УДК
DOI 10.17802/2306-1278-2025-14-5-16-26

КАЧЕСТВО ЖИЗНИ И ЭМОЦИОНАЛЬНОЕ СОСТОЯНИЕ ПАЦИЕНТОВ ПОСЛЕ ХИРУРГИЧЕСКОЙ КОРРЕКЦИИ ПРИОБРЕТЕННОГО ПОРОКА МИТРАЛЬНОГО КЛАПАНА ЗАВИСИТ ОТ НАЛИЧИЯ ПРЕДОПЕРАЦИОННОЙ ЛЕГОЧНОЙ ГИПЕРТЕНЗИИ

И.Н. Ляпина[1], Ю.Е. Кузьмина[2], Т.В. Мартынюк[3], Е.В. Дрень[1], И.В. Двадцатов[1], П.Н. Двадцатова[4], Ю.А. Аргунова[1], О.Л. Барбараш[1]

[1] Федеральное государственное бюджетное учреждение "Научно-исследовательский институт комплексных проблем сердечно-сосудистых заболеваний", бульвар имени академика Л.С. Барбараша, 6, Кемерово, Российская Федерация, 650002; [2] ООО "Каноха", улица имени Адмирала Серебрякова, д. 4, стр. 1, Краснодар, Российская Федерация, 350073; [3] Национальный медицинский исследовательский центр кардиологии имени академика Е.И. Чазова, ул. Академика Чазова, 15А, стр. 3, Москва, Российская Федерация, 121552; [4] Федеральное государственное бюджетное образовательное учреждение высшего образования "Кемеровский государственный медицинский университет" Министерства здравоохранения Российской Федерации, ул. Ворошилова, 22А, Кемерово, Российская Федерация, 650056

Основные положения

- Одним из факторов, существенно влияющих на тяжесть течения заболевания у пациентов с приобретенными пороками клапанов сердца, является наличие не только нарушений внутрисердечной гемодинамики, но и предоперационной легочной гипертензии.
- У пациентов с приобретенным пороком митрального клапана и предоперационной легочной гипертензией наблюдалась хорошая положительная динамика качества жизни по многим параметрам в течение первого месяца после операции. Однако пациенты без легочной гипертензии на исходном этапе демонстрировали лучшие параметры, тогда как в послеоперационном периоде у них наблюдались функциональные ограничения.
- Были выявлены факторы, связанные с ухудшением качества жизни и эмоционального статуса до и после хирургической коррекции приобретенного порока митрального клапана, такие как наличие фибрилляции предсердий до операции и мужской пол.

Цель	Проанализировать периоперационное качество жизни и эмоциональное состояние пациентов с приобретенным пороком митрального клапана (ППМК), перенесших хирургическую коррекцию, а также оценить вклад предоперационной легочной гипертензии (ЛГ) в периоперационную динамику этих показателей.
Материалы и методы	В исследование были включены 103 пациента с ППМК неинфекционного генеза, которые были госпитализированы для плановой операции на сердце. У 61,2% пациентов до операции была выявлена ЛГ. Анализ качества жизни (SF-36) и эмоционального состояния (HADS) проводился до операции и на 7-й день, через месяц и год после операции.
Результаты	У пациентов с ППМК и предоперационной ЛГ в течение первого месяца после операции наблюдалась значительная положительная динамика качества жизни по многим параметрам. Однако пациенты без ЛГ были более компенсированы на исходном этапе, но демонстрировали функциональные ограничения в послеоперационном периоде. Установлено, что увеличение возраста пациента с ППМК на 1 год связано со снижением исходного уровня физической составляющей здоровья на B-коэффициент = –0,21 (p = 0,014). Наличие фибрилляции предсердий до коррекции ППМК было связано со снижением физической составляющей здоровья на 7-й день (B-коэффициент = –10,92; p = 0,03) и снижением психической составляющей здоровья на 30-й день после операции (B-коэффициент = –12,66; p = 0,006). Мужской пол ассоциируется с повышенным уровнем тревожности и депрессии во всех контрольных точках и более низким уровнем психического здоровья, чем у женщин с ППМК.
Заключение	Были выявлены факторы, связанные с ухудшением качества жизни и эмоционального статуса как до, так и после хирургической коррекции приобретенного

Для корреспонденции: *Ирина Николаевна Ляпина, zaviirina@mail.ru; адрес: бульвар имени академика Л.С. Барбараша, 6, Кемерово, Российская Федерация, 650002*
Corresponding author: *Irina N. Lyapina, zaviirina@mail.ru; address: 6, Acad. Barbarash blvd., Kemerovo, Russian Federation, 650002*

порока митрального клапана, такие как наличие фибрилляции предсердий до операции и мужской пол.

Ключевые слова Пороки клапанов сердца • Хирургическая коррекция • Митральный клапан • Легочная гипертензия • Качество жизни • Тревога и депрессия

Поступила в редакцию: *27.05.2025;* ***поступила после доработки:*** *03.07.2025;* ***принята к печати:*** *17.07.2025*

QUALITY OF LIFE AND EMOTIONAL STATE IN PATIENTS AFTER SURGICAL CORRECTION OF ACQUIRED MITRAL VALVE DISEASE DEPENDS ON THE PRESENCE OF PREOPERATIVE PULMONARY HYPERTENSION

I.N. Lyapina[1], Yu.E. Kuz'mina[2], T.V. Martynyuk[3], E.V. Dren'[1], I.V. Dvadtsatov[1], P.N. Dvadtsatova[4], Yu.A. Argunova[1], O.L. Barbarash[1]

[1] Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", 6, Acad. Barbarash blvd., Kemerovo, Russian Federation, 650002; [2] LLC "Kanoha", 4, bld. 1, Im. Admirala Serebryakova St., Krasnodar, Russian Federation, 350073; [3] E.I. Chazov National Medical Research Centre of Cardiology, 15A, Academican Chazov St., Moscow, Russian Federation, 121552; [4] Federal State Budgetary Educational Institution of Higher Education "Kemerovo State Medical University" of the Ministry of Health of the Russian Federation, 22A, Voroshilova St., Kemerovo, Russian Federation, 650056

Highlights

• One of the factors that significantly contribute to the severity of the disease in patients with acquired valvular heart disease is the presence not only intracardiac hemodynamic disorders, but also preoperative pulmonary hypertension.

• Patients with acquired mitral valve disease and preoperative pulmonary hypertension showed significant positive dynamics in the quality of life in many parameters within the first month after surgery. However, patients without pulmonary hypertension were more compensated at baseline and noted functional limitations in the postoperative period.

• Factors associated with deterioration in quality of life and emotional status before and after surgical correction of acquired mitral valve disease were identified as the presence of preoperative atrial fibrillation and male gender.

Aim To analyze a perioperative quality of life and emotional state of patients with acquired mitral valve disease (AMVD) who underwent surgical correction, as well as to assess the contribution of preoperative pulmonary hypertension (PH) to the perioperative dynamics of these parameters.

Methods The study included 103 patients with AMVD of noninfectious origin, who were hospitalized for elective cardiac surgery. 61.2% of patients had PH before surgery. Quality of life (SF-36) and emotional state (HADS) analysis were conducted before surgery and on day 7, one month and one year after surgery.

Results Patients with AMVD and preoperative PH showed significant positive dynamics in the quality of life in many parameters within the first month after surgery. However, patients without PH were more compensated at baseline and noted functional limitations in the postoperative period. It was found that an increase in the age of a patient with AMVD by 1 year is associated with a decrease in the initial level of the physical component of health by B-coefficient = –0.21 (p = 0.014). The presence of atrial fibrillation before the correction of the AMVD was associated with a decrease in the physical component of health on day 7 (B-coefficient = –10.92; p = 0.03) and decrease in the mental component of health on day 30 after surgery (B-coefficient = –12.66; p = 0.006). Male gender is associated with increased levels of anxiety and depression at all control points with lower level of mental health than women with AMVD.

Conclusion Factors associated with a deterioration in quality of life and emotional status both before and after surgical correction of acquired mitral valve disease were identified as the presence of preoperative atrial fibrillation and male gender.

Keywords Valvular heart disease • Surgical correction • Mitral valve • Pulmonary hypertension • Quality of life • Anxiety and depression

Received: *27.05.2025;* ***received in revised form:*** *03.07.2025;* ***accepted:*** *17.07.2025*

List of abbreviations

AF – atrial fibrillation
AMVD – acquired mitral valve disease
BP – bodily pain
GH – general health
HADS – hospital anxiety and depression scale
MH – mental health
MV – mitral valve
PF – physical functioning
PH – pulmonary hypertension
QoL – quality of life
RE – role-emotional
RP – role-physical functioning
RV – right ventricular
SF – social functioning
VHD – valvular heart disease
VT – vitality

Introduction

Currently, the quality of life (QoL) and emotional state of patients with cardiovascular pathology are recognized by many researchers as a reliable characteristic of psychological status and an important criterion for evaluating the effectiveness of medical care, including cardiac surgery [1]. The high significance of such an indicator as QoL is determined by the reflection of the patient's subjective perception of changes in their physical condition against the background of exposure to the existing disease or treatment, psychological background and interaction with society, which directly affect the patient's prognosis. A significant influence on the patient's QoL level is also exerted by their demographic status, living conditions, nature of work, lifestyle, and cultural values [2]. One of the most common and validated questionnaires for assessing QoL is the «SF-36 health status survey» (SF-36) [3].

Open heart surgeries are stressful and asthenic processes, that have a significant impact on the mental status, provoking or exacerbating preoperative anxiety and depressive disorders, which, in turn, can further worsen the QoL of patients, reducing the effect of treatment [4]. Patients with valvular heart disease (VHD) are a special group in which the progression of the disease is naturally accompanied by the development of heart failure and cardiac arrhythmia, which significantly limits the QoL of such patients.

Ensuring a satisfactory state of health in the postoperative period is particularly relevant for patients with multivalvular lesions, that initially have a more severe functional class of heart failure (NYHA). The emotional status of the patient is also important, as it determines the speed of postoperative recovery and compliance with the recommendations given at discharge from the hospital [5].

One of the factors that significantly contributes to the severity of the disease, perioperative QoL, and rehabilitation potential of patients with acquired VHD is the presence of not only intracardiac hemodynamic disorders, but also preoperative pulmonary hypertension (PH) [6].

Therefore, **the aim of this study** was to study the perioperative analysis of QoL and the emotional state of patients who underwent elective cardiac surgery of mitral valve disease, using artificial circulation, as well as to study the contribution of PH to the nature of the perioperative dynamics of QoL and the emotional state of these patients.

Methods

The study included patients with acquired non-infectious mitral valve (MV) disease (AMVD) (n = 103). In the period from November 2020 to December 2022, patients were hospitalized to perform mitral valve correction in the conditions of artificial circulation. Criteria presented in *Figure*.

Before the operation and 7 days, 30 days, and 1 year after the MV intervention, in addition to the standard clinical and instrumental examination, QoL was assessed using the SF-36 health status survey and the patient's emotional status using the hospital anxiety and depression scale (HADS).

After conducting preoperative transthoracic echocardiographic (Echo), all patients (n = 103) were divided into two groups, depending on the presence (group 1) or absence (group 2) of PH. A high probability of PH according to transthoracic echocardiography was the criterion for separating patients (*Figure*) [7]. The presence of PH before surgery was confirmed by right heart catheterization in 40 patients from group 1. Isolated postcapillary PH was diagnosed in 30 patients (75%) and combined post-/precapillary PH was diagnosed in 10 patients (25%).

The group with high probability of PH according Echo included 63 patients (61.2%), and the group

without PH included 40 patients (38.8%). The groups were comparable in age and gender (Table 1). The groups were comparable in comorbid pathology, except for one position – the prevalence of stage 3A – 5 chronic kidney disease. Despite insignificant differences in the median GFR, almost half of the patients in the PH group had severe kidney disease with stage 3A to stage 4 chronic kidney disease (46.0% vs. 35.0%; p = 0.006). More severe functional statuses, as well as heart failure signs were characterized by patients from the PH group.

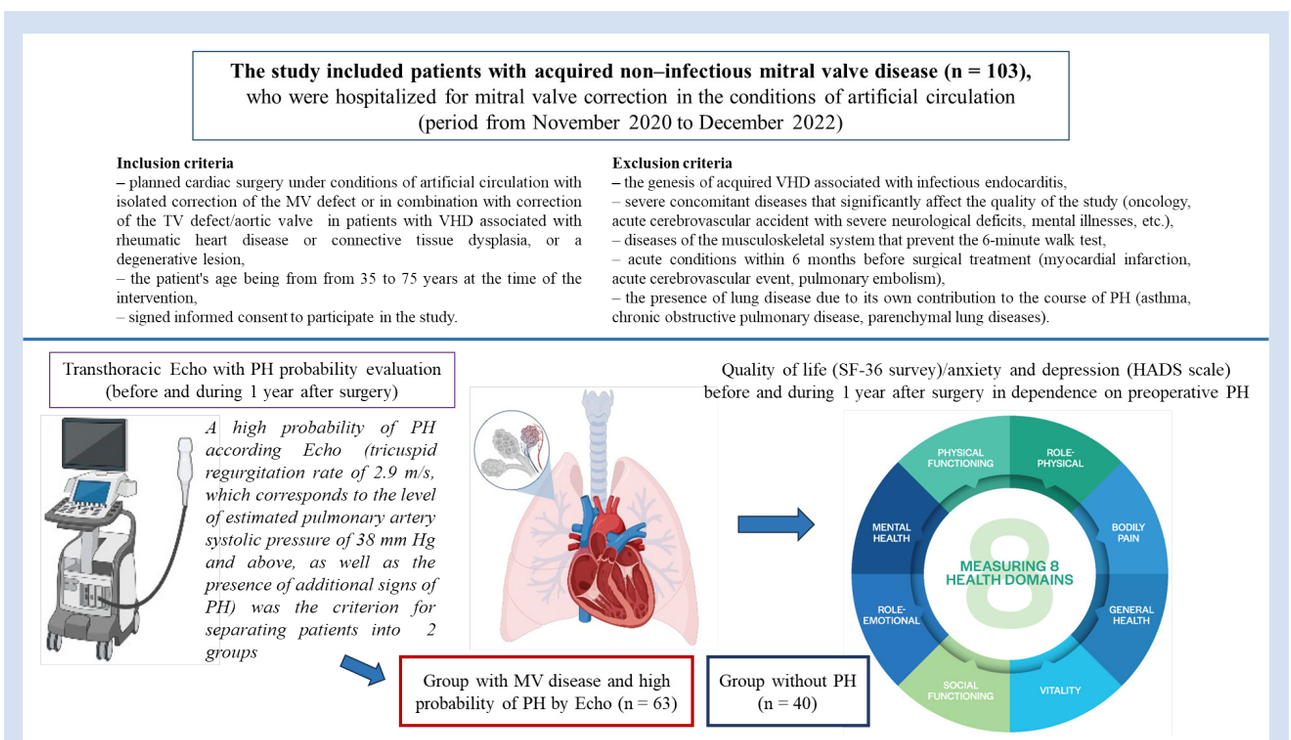
Before the surgery all patients signed informed consents for the possibility of using their medical history data and the results of examinations/course of the surgery. The study was carried out in accordance with the principles of the Declaration of Helsinki the World Medical Association; the study protocol was approved by the Academic Council and the local Ethics Committee of the Research Institute for Complex Issues of Cardiovascular Diseases (meeting No. 19 of 05.11.2020).

Statistical analysis of the data was performed using standard nonparametric methods after determining the normality of the distribution using the licensed STATISTICA 10.0 program (StatSoft, USA). Quantitative variables are represented as a median with an interquartile range (Me [Lq; Uq]), while qualitative variables are represented as a percentage (n (%)). The Mann-Whitney U-test was used to evaluate the quantitative trait in two independent samples, and the Wilcoxon test was used in two dependent samples. To analyze the frequency differences in two independent samples, Pearson's χ^2 criterion was used. To identify the relationship between the studied values, Spearman correlation analysis was performed. For quantitative indicators, the results of linear regression analysis are presented as the B-coefficient (coefficient of elasticity) and the level of statistical significance (p-level). The critical level of statistical significance was assumed to be 0.05.

Result

When comparing the preoperative QoL levels of patients with AMVD in the two groups, a more significant decrease in only role-based physical functioning (RP) was found in patients with PH (RP; p = 0.01), which indicates a greater restriction in the performance of work and household duties, compared with the group of patients with MV disease without PH (Table 2).

A week after the surgery, a significant improvement in mental health was observed within the PH group (Group 1) (mental health (MH), despite an increase in pain intensity (bodily pain (BP), which in turn was associated with the sternotomy. In patients of group 2 (without PH) with initially better functional state, self-care and freedom of movement were restricted (physical functioning (PF) against the existing pain syndrome (p = 0.03). A week after the intervention,



Study design

Note: *HADS – hospital anxiety and depression scale; MV – mitral valve; PH – pulmonary hypertension; TV – tricuspid valve; VHD – valvular heart disease.*

The images are borrowed from the article by Riley JM, Fradin JJ, Russ DH, Warner ED, Brailovsky Y, Rajapreyar I. Post-Capillary Pulmonary Hypertension: Clinical Review. Journal of Clinical Medicine. 2024; 13(2):625. https://doi.org/10.3390/jcm13020625. Distributed under the License CC BY 4.0.

when comparing the results of the questionnaires of the two groups, a greater influence of pain syndrome (BP) and emotional background on their own physical abilities (role emotional (RE) was noted in the respondents of the first group compared to patients without PH before surgery (Table 2).

In the group of patients with preoperative PH there was a significant improvement in physical functioning (PF) with general health (GH), as well as an improvement in physical and mental components of QoL a month after surgery. However, in group 2 (without PH), there were restrictions in the performance of work duties (RP). The QoL indicators in these two groups became comparable only 30 days after the operation (Table 2).

Thus, during the year after cardiac surgery, the PH group showed a significant increase in scores for almost all QoL points compared to the preoperative period. Improvement in general health (GH) and vital activity (VT) was mainly observed due to a decrease in pain intensity (BP) and an improvement in the emotional state of patients (RE). Such dynamics of QoL scales made it possible to more than double the opportunities for self-service and free movement (PF), as well as to perform work duties (RP). As a consequence, the social interaction of patients also expanded (SF, p = 0.001). In group 2 patients (without PH), QoL also improved one year after surgery compared to the condition before valve intervention. However, it was improved only on three scales and with less significant dynamics than in the group with PH (physical functioning (PF), pain intensity (BP) and vital activity (VT) (Table 2).

When assessing the level of anxiety according to the HADS scale, its significant dynamics were observed only 7 days after the surgery with a more pronounced decrease in the group without PH (by 3 points), and by a median of 1.5 points in the group with PH (p = 0.04 between groups). According to the HADS scale, the level of depression in two groups decreased by only 1 point one month after the intervention, which remained

Table 1. Comparative characteristics of patients before surgical correction of VHD, depending on the presence or absence of preoperative PH

Indicator	Group		p
	with PH according to Echo data (group 1) (n = 63)	without PH according to Echo data (group 2) (n = 40)	
Gender, men, n (%)	33 (52.4)	24 (60.0)	0.49
Age, years, Me [Lq; Uq]	61.0 [51.0; 67.0]	58.0 [51.0; 66.0]	0.52
Type of MV disease, n (%): – MV stenosis – MV insufficiency – associated defect	 20 (31.8) 27 (42.9) 16 (25.4)	 7 (17.5) 26 (65.0) 7 (17.5)	 0.17 0.25 0.49
The number of patients with a combined VHD, n (%): – insufficiency or stenosis of AV – TV insufficiency	 9 (14.3) 31 (49.2)	 9 (22.5) 6 (15.0)	 0.42 0.0001
The etiology of VHD, n (%): – rheumatic genesis – connective tissue dysplasia syndrome – degenerative genesis – partial separation of the chords of MV	 35 (55.6) 16 (25.4) 7 (11.1) 5 (7.9)	 14 (35.0) 21 (52.5) 1 (2.5) 4 (10.0)	 0.045 0.01 0.22 0.99
Characteristics of the heart rhythm, n (%): – sinus – atrial fibrillation: • paroxysmal • persistent • permanent – ventricular arrhytmia (IVa – V grades in Lown)	 26 (41.3) 37 (58.7) 3 (8.1) 21 (56.8) 13 (35.1) 14 (22.2)	 20 (50.0) 20 (50.0) 7 (35.0) 7 (35.0) 6 (30.0) 5 (12.5)	 0.03 0.46 0.03 0.19 0.92 0.97
GFR, ml/min/1.73 m^2 (CKD-EPI 2011), Me [Lq; Uq]	66.0 [56.0; 85.0]	77.0 [56.0; 87.0]	0.52
The body mass Index, kg/m^2, Me [Lq; Uq]	26.9 [23.9; 30.7]	26.5 [23.9; 28.1]	0.18
Stage of chronic heart failure, n (%): – Preheart failure – Stage 1 – Stage 2	 0 58 (92.06) 4 (6.4)	 15 (37.5) 25 (62.5) 7 (17.5)	 < 0.001 0.01 0.27
Functional class CHF NYHA, n (%): – I – II – III – IV	 0 26 (41.3) 36 (57.1) 1 (1.6)	 6 (15.0) 23 (57.5) 9 (22.5) 2 (5.0)	 0.006 0.09 0.001 0.69
Distance in 6 minute walking test, m, Me [Lq; Uq]	350.0 [261.0; 394.0]	392.0 [350.0; 490.0]	0.04

Note: *AV – aortic valve; CHF – chronic heart failure; CKD – chronic kidney disease; Echo – echocardiography; GFR – glomerular filtration rate; MV – mitral valve; NYHA – New-York Heart Association; PH – pulmonary hypertension; TV – tricuspid valve; VHD – valvular heart disease.*

Table 2. Comparative assessment of the perioperative dynamics of quality of life and emotional state of patients depending on preoperative PH presence Me [Lq; Uq]

Parameters	Group								p between the groups	p – dynamics in group 1	p – dynamics in group 2
	with PH according to the Echo, n = 63 (group 1)				without PH according to the Echo, n = 40 (group 2)						
	Before the surgery	7th day	1 month	1 year	Before the surgery	7th day	1 month	1 year			
	1	2	3	4	5	6	7	8			
Physical Functioning	40.0 [20.0; 60.0]	40.0 [15.0; 60.0]	67.5 [55.0; 85.0]	80.0 [75.0; 95.0]	57.5 [25.0; 90.0]	50.0 [40.0; 80.0]	50.0 [30.0; 80.0]	90.0 [70.0; 95.0]	$p_{1,5}=0.16$ $p_{2,6}=0.13$ $p_{3,7}=0.28$ $p_{4,8}=0.60$	$p_{1,2}=0.53$ $p_{1,3}=0.03$ $p_{1,4}<0.01$ $p_{2,3}<0.01$ $p_{2,4}<0.01$ $p_{3,4}=0.01$	$p_{5,6}=0.04$ $p_{5,7}=0.29$ $p_{5,8}<0.01$ $p_{6,7}=1.0$ $p_{6,8}<0.01$ $p_{7,8}=0.02$
Role-Physical	0.0 [0.0; 25.0]	0.0 [0.0; 25.0]	0.0 [0.0; 50.0]	75.0 [25.0; 100.0]	50.0 [0.0; 100.0]	12.5 [0.0; 50.0]	0.0 [0.0; 75.0]	75.0 [37.5; 100.0]	$p_{1,5}=0.01$ $p_{2,6}=0.33$ $p_{3,7}=0.87$ $p_{4,8}=0.76$	$p_{1,2}=0.37$ $p_{1,3}=0.29$ $p_{1,4}<0.01$ $p_{2,3}=0.93$ $p_{2,4}=0.02$ $p_{3,4}<0.01$	$p_{5,6}=0.06$ $p_{5,7}=0.18$ $p_{5,8}=0.09$ $p_{6,7}=0.04$ $p_{6,8}<0.01$ $p_{7,8}=0.09$
Bodily Pain	52.0 [41.0; 74.0]	41.0 [22.0; 52.0]	52.0 [41.0; 74.0]	100.0 [74.0; 100.0]	52.0 [41.0; 94.0]	51.0 [41.0; 74.0]	20.0 [0.0; 80.0]	100.0 [85.0; 100.0]	$p_{1,5}=0.96$ $p_{2,6}=0.04$ $p_{3,7}=0.38$ $p_{4,8}=0.39$	$p_{1,2}<0.01$ $p_{1,3}=0.70$ $p_{1,4}<0.01$ $p_{2,3}=0.19$ $p_{2,4}<0.01$ $p_{3,4}<0.01$	$p_{5,6}=0.03$ $p_{5,7}=0.11$ $p_{5,8}=0.01$ $p_{6,7}=0.59$ $p_{6,8}<0.01$ $p_{7,8}=0.05$
General Health	50.0 [35.0; 60.0]	57.0 [47.0; 72.0]	79.5 [57.0; 87.0]	65.0 [55.0; 82.0]	57.0 [40.0; 72.0]	58.5 [45.0; 72.0]	65.0 [45.0; 67.0]	61.0 [52.0; 86.0]	$p_{1,5}=0.18$ $p_{2,6}=0.90$ $p_{3,7}=0.21$ $p_{4,8}=0.58$	$p_{1,2}=0.12$ $p_{1,3}<0.01$ $p_{1,4}<0.01$ $p_{2,3}<0.01$ $p_{2,4}=0.04$ $p_{3,4}=0.17$	$p_{5,6}=0.89$ $p_{5,7}=0.24$ $p_{5,8}=0.53$ $p_{6,7}=0.29$ $p_{6,8}=0.14$ $p_{7,8}=0.78$
Vitality	50.0 [40.0; 60.0]	55.0 [35.0; 75.0]	60.0 [40.0; 80.0]	70.0 [65.0; 80.0]	62.5 [50.0; 70.0]	55.0 [45.0; 65.0]	55.0 [50.0; 65.0]	67.5 [60.0; 80.0]	$p_{1,5}=0.07$ $p_{2,6}=0.48$ $p_{3,7}=0.80$ $p_{4,8}=0.75$	$p_{1,2}=0.16$ $p_{1,3}=0.67$ $p_{1,4}<0.01$ $p_{2,3}=0.04$ $p_{2,4}<0.01$ $p_{3,4}=0.13$	$p_{5,6}=0.36$ $p_{5,7}=0.29$ $p_{5,8}=0.04$ $p_{6,7}=0.66$ $p_{6,8}=0.04$ $p_{7,8}=0.13$
Social Functioning	62.5 [50.0; 100.0]	75.0 [50.0; 87.5]	62.5 [37.5; 87.5]	100.0 [87.5; 100.0]	87.5 [50.0; 100.0]	75.0 [62.5; 100.0]	50.0 [37.5; 75.0]	100.0 [75.0; 100.0]	$p_{1,5}=0.39$ $p_{2,6}=0.60$ $p_{3,7}=0.70$ $p_{4,8}=0.98$	$p_{1,2}=0.87$ $p_{1,3}=0.93$ $p_{1,4}<0.01$ $p_{2,3}=0.44$ $p_{2,4}=0.01$ $p_{3,4}=0.06$	$p_{5,6}=0.81$ $p_{5,7}=0.11$ $p_{5,8}=0.78$ $p_{6,7}=0.11$ $p_{6,8}=0.09$ $p_{7,8}=0.50$
Role-Emotional	33.3 [0.0; 100.0]	0.0 [0.0; 100.0]	16.7 [0.0; 100.0]	100.0 [66.7; 100.0]	83.3 [0.0; 100.0]	100.0 [33.3; 100.0]	100.0 [66.7; 100.0]	100.0 [66.7; 100.0]	$p_{1,5}=0.19$ $p_{2,6}=0.04$ $p_{3,7}=0.18$ $p_{4,8}=0.66$	$p_{1,2}=0.47$ $p_{1,3}=0.29$ $p_{1,4}=0.04$ $p_{2,3}=0.67$ $p_{2,4}<0.01$ $p_{3,4}<0.01$	$p_{5,6}=1.0$ $p_{5,7}=0.14$ $p_{5,8}=0.08$ $p_{6,7}=0.78$ $p_{6,8}=0.22$ $p_{7,8}=0.98$
Mental Health	64.0 [48.0; 80.0]	68.0 [56.0; 80.0]	82.0 [68.0; 88.0]	84.0 [68.0; 88.0]	70.0 [60.0; 80.0]	70.0 [60.0; 84.0]	68.0 [64.0; 72.0]	76.0 [62.0; 84.0]	$p_{1,5}=0.20$ $p_{2,6}=0.42$ $p_{3,7}=0.37$ $p_{4,8}=0.27$	$p_{1,2}=0.03$ $p_{1,3}=0.65$ $p_{1,4}=0.06$ $p_{2,3}=0.01$ $p_{2,4}=0.02$ $p_{3,4}=0.22$	$p_{5,6}=0.18$ $p_{5,7}=0.18$ $p_{5,8}=0.48$ $p_{6,7}=0.18$ $p_{6,8}=0.15$ $p_{7,8}=0.35$
Physical Health-	34.2 [28.9; 36.7]	32.3 [26.0; 43.3]	45.1 [40.4; 52.1]	49.2 [40.8; 56.3]	36.3 [31.2; 41.9]	35.9 [30.6; 40.3]	42.9 [37.7; 54.95]	48.80 [44.4; 54.4]	$p_{1,5}=0.16$ $p_{2,6}=0.52$ $p_{3,7}=0.64$ $p_{4,8}=0.86$	$p_{1,2}=0.69$ $p_{1,3}<0.01$ $p_{1,4}<0.01$ $p_{2,3}<0.01$ $p_{2,4}<0.01$ $p_{3,4}=0.06$	$p_{5,6}=0.27$ $p_{5,7}=0.12$ $p_{5,8}<0.01$ $p_{6,7}=0.39$ $p_{6,8}<0.01$ $p_{7,8}=0.02$
Mental Health	50.4 [41.3; 61.7]	46.5 [38.7; 54.4]	60.6 [50.3; 76.9]	54.8 [48.6; 57.4]	50.9 [45.2; 57.4]	54.2 [41.1; 62.5]	57.6 [50.3; 76.8]	53.9 [44.6; 58.0]	$p_{1,5}=0.69$ $p_{2,6}=0.28$ $p_{3,7}=0.90$ $p_{4,8}=0.97$	$p_{1,2}=0.28$ $p_{1,3}<0.01$ $p_{1,4}=0.29$ $p_{2,3}<0.01$ $p_{2,4}=0.04$ $p_{3,4}=0.15$	$p_{5,6}=0.88$ $p_{5,7}=0.04$ $p_{5,8}=0.38$ $p_{6,7}=0.49$ $p_{6,8}=0.79$ $p_{7,8}=0.66$
Emotional state according to the HADS questionnaire											
Level of anxiety	5.5 [3.0; 9.0]	4.0 [2.0; 6.0]	2.0 [0.0; 4.0]	2.0 [0.0; 4.0]	4.0 [2.0; 7.0]	1.0 [1.0; 3.0]	1.5 [0.5; 2.5]	1.5 [0.5; 6.0]	$p_{1,5}=0.28$ $p_{2,6}=0.04$ $p_{3,7}=0.73$ $p_{4,8}=0.60$	$p_{1,2}=0.11$ $p_{1,3}<0.01$ $p_{1,4}<0.01$ $p_{2,3}<0.01$ $p_{2,4}<0.01$ $p_{3,4}=0.15$	$p_{5,6}=0.09$ $p_{5,7}=0.03$ $p_{5,8}=0.02$ $p_{6,7}=0.33$ $p_{6,8}=0.23$ $p_{7,8}=0.50$
Level of depression	4.0 [3.0; 6.0]	5.0 [1.0; 7.0]	1.0 [1.0; 4.0]	1.0 [0.0; 4.0]	3.0 [2.0; 7.0]	3.0 [1.0;4.0]	1.0 [0.5;2.5]	1.0 [0.0; 3.0]	$p_{1,5}=0.28$ $p_{2,6}=0.21$ $p_{3,7}=0.37$ $p_{4,8}=0.71$	$p_{1,2}=0.84$ $p_{1,3}=0.01$ $p_{1,4}<0.01$ $p_{2,3}=0.02$ $p_{2,4}<0.01$ $p_{3,4}=0.36$	$p_{5,6}=0.33$ $p_{5,7}=0.13$ $p_{5,8}=0.06$ $p_{6,7}=0.01$ $p_{6,8}=0.04$ $p_{7,8}=0.97$

Note: *HADS – hospital anxiety and depression scale.*

without significant dynamics during the subsequent year of follow-up (Table 2).

Further, a correlation analysis was performed to determine the relationship between the level of QoL in patients and their functional status in the general cohort of patients with AMVD before surgery (Table 3).

Reverse remodeling of the right heart myocardium in patients with preoperative PH was reflected in the right ventricular (RV) size decrease by 0.4 cm (p = 0.03) and right atrium area decrease by 31.3% (p = 0.005) 1 year after surgery. At 1 year follow-up the systolic excursion of tricuspid annular plane (TAPSE) in the group without preoperative PH returned to the baseline, while in patients with preoperative PH the TAPSE remained decreased (1.4 cm at the annual control, p = 0.01 between groups). However, according to three-dimensional Echo, in patients with preoperative PH, RV ejection fraction improved by 10.1% (p = 0.005) achieved 48.1% value at the annual follow-up (p = 0.005). In PH group the tricuspid insufficiency of 2–4th degrees remained in 12.7% patients 1 year after surgery.

According to the Echo at 7th day after surgery the regress of PH (SPAP < 38 mm Hg and absence of additional signs of PH) was revealed in 40 patients (63.5%) from group 1. At 1 year follow-up only 11 patients had high probability of PH according to the Echo (17.5%).

One year after cardiac surgery according to the right heart catheterization amvd(n = 21) in 10 (47.6%) patients the PH regression was confirmed. The median delta of mPAP (mean pulmonary artery pressure) dynamics was 28.9%. Despite the successful surgical correction of AMVD in three (14.3%) patients the combined post-/precapillary form of PH was revealed and seven patients (33.3%) had isolated postcapillary form of PH 1 year after surgery.

In patients with AMVD the severity of RV systolic dysfunction according to the initial transthoracic Echo data is clearly reflected in the results of psychological questionnaires before cardiac surgery and at each stage of the postoperative period.

Thus, the stroke volume of the RV is directly related to the influence of the emotional state on daily activities (RE: r = 0.50, p = 0.02), and the ejection fraction of the RV (3D Echo) is directly related to the overall assessment of the patient's state of health (GH: r = 0.45, p = 0.04) before valvular intervention. The level of systolic excursion of tricuspid annular plane (TAPSE) is directly related to the physical scales of the SF-36 questionnaire, obtained both at baseline (PF: r = 0.36, p = 0.01; and on the 7th postoperative day (PF: r = 0.37, p = 0.02; physical component of health: r = 0.36, p = 0.03) and the reverse with the presence of depression (r = –0.38, p = 0.04) at the annual examination. The value of the fractional area change (FAC) of the RV is reflected in physical (PF: r = 0.37, p = 0.03) and role-based physical functioning (RP: r = 0.34, p = 0.048) on day 7, and the end-systolic volume (ESV) of the RV at the level of depression one year later (r = 0.47, p = 0.04). The initial level of free RV wall myocardial strain (GLPS RVwt) is closely related to the initial level of physical health (r = –0.44, p = 0.02) and role-based physical functioning on day 7 (RP: r = –0.43, p = 0.04). In addition, increased atrial size associated with VHD is also reflected in a lower quality of life and unstable emotional state of patients: the right atrial area is associated with the SF-36 questionnaire scales (initially RP: r = –0.66, p = 0.03 and BP: r = –0.68, p = 0.02; on day 7: mental health component (r = –0.62, p = 0.04) and anxiety level on day 7 (r = 0.64, p = 0.03), and left atrium size – with mental health level (MH: r = –0.44, p = 0.005) and scores on the depression scale in the HADS questionnaire (r = 0.48, p = 0.01).

Correlation analysis in the group with preoperative PH showed close negative relationships between the Echo parameters of the RV after 1 month (end diastolic volume of the RV: r = –0.78, p = 0.005; ESV of the RV: r = –0.62, p = 0.04) and after one year (end diastolic

Table 3. Correlations between preoperative distance in 6-minute walking test and quality of life/emotional status before and one week after surgery

	Distance in the 6-minute walk test before surgery	**Distance in the 6-minute walk test before surgery**
SF-36 scale parameters	**SF-36 scale before surgery**	**SF-36 scale on 7th day after surgery**
Physical functioning	r = 0.45, p = 0.001	–
General health	r = 0.47, p = 0.0007	r = 0.50, p = 0.005
Self-functioning	r = 0.54, p = 0.00008	–
Role emotional	r = 0.53, p = 0001	–
Mental health	r = 0.54, p = 0.00006	–
Vitality	–	r = 0.52, p = 0.003
Physical component of health	r = 0.35, p = 0.009	–
Mental component of health	r = 0.58, p = 0.000005	–
HADS scale parameters	**HADS scale before surgery**	**HADS scale on 7th day after surgery**
Depression level	r = –0.45, p = 0.002	–0.62, p = 0.0002
Anxiety level	r = –0.41, p = 0.006	–0.56, p = 0.0009

Note: *HADS – hospital anxiety and depression scale.*

volume of the RV: r = –0.63, p = 0.003; ESV of the RV: r = –0.46, p = 0.04) with the level of mental health in the annual SF-36 survey. At the annual control point, there were inverse relationships between the level of SPAP with the severity of physical functioning restriction (PF: r = –0.49; p = 0.003), vital activity (VT: r = –0.47; p = 0.004) and mental health (MH: r = –0.38; p = 0.03).

Regression analysis was performed to identify factors that affect the level of QoL and emotional status of patients before and after successful correction of AMVD (Table 4).

Discussion

Recently, the focus in the treatment of patients with chronic pathology has shifted to not only life expectancy but also the quality of life. This position is also valid for patients with VHD. Morbidity and mortality rates after cardiac surgery (including those related to AMVD) are extremely important criteria for treatment success, but they do not reflect as valuable data as the patient's physical, functional, emotional and psychological well-being. Accounting QoL indicators related to a person's state of health has become recognized as an important component of evaluating the effectiveness of treatment tactics [1].

Studies devoted to the assessment of QoL in cardiac surgery patients before surgery show the most pronounced decrease in the role-physical, role-emotional, as well as physical functioning and vital activity scales [8].

The key role in changing the QoL level in cardiac surgery patients is played by the nature and value of cardiac intervention, the use of thoracotomy access (mini-access) or median sternotomy, the type of prosthesis used and, as a consequence, the type of anticoagulation therapy, the need to monitor the international normalized ratio [9], and the length of hospital stay. Living conditions and social interactions, the patient's age, and the severity of comorbidities are all essential factors in the patient's mood formation for surgery and recovery after surgery.

Table 4. Factors, associated with perioperative QoL and emotional status in patients with mitral valve disease

Parametr		B-cofficient	p
Before the surgery			
Preoperative atrial fibrillation	Physical component of health	–6.39	0.002
Age	Physical functioning	–0.21	0.01
Male gender	Anxiety	3.58	0.002
Male gender	Depression	3.04	0.002
7th day after surgery			
Preoperative atrial fibrillation	Physical component of health	–10.92	p = 0.03
Male gender	Anxiety	2.34	p = 0.03
Male gender	Depression	2.47	p = 0.02
30th day after surgery			
Preoperative atrial fibrillation	Mental component of health	–12.66	p = 0.006
Male gender	Mental component of health	–15.37	p = 0.001
Male gender	Anxiety	2.79	p = 0.03

Note: *HADS – hospital anxiety and depression scale.*

In patients who underwent coronary bypass surgery, it was seen that the presence of a higher level of anxiety before surgery is associated with lower levels of physical and mental components of QoL health in the postoperative period [10].

While assessing the contribution of demographic characteristics of patients to the features of perioperative dynamics of quality of life and emotional state, our study revealed an association of increasing age with a deterioration in the level of the physical component of health and an association of male gender with higher levels of anxiety and depression before the correction of the MV disease. Even 30 days after surgery, male patients were also more likely to have anxiety and depression, as well as lower mental health scores, compared to female patients.

In our study, the association of male gender with worsened mental health status and high levels of anxiety is remarkable, especially considering that in previously published studies, females [11] who underwent heart surgery in conditions of artificial circulation were more likely to be exposed to anxiety in the pre- and postoperative period. As seen in a published study by Y. Guzelhan et al., this was explained by a more frequent presence of obesity, diabetes mellitus and, as a consequence, infectious complications of the sternum wound after sternotomy procedure and a longer hospital stay after coronary bypass surgery [11]. Russian authors found a significantly higher risk of QoL reduction among women after correction of acquired MV disease, compared with the general population. As seen in a study by N. A. Shostak et al. [12], a group of patients with PH showed an association of lower QoL scores on all scales in women with a significant difference on the scale of physical functioning. In our study, the association of men with worsened levels of psychological health and high anxiety is most likely due to concerns about the length of disability after surgery, and, as a result, the need to solve financial problems within the family.

While assessing the contribution of concomitant cardiovascular pathology to the level of QoL and emotional state of the patient, it was noted that the presence of atrial fibrillation (AF) has a significant effect on the deterioration of the patient's QoL [13]. Indicators of physical and social functioning, as well as mental and general health in individuals with AF are significantly lower (up to 30%), compared with the cohort without AF (p < 0.001) [14].

Our study demonstrated an association between the presence of preoperative AF and a lower value of the physical component of health according to the SF-36 questionnaire on B-coefficient = –6.39; p = 0.002 before surgery. At the same time, the persistence of AF in the first week after the intervention is associated with both a worsened physical and mental component of health. Subsequently, more severe changes in intracardiac hemodynamics in the presence of AF affect a decrease in exercise tolerance and QoL in general in such patients.

A number of studies have demonstrated positive dynamics of QoL parameters in patients with VHD in the early and long-term postoperative periods in the form of improvement in general and mental health, as well as in the role-based emotional area [15]. According to foreign authors, the level of QoL after correction of AMVD significantly improves, but does not always reach the general population. However, patients after reconstructive intervention show better dynamics in the postoperative period in contrast to those who underwent MV prosthetics [15–18]. For example, as depicted in a study by Dutch authors, patients who underwent prosthetics of the VHD showed a higher level of QoL scales compared to healthy individuals. This can be explained by the greater value placed on life by those who have undergone successful heart surgery [22]. Russian researchers reported that patients who underwent MV prosthesis implantation 2-8 years ago experience greater social contact limitations, despite having a higher level of physical capacity for self-care, compared to the who reconstructive surgery cohort [9].

The remodeling of the left heart chambers, as well as structural and functional impairments of the right ventricle, reflects the severity of the patient's condition. In our study, we demonstrated a direct correlation between the systolic function of the RV, estimated from two-dimensional echocardiography (tricuspid annular plane systolic excursion), as well as longitudinal RV free wall strain, with the physical component of health in individuals with AMVD. An inverse correlation was found between the value of SPAP with the degree of restriction in the amount of physical activity during self-care, vital activity and mental health one year after surgery.

It was assumed that in more severe patients with intracardiac hemodynamic disorders with the presence of right ventricular failure and PH, the level of quality of life both before and after surgery would be lower than in patients with AMVD without PH [19]. However, it is important to note that quality of life is a relative indicator. Our study shows that patients with preoperative PH experienced an improvement in exercise tolerance already in the early postoperative period, despite having a challenging physical health and functional status prior to surgery. After AMVD surgical correction, patients with preoperative PH noted more positive dynamics on almost all QoL scales than patients without preoperative PH, who noted a decrease in physical abilities at work and at home during the year. At the same time, the presence of preoperative PH did not affect the level of QoL as early as 1 month after the correction of AMVD.

However, for patients with AMVD without PH, who initially did not have such pronounced functional disorders and right ventricular failure, surgery was a serious factor limiting the quality of life. This suggests the need for additional preoperative psychological training for such patients [20].

Conclusion

Patients with acquired mitral valve disease and preoperative pulmonary hypertension showed significant positive dynamics in the quality of life on many scales as early as one month after the mitral valve surgery. The presence of preoperative PH did not affect the level of QoL as early as 1 month after the correction of AMVD. In contrast, patients without preoperative pulmonary hypertension experienced more pronounced functional limitations in the postoperative period. These findings highlight the need for targeted preoperative psychological preparation, particularly for male patients and those with preoperative atrial fibrillation, as these factors were associated with poorer quality of life, anxiety, and depression both before and after surgery.

Limitations of the study

• Small sample of patients with pulmonary hypertension and acquired mitral valve disease included in the study.

• Right heart catheterization was not performed in the entire cohort of patients included in the study (only in 40 patients before the surgery and in 21 patients one year after surgery).

Conflict of interest

I.N. Lyapina declares no conflict of interest. Yu.E. Kuz'mina declares no conflict of interest. T.V. Martynyuk declares no conflict of interest. E.V. Dren' declares no conflict of interest. I.V. Dvadtsatov declares no conflict of interest. P.N. Dvadtsatova declares no conflict of interest. Yu.A. Argunova declares no conflict of interest. O.L. Barbarash is the editor-in-chief of the journal "Complex Issues of Cardiovascular Diseases".

Funding

The study was carried out on the basis of the Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", within the framework of the fundamental topic No. 0419-2022-0002 "Development of innovative models for managing the risk of developing diseases of the circulatory system, taking into account comorbidity, based on the study of fundamental, clinical, epidemiological mechanisms and organizational technologies of medical care in the industrial region of Siberia".

Author Information Form

Lyapina Irina N., PhD, Researcher at the Rehabilitation Laboratory of the Department of Clinical Cardiology, Cardiologist of Pulmonary Arterial Hypertension Center, Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", Kemerovo, Russian Federation; **ORCID** 0000-0002-4649-5921

Kuzmina Yuliya E., PhD, cardiologist at the LLC "Kanoha", Krasnodar, Russian Federation; **ORCID** 0000-0001-7549-8075

Martynyuk Tamila V., PhD, Head of the Department of Pulmonary Hypertension and Heart Diseases, A.L. Myasnikov Research Institute of Clinical Cardiology, E.I. Chazov National Medical Research Centre of Cardiology, Moscow, Russian Federation; **ORCID** 0000-0002-9022-8097

Dren' Elena V., PhD Student, Junior Researcher of Laboratory of Rehabilitation, Laboratory Researcher at the Laboratory of Myocardial Fibrogenesis, Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", Kemerovo, Russian Federation; **ORCID** 0000-0002-5469-7638

Dvadtsatov Ivan V., PhD, Cardiovascular Surgeon of 1st Cardiac Surgery Department, Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", Kemerovo, Russian Federation; **ORCID** 0000-0002-8876-005X

Dvadtsatova Polina N., 5th year student at the Federal State Budgetary Educational Institution of Higher Education "Kemerovo State Medical University" of the Ministry of Health of the Russian Federation, Kemerovo, Russian Federation; **ORCID** 0000-0003-3224-9727

Argunova Yulia A., PhD, Head of the Rehabilitation Laboratory, Department of Clinical Cardiology, Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", Kemerovo, Russian Federation; **ORCID** 0000-0002-8079-5397

Barbarash Olga L., Academician of RAS, MD, Professor, Head of Federal State Budgetary Institution "Research Institute for Complex Issues of Cardiovascular Diseases", Kemerovo, Russian Federation; **ORCID** 0000-0002-4642-3610

Author Contribution Statement

LIN – contribution to the design of the study, data collection and interpretation, manuscript writing, approval of the final version, fully responsible for the content

KYuE – data collection, analysis and interpretation, manuscript writing, approval of the final version, fully responsible for the content

MTV – contribution to the design of the study, editing, approval of the final version, fully responsible for the content

DEV – data collection and analysis, editing, approval of the final version, fully responsible for the content

DIV – data collection, editing, approval of the final version, fully responsible for the content

DPN – data collection, editing, approval of the final version, fully responsible for the content

AYuA – data interpretation, editing, approval of the final version, fully responsible for the content

BOL – contribution to the design of the study, editing, approval of the final version, fully responsible for the content

REFERENCES

1. Barbarash O.L., Odarenko Yu.N., Kondyukova N.V. Quality of life indicators in evaluating the efficiency of surgical treatment in patients with acquired heart diseases undergoing bioprosthetic and mechanical heart valve replacement. Creative Cardiology. 2019;13(1):28–39. doi:10.24022/1997-3187-2019-13-1-28-39. (in Russian)

2. IPDAS 2005: Criteria for judging the quality of patient decision aids. International Patient Decision Aids Standards (IPDAS) Collaboration. http://ipdas.ohri.ca/ipdas_checklist.pdf (accessed 07 November 2024)

3. Bermudez T, Bierbauer W, Scholz U, Hermann M. Depression and anxiety in cardiac rehabilitation: differential associations with changes in exercise capacity and quality of life. Anxiety Stress Coping. 2022 Mar;35(2):204-218. doi: 10.1080/10615806.2021.1952191

4. Goruleva M. V., Ganenko O. S., Kovaltcova R. S., Kutuzova A., Petrova N. N., Demchemnko E. A., Nedoshivin A. O. Quality of life and psycho-cognitive condition in patients after coronary artery bypass graft surgery. Russian Journal of Cardiology. 2014;9(113):68–71. https://doi.org/10.15829/1560-4071-2014-9-68-71 (in Russian)

5. Bubnova M.G. Relevant problems of participation and education of patients in cardiac rehabilitation and secondary prevention programs. Cardiovascular Therapy and Prevention. 2020;19(6):2649. doi:10.15829/1728-8800-2020-2649. (in Russian)

6. Zheleznev S.I., Demidov D.P., Afanasiev A.V., Nazarov V.M., Demin I.I., Bogachev-Prokofiev A.V., Astapov D.A., Karaskov A.M. Radiofrequency denervation of pulmonary artery in surgery of dysplastic mitral valve defects with severe pulmonary hypertension. Russian Journal of Cardiology. 2016;11(139):70–72. doi:10.15829/1560-4071-2016-11-70-72. (in Russian)

7. Avdeev S.N., Barbarash O.L., Valieva Z.S., Volkov A.V., Veselova T.N., Galyavich A.S., Goncharova N.S., Gorbachevsky S.V., Gramovich V.V., Danilov N.M., Klimenko A.A., Martynyuk T.V., Moiseeva O.M., Ryzhkova D.V., Simakova M.A., Sinitsyn V. E., Stukalova O. V., Chazova I. E., Chernogrivov I. E., Shmalts A. A., Tsareva N.A. 2024 Clinical practice guidelines for Pulmonary hypertension, including chronic thromboembolic pulmonary hypertension. Russian Journal of Cardiology. 2024;29(11):6161. doi: 10.15829/1560-4071-2024-6161.

8. Thomson Mangnall L.J., Gallagher R.D., Sibbritt D.W., Fry M.M. Health-related quality of life of patients after mechanical valve replacement surgery: an integrative review. Eur. J. Cardiovasc. Nurs. 2015 Feb;14(1):16–25. doi:10.1177/1474515114528126.

9. Bazylev V.V., Nemchenko E.V., Abramova G.N., Kanaeva T.V., Karnakhin V.A.. Quality of life after surgical treatment of mitral heart disease. Cardiosomatics. 2020;11(4):30–35. doi:10.26442/22217185.2020.4.200553. (in Russian)

10. Muthukrishnan A, Tayyib N.A, Alsolami F.J, Ramaiah P, Lathamangeswaric C. Anxiety and quality of life outcomes after coronary artery bypass graft surgery - a prospective cohort study. Curr. Probl. Cardiol. 2023;48(2):101474. doi:10.1016/j.cpcardiol.2022.101474.

11. Guzelhan Y, Conkbayir C, Ugurlucan M, Yildiz C.E, Alpagut U, Bozbuga N. Gender differences in patients with anxiety after coronary artery bypass surgery. Heart Surg. Forum. 2018;21(3):E165-E169. doi:10.1532/hsf.1451.

12. Shostak N.A., Klimenko A.N., Shemenkova V.S., Svet A.V. Use of the SF-36 questionnaire in assessment of quality of life in patients with chronic thromboembolic pulmonary hypertension. The Clinician. 2017;11(3-4):44–49. doi:10.17650/1818-8338-2017-11-3-4-44-49. (in Russian)

13. Sale A, Yu J. Quality of life instruments in atrial fibrillation: a systematic review of measurement properties. Health Qual Life Outcomes. 2022;20(1):143. doi: 10.1186/s12955-022-02057-y.

14. Bockeria O.L., Yurkulieva G.A. Effectiveness and impact of modern af-treatment methods on quality of life in patients with different forms of atrial fibrillation. Annals of Arrhythmology. 2017;14(4):211–220. doi:10.15275/annaritmol.2017.4.4. (in Russian)

15. Goldsmith I.R., Lip G.Y., Patel R.L. A prospective study of changes in the quality of life of patients following mitral valve repair and replacement. Eur. J. Cardiothorac. Surg. 2001;20(5):949–955. doi:10.1016/S1010-7940(01)00952-6.

16. Ay Y, Kara I, Aydin C, Ay N.K., Inan B, Basel H, Zeybek R.. Comparison of the health related quality of life of patients following mitral valve surgicalprocedures in the 6- months follow-up: a prospective study. Ann. Thorac. Cardiovasc. Surg. 2013;19(2):113–119. doi:10.5761/atcs.oa.12.02234.

17. Sedrakyan A., Vaccarino V., Elefteriades J.A., et al. Health related quality of life after mitral valve repairs and replacements. Qual. Life Res. 2006;15(7):1153–1160. doi:10.1007/s11136-006-0055-3.

18. Immer F.E., Donati O., Wyss T., et al. Quality of life after mitral valve surgery: differences between reconstruction and replacement. J. Heart Valve Dis. 2003;12(2):162–168.

19. Balasubramanian A, Larive AB, Horn EM, DuBrock HM, Mehra R, Jacob MS, Hemnes AR, Leopold JA, Radeva MK, Hill NS, Erzurum SC, Rosenzweig EB, Frantz RP, Rischard FP, Beck GJ, Hassoun PM, Mathai SC; PVDOMICS Study Group. Health-Related Quality of Life Across the Spectrum of Pulmonary Hypertension. Chest. 2024 ;165(6):1493-1504. doi: 10.1016/j.chest.2024.02.009.

20. Gorbunova E.V., Rozhnev V.V., Lyapina I.N., Barbarash O.L. Dynamics of adherence to treatment and quality of life in patients with prosthetic heart valves who participated in the educational programs (10-year follow-up). Complex Issues of Cardiovascular Diseases. 2022;11(1):69-77. (In Russian) https://doi.org/10.17802/2306-1278-2022-11-1-69-77

Для цитирования: *Ляпина И.Н., Кузьмина Ю.Е., Мартынюк Т.В., Дрень Е.В., Двадцатов И.В., Двадцатова Аргунова П.Н., Ю.А., Барбараш О.Л. Качество жизни и эмоциональное состояние пациентов после хирургической коррекции приобретенного порока митрального клапана зависит от наличия предоперационной легочной гипертензии. Комплексные проблемы сердечно-сосудистых заболеваний. 2025;14(5): 16-26. DOI: 10.17802/2306-1278-2025-14-5-16-26*

To cite: *Lyapina I.N., Kuz'mina Yu.E., Martynyuk T.V., Dren'E.V., Dvadtsatov I.V., Dvadtsatova P.N., Argunova Yu.A., Barbarash O.L. Quality of life and emotional state in patients after surgical correction of acquired mitral valve disease depends on the presence of preoperative pulmonary hypertension. Complex Issues of Cardiovascular Diseases. 2025;14(5): 16-26. DOI: 10.17802/2306-1278-2025-14-5-16-26*