (V2).

Statistical data were processed using STATISTICA 10.0 pack of programs (StatSoft Inc., USA). The normality of distribution of qualitative parameters was checked using the Kolmogorov-Smirnov test with Lilliefors' amendment and

Shapiro-Wilk test. Due to log-normal distribution of attributes, the cited data are presented as a median and percentiles (25.0% and 75.0%). A Mann-Whitney U test was utilized to compare two independent groups by one attribute. The study of an attribute dependence type on one or several other attributes was done based on the logistic regression analysis. The critical value of statistical significance level was at 5.0%.

## RESULTS AND DISCUSSION

When analyzing the results of quality life parameters obtained during research using the SF-36 survey (table 1), it was established that in the group with CIHD, MH and PH were 39.2 and 31.4 scores, respectively, prior to the surgery, and 49.3 and 41.1 scores, respectively, at 6 months ( $p = 0.004$  and  $p = 0.0001$ ).

In patients with IHD and old MI (table 2), MH and PH were 39.3 and 34.6 scores, respectively, prior to the surgery, and 48.4 and 41.1, respectively, at 6 months after the coronary artery bypass grafting ( $p = 0.0017$  and  $p < 0.0001$ ).

A statistically significant improvement of life quality, both in physical, and psychoemotional spheres, was observed in patients with stable ischemic heart disease, including those with a history of myocardial infarction. No statistically significant differences were obtained during comparison of physical and psychoemotional health parameters in patients with or without a history of myocardial infarction.

The logistic regression analysis showed a lack of old MI influence on quality of life in patients after myocardial revascularization (table 3).

Coronary artery bypass grafting is performed under cardiopulmonary bypass (on-pump CABG) or under the beating heart (off-pump CABG). The results of a large multi-center clinical study revealed no advantages of any surgery neither for prognosis and rate of revascularization, nor for quality of life or cognitive functions [4]. The subsequent studies showed no difference between ONCABG and OPCABG for the effect produced on life quality [6], including in the need of recurrent intervention [7].

The method of revascularization (PCI or coronary artery bypass), performed in accordance with indications, also produces no influence on life quality parameters [8]. Based on the results of a small prospective randomized study, a greater improvement of life quality according to the SF-36 was noted at 3 months after the surgery as compared to those who

underwent an intervention under standard cardiopulmonary bypass [9].

According to Pačarić S et al., in the remote period, coronary artery bypass grafting is followed by a significant improvement of life quality over all domains of the SF-36 survey with the greatest difference for the pain syndrome. The best outcome was observed at one year after the intervention, whereas at one month after the surgery quality of life was not satisfactory [10]. Grazulyte D. et al. showed that within five years after surgical interventions on the heart (the study also included the patients who underwent a surgery on the valvular heart apparatus) a significant improvement of physical and social functioning, mental health and vitality was noted.

Among the analyzed factors (dyslipidemia, arterial hypertension, low ejection fraction, high scoring according to EuroScore II, cardiac rhythm disorders), only arrhythmia was a significant prognostic factor for lower parameters of vitality and social functioning [11]. High level of anxiety for myocardial infarction in patients with CHD and diabetes was associated with a greater rate of occurrence of new areas of myocardial ischemia [14]. In patients with CHD, who underwent rehabilitation, bad quality of life was related to a greater fatigue and decreased tolerability of physical load irrespective of psychoemotional stress and CHD severity [15].

A large prospective study was conducted in Netherlands. The purpose was to study quality of life and potential factors with an influence within one year after a cardiosurgical intervention. 2 basic groups of patients were identified (with and without improved physical functioning) based on the scoring in the SF-36 survey physical functioning domain. The last ones accounted for 21.9% of all the participants. Lower scores in the domain of physical functioning were observed in patients with improvement at one year after the surgery.

The patients with a lack of improvement after the surgery had a more frequent history of myocardial infarction. The factors associated with a lack of improvement were identified during the subsequent analysis: infectious complications following the interventions and need in recurrent PCI. 23.2% of patients who underwent coronary artery bypass grafting had no improvement in the physical domain at one year following the intervention. The factors associated with the lack of improvement were the same. A surgery type produced no effect on life quality [12].

A prospective study involving 272 patients who underwent coronary artery bypass grafting was conducted based on the university clinics of cardio- and thoracic surgery in France. Prior to the surgery and within 10 years after it, the patients were surveyed using the SF-36. At 5 years, the cumulative indicators of both the physical, and mental components were significantly higher than the primary ones. At 10 years, PH was significantly lower than at 5 years. However, it was still significantly higher than the primary one. Diabetes and dyspnea made the greatest contribution into the worsening of a physical condition. At 10

years, the mental component parameter was higher than prior to the surgery [13].

Østergaard B. et al. made an emphasis on the population elder than 70 years old and subsequently examined their life quality at 3, 5 and 8 years after the intervention. Statistically significant differences were noted only for the social functioning with a higher scoring for the patients who underwent a surgery using cardiopulmonary bypass. At eight years, a significant improvement of role functioning due to an emotional condition was found in the general population. On the contrary, the parameters of physical functioning that were the best at 12 months were gradually decreased at eight years after the intervention. This was probably associated with the peculiarities of inclusion criteria [16].

## CONCLUSION

The coronary heart disease materially produces a negative influence both on the physical, and psychoemotional health of patients. Myocardial revascularization due to coronary artery bypass grafting improves the prognosis and life quality in patients with CHD irrespective of a history of myocardial infarction.

The patient needs to be actively involved into the search for an optimal individual strategy of improving the prognosis and quality of life. This is associated with certain ethical issues of choice. It is important to find a correct decision, considering the balance of benefit and risk and using the weighted assessment of prognosis and quality of life priorities. Though the benefit of revascularization in relation to ischemia therapy was convincingly proved, in some cases, optimal drug therapy is a reasonable alternative, which is not less effective than a surgery and has no associated risks. Thus, a patient with a stable CHD must be explained all possible types of treatment and their potential negative consequences associated with some kind of intervention in an easily understandable and clear way, both in the nearest, and remote time.

The patient who is currently satisfied with life quality, can underestimate the risks of great unfavorable cardiovascular events in the future. On the contrary, the patient who suffers from angina pectoris, can ignore the fact that in certain clinical situations a drug therapy and modified way of life help avoiding bad symptoms and improve the outcomes just like revascularization does. In his turn, a cardiovascular surgeon must be driven not by professional ambitions and objectively assess his skills while choosing a method of coronary artery bypass grafting: technically, an off-pump surgery is a more complicated procedure that must be performed by an experienced surgical team only. When revascularization is an option, a decision on its optimal method must be jointly taken by a cardiologist, heart surgeon and specialist in X-ray endovascular diagnostics.

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