Vinogradova N. G.[1,2], Tyurin A A.[1], Fomin I. V.[1], Polyakov D. S.[1],
Ivanchenko E. Yu.[1], Vaisberg A. R.[1], Shcherbinina E. V.[1], Krylova A. N.[1]

[1] Privolzhsky Research Medical University, Nizhniy Novgorod, Russia

[2] Municipal Clinical Hospital # 38, Nizhniy Novgorod, Russia

Patients after acute decompensation of Heart Failure: adherence to self-monitoring and treatment depending on the mode of outpatient monitoring

Aim — To evaluate compliance with self-monitoring and drug and non-drug treatment of patients after ADHF during the management at a specialized center for CHF treatment (CCHF) or in real-life clinical practice.

Material and methods — The study included 942 CHF patients after ADHF. In two years, the entire sample of patients was retrospectively divided into 4 groups based on their compliance with the management at the CCHF: group 1, 313 patients who were managed at the CCHF continuously for two years; group 2, 383 patients who choose the management at district outpatient clinics after discharge from a hospital; group 3, 197 patients who visited the CCHF for one year but then stopped the management; and group 4, 49 patients who initially preferred the management at district clinics but then switched to constant management at the CCHF. Compliance with recommendations was analyzed by data of outpatient clinical records or by data of structured telephone calls for patients who did not visit the CCHF or did not follow the visit schedule. Statistics was performed with a Statistica 7.0 for Windows software package.

Results — Patients of groups 2 (72.4%) and 3 (88.3%) performed self-monitoring less frequently whereas patients of groups 1 (94.6%) and 4 (87.8%) performed self-monitoring more frequently ($p_{1/3}$=0.01, $p_{1/2}$<0.001, $p_{1/4}$=0.07, $p_{2/4}$=0.02, $p_{2/3}$<0.001, $p_{4/3}$=0.9). Patients of group 2 (58.1%) performed self-monitoring of heart rate less frequently than patients of groups 1, 3, and 4 (90.7%, 81.7%, and 87.8%; $p_{1/3}$=0.003, $p_{1/2}$<0.001, $p_{1/4}$=0.5, $p_{2/4}$<0.001, $p_{2/3}$<0.001, and $p_{4/3}$=0.3). Patients of group 2 performed body weight self-monitoring less frequently than patients of groups 1, 3, and 4 (78.6%, 67.9%, and 72.9%; $p_{1/3}$=0.008, $p_{1/2}$<0.001, $p_{1/4}$=0.4, $p_{2/4}$=0.002, $p_{2/3}$<0.001, and $p_{4/3}$=0.5). Compliance with the diet and restriction of salt consumption was 32.3% and 37.5% in groups 1 and 4, and 24.9% and 19.9% in groups 2 and 3 ($p_{1/3}$=0.002, $p_{1/2}$=0.03, $p_{1/4}$=0.5, $p_{2/4}$=0.02, $p_{2/3}$=0.2, and $p_{4/3}$=0.009). Compliance with recommendations on physical rehabilitation was 44.7% in group 1, which was better than in groups 2, 3, and 4 (8.2%, 21.6%, and 9.1%; $p_{1/2}$<0.001, $p_{1/3}$=0.0003, $p_{1/4}$=0.002, $p_{2/4}$=0.9, $p_{2/3}$=0.0006, and $p_{4/3}$=0.2). At the end of the second year of follow-up, the actual proportion of patients taking ACE inhibitors/angiotensin receptor antagonists was low in groups 2, 3, and 4 (43.2%, 45%, and 66.7%) and satisfactory in group 1 (92.4%; $p_{1/2}$<0.001, $p_{1/3}$<0.001, $p_{1/4}$<0.001, $p_{2/3}$=0.6, $p_{2/4}$=0.05, and $p_{3/4}$=0.05). Proportion of patients taking beta-blockers was greater in group 1 (97.2%) than in groups 2, 3. and 4 (73.2%, 71.1%, and 90.5%; $p_{1/2}$<0.001, $p_{1/3}$<0.001, $p_{1/4}$=00.08, $p_{2/3}$=0.6, $p_{2/4}$=0.1, and $p_{3/4}$=0.06). Patients of group 1 (96.2%) showed good compliance with the mineralocorticoid receptor antagonist treatment compared to groups 2, 3, and 4 (58.8%, 55.4%, and 81.2%; $p_{1/2}$<0.001, $p_{1/3}$<0.001, $p_{1/4}$<0.001, $p_{2/3}$=0.5, $p_{2/4}$=0.1, and $p_{3/4}$=0.

Conclusion — Only scheduled management by a cardiologist of the specialized CCHF provided sufficient compliance with self-monitoring and drug and non-drug treatment of CHF during the long-term follow-up.

Keywords — Decompensated chronic heart failure; compliance; compliance with treatment; non-drug treatment of CHF; self-monitoring; body wight control; specialized medical care for CHF patients; center for treatment of heart failure

For Citation — Vinogradova N. G., Tiurin A. A., Fomin I. V., Polyakov D. S., Ivanchenko E. Yu., Vaisberg A. R. et al. Patients after acute decompensation of Heart Failure: adherence to self-monitoring and treatment depending on the mode of outpatient monitoring. Kardiologiia. 2020;60 (5):25 – 34. [Russian: Виноградова Н. Г., Тюрин А. А., Фомин И. В., Поляков Д. С., Иванченко Е. Ю., Вайсберг А. Р. и др. Пациенты после острой декомпенсации сердечной недостаточности: приверженность к самоконтролю и лечению в зависимости от условий амбулаторного наблюдения. Кардиология. 2020;60 (5):25 – 34]

Corresponding author — Vinogradova Nadezhda Georgievna. E-mail: vinogradovang@yandex.ru

Patient adherence to physician recommendations for non-drug and drug treatment is essential for the effective treatment of patients with chronic heart failure (CHF). It is known that those patients with CHF who have a history of hospitalization for worsening of heart failure (HF) are at higher risk of complications and death [1–4]. According to the literature, the prognosis is worse for those patients with CHF who did not receive drug treatment after discharge

from the hospital after acute decompensated HF (ADHF) [4–6]. Unfortunately, modern cardiology faces the challenge of reduced efficacy of outpatient treatment of patients with CHF. For example, the EPOCH-CHF study (hospital stage) showed that effective therapy for CHF was more common at the inpatient stage, and that doses of disease-modifying agents for the treatment of CHF were reduced at the outpatient stage [7–9]. This study also detected a low rate of using a combination of CHF-modifying agents as well as frequent interruption of treatment, which naturally resulted in high mortality rates in patients with CHF [8–12].

The foreign practice (in developed countries) has experienced a phenomenon in which CHF-modifying treatment ends at the outpatient stage. Thus, the problem of treatment adherence in patients with CHF is widely discussed [13–16]. Specifically, the PREDICTOR study showed that 14.7% of patients with HF with reduced ejection fraction (HFrEF) and 24.4% of patients with HF with preserved EF (HFpEF) did not use any disease-modifying agent for the treatment of CHF 1 year after the diagnosis of CHF [16].

In the ESC-HF Pilot study, the analysis of ambulatory prescriptions for CHF detected that angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor antagonists (ARBs) were used in 89.2% of patients, beta-blockers (BBs) in 88.9% of patients, and mineralocorticoid receptor antagonists (MCRAs) in 59.3% of patients [1, 14]. However, the rate of real-world use of CHF-modifying agents among the ESC-HF Pilot patients admitted to the hospital with ADHF was significantly lower: the rate of ACE inhibitors/ARBs was 64.3%; the rate of BBs was 54.8%; and that of MCRAs was 33.9% [14]. This fact proves once again that there is a problem of ending disease-modifying therapy at the outpatient stage, which naturally leads to an increased risk of ADHF and hospitalization.

The European and national clinical guidelines give great attention to the non-drug treatment of CHF [17, 18]. Strong evidence indicates that when patients are not adherent to non-drug treatment for CHF, the risk of re-hospitalization and death increases [2, 19–22].

The study of patient adherence to non-drug treatment produced interesting findings: patients who did not adhere to at least one of these recommendations (diet, fluid restriction, weight monitoring, exercises) had a 40% increased risk of death and hospitalization for CHF within 6 months of the study [23].

Thus, training patients in self-control, self-care, and ensuring their adherence to drug and non-drug treatment is an essential element of CHF management [24–27]. Approaches to ensuring high patient adherence have been developed for this purpose. The establishment of specialized CHF clinics providing the continuity between inpatient and outpatient treatment stages is one of such approach [28–30].

The objective of this work was to assess adherence in patients with decompensated CHF to self-control, drug, and non-drug treatments depending on the duration and regularity of follow-up in the CHF treatment center or local outpatient clinics.

Materials and Methods

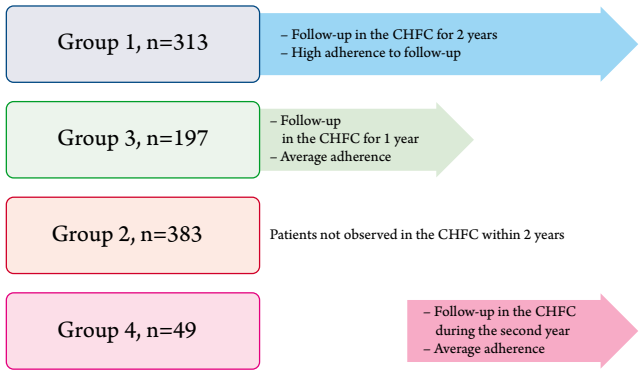
The cohort study consistently enrolled 942 patients with CHF of any origin at the age of 18 years or older who were treated for ADHF at the City CHF Treatment Center (CHFC). All patients or caregivers were trained at the CHF patient school based on the guidelines of the Society of Heart Failure Specialists (OSSN). All patients received an «extended» discharge summary with detailed recommendations for drug therapy, self-control, diet, salt restriction, and physical rehabilitation (PR). The last was initiated at the inpatient stage and continued at the outpatient stage under the supervision of a CHFC physician, only for those patients who continued follow-up in the CHFC. Subsequently, patients were followed up on an outpatient basis in the CHFC or the city outpatient clinics, depending on their decision on whether to continue follow-up in the CHFC or not. The follow-up period lasted 2 years. Patients were observed in the local outpatient clinic according to the relevant internal regulations. A CHFC nurse observed patients who refused to be followed up at the CHFC through structured phone calls at least once every 1–3 months. Follow-up at the CHFC included a combination of cardiology consultations and monthly over-the-phone support from the CHFC nurse. The cardiology consultation mode was established individually for each patient, depending on disease severity, at least once every 3 months in stable CHF. Patients could additionally revisit the cardiologist during the entire follow-up period, if necessary. There were eight mandatory visits within the 2 years of the study. If a patient missed another visit or refused to be followed up at the CHFC, the CHFC nurse continued making structured telephone calls.

After the 2 years of follow-up, we retrospectively analyzed patient adherence to follow-up at the CHFC based on the number and frequency of consultations at the CHFC. For patients who had at least the four visits per year and continued adherence to follow-up throughout the study, their adherence to CHFC follow-up was considered high. Adherence was considered moderate if patients were followed up at the CHFC only during the first or the second year of the study. Adherence was considered low if patients were observed only at local outpatient clinics during the 2 years.

The entire sample of patients was retrospectively distributed into four groups based on adherence to follow-up in the CHFC: Group 1 included 313 patients who were followed up in the CHFC continuously for 2 years and made a minimum number of visits; Group 2 included 383 patients who were never followed up in the CHFC after discharge

ISSN 0022-9040. Kardiologiia. 2020;60(5). DOI: 10.18087/cardio.2020.5.n1022

Figure 1. Distribution of patients with CHF into groups according to adherence to the follow-up in the CHFC



from the hospital because they preferred to be observed in the local outpatient clinics; Group 3 consisted of 197 patients who visited the CHFC during the first year of the study, but later discontinued follow-up and were observed in the local outpatient clinics; and Group 4 consisted of 49 patients who, at enrollment in the study, preferred to be observed at the local outpatient clinics but a year afterward began to be continuously followed up at the CHFC and visited the cardiologist in the second year (Figure 1).

Adherence to recommended treatment was analyzed using outpatient medical records because the physician analyzed patient adherence at each visit to the CHFC, and all data were entered in the outpatient medical records of CHF patients. Structured phone calls were used to assess adherence in patients who did not visit the CHFC or violated the visit routine. The structured phone call protocol included questions to monitor the implementation of recommendations for self-control, drug, and non-drug treatment of CHF. We analyzed refusals of prescribed drugs, the real-life rate of administration of CHF-modifying agents for the treatment of CHF, and the rate of adherence to recommendations for non-drug treatment of CHF.

The statistical analysis was performed using the Statistica 7.0 software package for Windows. Data are expressed as the mean and standard deviation (M, σ) with the parametric distribution of the sample. The Student's t-test was used with normal distribution, and the χ^2 test was used to analyze the frequency differences. The Shapiro-Wilk test was used to verify the normality of distribution. The Mann-Whitney test was used if the distribution was different from normal. The nonparametric Wilcoxon test was used in the analysis of paired samples to assess the statistical significance of differences. The Benjamini-Hochberg method was used for multiple comparisons. When two groups were compared to assess the strength of the effect of an independent predictor variable on the dependent variable (response), odds ratio (OR) and 95% confidence interval (CI) were determined. Differences were statistically significant with $p < 0.05$. The results of the comparison are given for statistically significant differences.

Results

Baseline clinical measurements of patients of the study groups are given in Table 1. Patients in Group 2 were older than patients in Group 1. Both groups included more female patients. After the distribution of patients according to baseline left ventricular ejection fraction (LVEF), Group 1 included fewer patients with HFpEF than Group 2 and Group 3, but more patients with HFmrEF than Group 3. The study groups did not differ by the percentage of patients with HFrEF. After the distribution of patients by CHF functional class (FC), CHF FC II and III turned out to prevail in all study groups (Figure 2).

Additionally, subgroups were formed in each group based on the baseline FC: FC I–II and FC III–IV; the percentages of patients with FC I–II and FC III–IV were comparable in Group 1, Group 2, and Group 4. Interestingly, Group 3 included more patients with baseline FC I–II compared with Group 1 and Group 2. When patients were compared by the baseline mean value of 6-minute walk distance (6MWD), it was found to be lower in Group 2 than in Group 1 and Group 3, which corresponds with the distribution by baseline CHF FC (Table 1).

The baseline Scale of Heart failure Optimizing Clinical Status (SHOCS) score was higher in Group 2, which reflected the clinical severity of patient condition at the time of discharge from the hospital after ADHF (Table 1).

The etiological factors of CHF and comorbidity shown in Table 1. About a quarter of patients had a history of myocardial infarction (MI), and almost half had a history of atrial fibrillation (AF). The percentage of patients with a glomerular filtration rate <60 mL/min/1.73 m^2 was high, and the baseline mean value was lower in Group 2 versus Group 1 and Group 3.

Using the above methods, we determined adherence to self-control of the main hemodynamic measurements and weight, non-drug, and drug treatments of CHF after the 2 years of follow-up. The calculation is based on the number of survivors by the end of the second year of follow-up: 278 patients in Group 1; 259 patients in Group 2; 179 patients in Groups 3; and 45 patients in Group 4.

Figures 3 and 4 show patient adherence to self-control and non-drug treatments.

The rate of self-monitoring blood pressure (BP) at home was higher in Group 1 versus Group 2 and Group 3. Adherence to self-control of BP was higher in Group 3 and Group 4 versus Group 2 ($p_{1/2}<0.001$; $p_{1/3}=0.01$; $p_{1/4}=0.07$; $p_{2/4}=0.02$; $p_{2/3}<0.001$; $p_{4/3}=0.9$). The rate of self-control of heart rate (HR) was lower in Group 2 than in all other groups; it was the highest in Group 1 ($p_{1/2}<0.001$; $p_{1/3}=0.003$; $p_{1/4}=0.5$; $p_{2/4}<0.001$; $p_{2/3}<0.001$; $p_{4/3}=0.3$) (Figure 3).

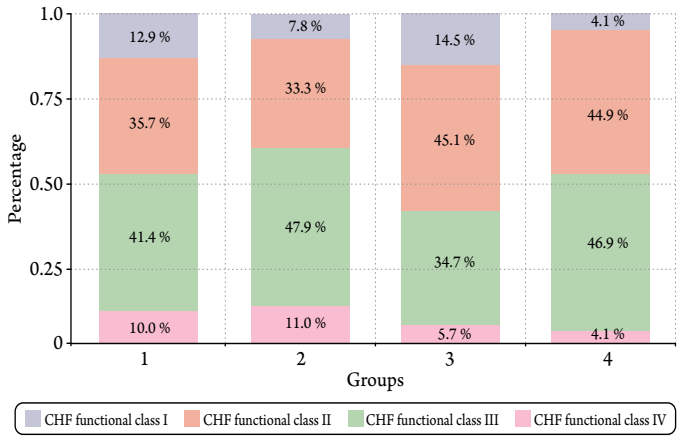
Self-control of weight at home is crucial for the management of CHF. Patients in Group 2 performed it significantly less frequently as compared to other groups. The highest adherence to self-control of weight was observed in Group 1 and Group 4 ($p_{1/2}$<0.001; $p_{1/3}$=0.008; $p_{1/4}$=0.4; $p_{2/4}$ =0.002; $p_{2/3}$<0.001; $p_{4/3}$=0.5) (Figure 3).

Non-drug treatments for CHF included salt restriction, diet, and PR at the outpatient stage. We assessed the adherence to these recommendations after the 2 years of follow-up. The highest adherence to diet and salt restriction was observed in Group 1 and Group 4. The poorest results were shown in Group 2 and Group 3 ($p_{1/2}$<0.03; $p_{1/3}$=0.002; $p_{1/4}$=0.5; $p_{2/4}$=0.02; $p_{2/3}$<0.001; $p_{4/3}$ =0.009). Less than half of patients in Group 1 were adherent to the PR recommendations, which was of greater statistical significantly than in other patient groups ($p_{1/2}$<0.001; $p_{1/3}$=0.0003; $p_{1/4}$=0.002; $p_{2/4}$=0.9; $p_{2/3}$=0.0006; $p_{4/3}$ =0.2) (Figure 4).

We evaluated adherence to CHF-modifying therapy in the retrospectively identified patient groups: the real-life administration of ACE inhibitors, ARBs, BBs, and MCRAs after the 2 years of follow-up. MCRA treatment was evaluated only in those patients to whom MCRAs were indicated. The percentage of patients taking eplerenone by the end of the second year of follow-up was calculated only in patients who actually took MCRAs by the end of this follow-up period (Figure 5).

The actual percentage of patients taking ACE inhibitors or ARBs was low in Group 2 and Group 3 by the end of the second year of follow-up (43.2% and 45%, respectively). It was predictable in Group 2, but we expected that this rate would be the same in Group 3 as in Group 1 since patients in Group 1 were observed in the CHFC during the first year and received adequate treatment. The rate of administration of ACE inhibitors/ARBs was insignificantly higher in Group 4 (66.7%) than in Group 2 and Group 3 but is still insufficient. Thus, the real-life rate of administration of ACE inhibitors/ARBs

Figure 2. Distribution of patients of the study groups by CHF functional class

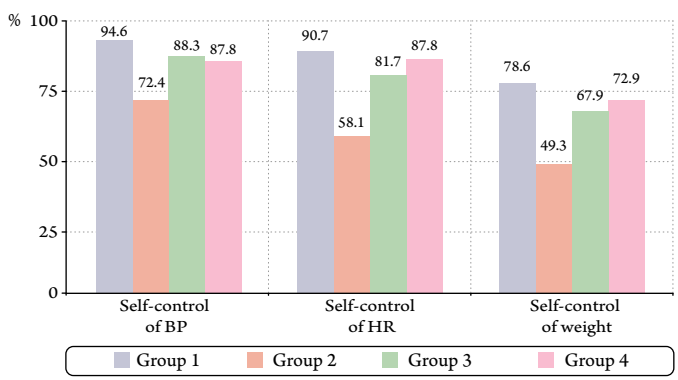


was higher in Group 1 than in all other groups ($p_{1/2}$<0.001; $p_{1/3}$<0.001; $p_{1/4}$<0.001; $p_{2/3}$=0.6; $p_{2/4}$=0.05; $p_{3/4}$=0.05) (Figure 5).

The percentage of patients taking BBs was statistically higher in Group 1 than in any other group by the end of the second year of follow-up. Only 2.8% of patients in Group 1 did not receive BBs because they were objectively contraindicated. The percentage of patients taking BBs was lower in Group 4 than in Group 1, but higher than in other groups ($p_{1/2}$<0.001; $p_{1/3}$<0.001; $p_{1/4}$=0.008; $p_{2/3}$=0.6; $p_{2/4}$=0.1; $p_{3/4}$=0.06). Unfortunately, the real-life adherence to BBs in Group 3 was comparable with that in Group 2, although, in Group 3, the doses of BBs were prescribed and titrated in the CHFC in the first year of follow-up. About a third of patients in Group 2 and Group 3 did not take BBs after the 2 years of the study (Figure 5).

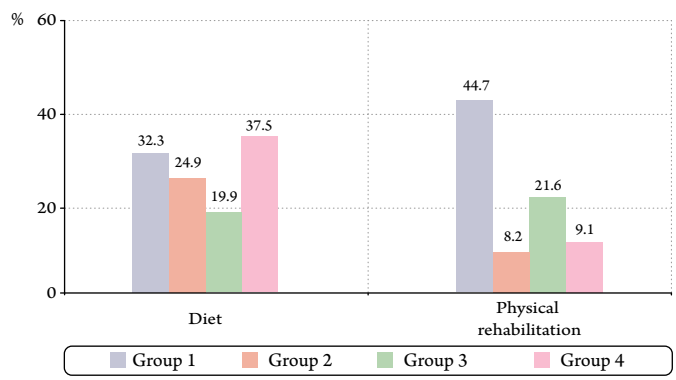
Interestingly, the real-life adherence to the administration of BBs in patients with CHF who did not visit the CHFC was higher compared to adherence to the use of ACE inhibitors/ARBs. The refusal of BBs likely caused withdrawal syndrome, and patients experienced an increase in HR

Figure 3. Adherence to self-control of BP, HR,* and weight in the study groups



** BP, blood pressure; HR, heart rate.*

Figure 4. Adherence to non-drug treatments of CHF in the study groups



ISSN 0022-9040. Kardiologiia. 2020;60(5). DOI: 10.18087/cardio.2020.5.n1022

Table 1. Baseline clinical measurements of patients in the study groups

Parameter	Group 1, n =313	Group 2, n =383	Group 3, n =197	Group 4, n =49
Age, years	69.6+9.9	71.8+11	70.1+10.9	71.6+8.3
*p=	$p_{1/2}$=0.006, $p_{1/3}$=0.7, $p_{1/4}$=0.14, $p_{2/3}$=0.06, $p_{2/4}$=0.8, $p_{3/4}$=0.3			
Sex (male/female), %	43.8/56.2	40.7/59.3	41.1/58.9	44.9/55.1
*p=	$p_{1/2}$=0.4, $p_{1/3}$=0.6, $p_{1/4}$=0.9, $p_{2/3}$=0.9, $p_{2/4}$=0.6, $p_{3/4}$=0.6			
HFpEF, %	64.5	73	74.6	69.6
*p=	$p_{1/2}$=0.02, $p_{1/3}$=0.02, $p_{1/4}$=0.5, $p_{2/3}$=0.7, $p_{2/4}$=0.6, $p_{3/4}$=0.5			
HFmrEF, %	22.1	17.7	11.3	21.7
*p=	$p_{1/2}$=0.2, $p_{1/3}$=0.003, $p_{1/4}$=0.96, $p_{2/3}$=0.055, $p_{2/4}$=0.5, $p_{3/4}$=0.06			
HFrEF, %	13.4	9.3	14.1	8.7
*p=	$p_{1/2}$=0.1, $p_{1/3}$=0.8, $p_{1/4}$=0.4, $p_{2/3}$=0.1, $p_{2/4}$=0.9, $p_{3/4}$=0.3			
FC I–II/III–IV CHF, %	48.6/51.4	41.1/58.9	59.6/40.4	49/51
*p=	$p_{1/2}$=0.052, $p_{1/3}$=0.02, $p_{1/4}$=0.96, $p_{2/3}$<0.001, $p_{2/4}$=0.3, $p_{3/4}$=0.2			
Baseline 6MWD, m	302.6+109.6	276.5+103.1	302.7+103.0	287.8+83.7
*p=	$p_{1/2}$=0.01, $p_{1/3}$=0.99, $p_{1/4}$=0.4, $p_{2/3}$=0.03, $p_{2/4}$=0.5, $p_{3/4}$=0.4			
SHOKS score	3 (2;4)	4 (2;5)	3 (2;4)	3 (2;4,5)
*p=	$p_{1/2}$<0.001, $p_{1/3}$=0.45, $p_{1/4}$=0.7, $p_{2/3}$<0.001, $p_{2/4}$=0.02, $p_{3/4}$=0.4			
Baseline SBP, mmHg	135+24	138+25	136+24	140+25
*p=	$p_{1/2}$=0.2, $p_{1/3}$=0.7, $p_{1/4}$=0.3, $p_{2/3}$=0.5, $p_{2/4}$=0.6, $p_{3/4}$=0.4			
Baseline DBP, mmHg	77+12	79+13	78+13	79+12
*p=	$p_{1/2}$=0.07, $p_{1/3}$=0.6, $p_{1/4}$=0.3, $p_{2/3}$=0.3, $p_{2/4}$=0.99, $p_{3/4}$=0.5			
Baseline HR, bpm	76+16	79+18	76+15	74+14
*p=	$p_{1/2}$=0.09, $p_{1/3}$=0.8, $p_{1/4}$=0.4, $p_{2/3}$=0.07, $p_{2/4}$=0.054, $p_{3/4}$=0.5			
History of hypertension, %	95.5	93.7	92.9	93.9
*p=	$p_{1/2}$=0.3, $p_{1/3}$=0.2, $p_{1/4}$=0.6, $p_{2/3}$=0.7, $p_{2/4}$=0.95, $p_{3/4}$=0.8			
History of CAD, %	82.4	83.3	79.2	85.7
*p=	$p_{1/2}$=0.8, $p_{1/3}$=0.4, $p_{1/4}$=0.6, $p_{2/3}$=0.2, $p_{2/4}$=0.7, $p_{3/4}$=0.3			
History of MI, %	29.1	26.3	24.4	26.5
*p=	$p_{1/2}$=0.4, $p_{1/3}$=0.2, $p_{1/4}$=0.7, $p_{2/3}$=0.6, $p_{2/4}$=0.97, $p_{3/4}$=0.8			
History of DM, %	24.1	24.9	27.9	18.4
*p=	$p_{1/2}$=0.8, $p_{1/3}$=0.3, $p_{1/4}$=0.4, $p_{2/3}$=0.4, $p_{2/4}$=0.4, $p_{3/4}$=0.2			
History of CI, %	10.6	8.1	9.6	8.2
*p=	$p_{1/2}$=0.3, $p_{1/3}$=0.7, $p_{1/4}$=0.6, $p_{2/3}$=0.5, $p_{2/4}$=0.99, $p_{3/4}$=0.7			
AF, %	51.8	44.7	47.4	42.9
*p=	$p_{1/2}$=0.06, $p_{1/3}$=0.3, $p_{1/4}$=0.3, $p_{2/3}$=0.5, $p_{2/4}$=0.8, $p_{3/4}$=0.6			
Baseline GFR, mean, mL/min/1.73 m^2	65.7+20.8	60.5+22.1	68.1+21.3	66.1+18.3
*p=	$p_{1/2}$=0.003, $p_{1/3}$=0.3, $p_{1/4}$=0.9, $p_{2/3}$=0.003, $p_{2/4}$=0.7, $p_{3/4}$=0.5			
GFR <60 mL/min/1.73 m^2, %	39.9	44.7	32.9	31.1
*p=	$p_{1/2}$=0.2, $p_{1/3}$=0.1, $p_{1/4}$=0.3, $p_{2/3}$=0.01, $p_{2/4}$=0.08, $p_{3/4}$=0.8			

* p, the significance of differences between Groups 1–4. SBP, systolic blood pressure; DBP, diastolic blood pressure; 6MWD, 6-minute walk distance; SHOKS, clinical assessment scale; CAD, coronary artery disease; MI, myocardial infarction; DM, diabetes mellitus; CI, carbohydrate intolerance; AF, atrial fibrillation; GFR, glomerular filtration rate; HFpEF, heart failure with preserved left ventricular ejection fraction; HFmrEF, heart failure with midrange left ventricular ejection fraction; HFrEF, heart failure with reduced left ventricular ejection fraction.

and heartbeat, which then improved adherence to the administration of BBs.

Patients in Group 1 showed excellent adherence to MCRAs (96.2%), higher than in any other group ($p_{1/2}$<0.001; $p_{1/3}$<0.001; $p_{1/4}$=0.001; $p_{2/3}$=0.5; $p_{2/4}$=0.1; $p_{3/4}$ =0.06). Group 1 was followed by Group 4; the rate of real-life administration of MCRAs was the lowest in Group 2 and Group 3 after the 2 years of follow-up. As with other treatments, patients in Group 3, unfortunately, showed low adherence to MCRAs, comparable with Group 2 (Figure 5).

We analyzed separately the rate of real-life administration of eplerenone by patients who actually took MCRAs by the end of the second year of follow-up. For financial reasons and contraindications in Group 1, only 48.3% of patients received eplerenone, which was statistically more than in Group 2 and Group 3. In Group 4, 40% of patients received eplerenone

($p_{1/2}$<0.001; $p_{1/3}$=0.0007; $p_{1/4}$=0.3; $p_{2/3}$ =0.003; $p_{2/4}$=0.009; $p_{3/4}$=0.2). In Group 2 and Group 3, the percentage of patients taking eplerenone was lower than in other groups. This means that eplerenone titrated in the first year of observation in Group 3 was replaced by spironolactone after the termination of follow-up in the CHFC (Figure 5).

We analyzed the reasons why patients refused of follow-up in the CHFC: low adherence, lack of desire to control BP, HR, and weight, count diuresis, and follow a diet (32.5% of patients); patients were accustomed to observation in the local outpatient clinics and do not want to visit a new physician (37.9% of patients); did not understand why they should be treated (21.3%); had transportation difficulties (4.8%); had arranged a visit to the center and then forgot (3.5%).

We think that a preference to be observed in the local outpatient clinic and low patient mobility are the objective reasons for refusing follow-up in the CHFC; 42.7% of study patients with CHF refused to be followed up in the specialized center. More than half of the reasons for refusing follow-up in the CHFC were modifiable. Analysis of these reasons allowed us to change approaches to improve patient adherence to treatment and follow-up in the CHFC after the end of the study.

Discussion

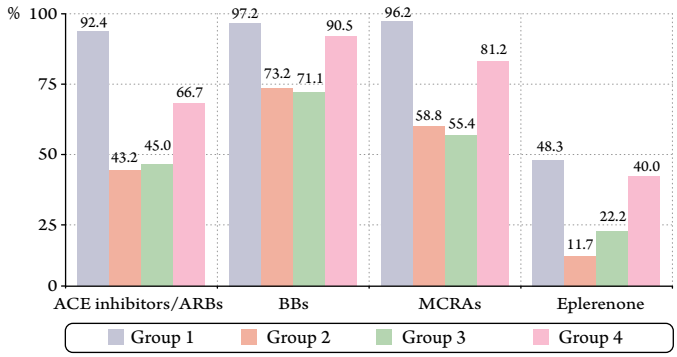
We found that adherence to follow-up in the CHFC can both reduce and increase over time. After the first year of follow-up, 11.3% of patients, who refused treatment at the CHFC at baseline, became adherent to follow-up in the CHFC, and 38.6% of patients with high adherence to the follow-up in the CHFC at baseline had reduced adherence and were placed in Group 3.

One important factor contributing to the adherence in patients with CHF to both follow-up and treatment was structured phone calls to patients made by a nurse. The existence of a specific factor influencing adherence should be taken into account: readmission to the CHFC inpatient clinic, where a patient who was not previously adherent to outpatient follow-up observation in the CHFC was retrained at the patient school and was advised to be followed up on the outpatient basis in the CHFC.

In more than half of cases in which a patient refused disease-modifying treatments, the causes were modifiable and could be corrected if there was a possibility of regular training of patients with CHF not only during inpatient treatment but also in the local outpatient clinics.

Using a detailed analysis of the baseline clinical characteristics of patients in the study groups, we were able to identify the reasons for the change in adherence to follow-up in the CHFC. Obviously, patients with a more clinically severe condition more often refused to visit CHFC due to logistic difficulties, and preferred to be observed in the local outpatient clinics (Group 2). Patients in Group 2 were older, had a shorter

Figure 5. Real-life rate of administration CHF-modifying agents in the study groups after the 2 years of follow-up



ACE, angiotensin-converting enzyme; ARBs, angiotensin II receptor blockers; BBs, beta-blockers; MCRAs, mineralocorticoid receptor antagonists.

6MWD and a higher SHOKS score. They were more likely to have chronic kidney disease, which suggested that these patients were particularly characterized by low mobility and required specialized medical care in the local outpatient clinics or at home.

Our results are consistent with data from foreign practice showing that patients who are not adherent to the treatment and observation are more likely to be older, have above-average LVEF, have been hospitalized for CHF before the enrollment, have FC III–IV CHF, diabetes mellitus, a history of cerebrovascular accidents, and higher levels of creatinine [23].

Interestingly, patients in Group 3 showed poor adherence to both self-control and non-drug and drug treatments, which clearly was associated with the termination of personal contacts with the CHFC physician.

Given the current prevalence of self-control of BP and HR at home, we expected a nearly 100% adherence to the self-control of BP and HR in all study groups. However, it turned out that not all patients measured BP, and even fewer patients measured their HR. The poorest adherence to self-control of BP and HR was shown by patients who were observed only in the local outpatient clinics.

During hospitalization for ADHF, patients in all groups were trained to keep a weight diary and count diuresis. However, after the 2 years of follow-up, 21.4% of patients in the group of continuous follow-up at the CHFC (Group 1) did not want to monitor their weight despite regular reminders. The poorest weight control was observed in the group of patients who were continuously monitored in the local outpatient clinics: more than half of patients did not control their weight.

It is essential to encourage patients to self-control their weight because there is strong evidence that just the absence of self-control of weight increases the risk of death and re-hospitalization for CHF by 57% [23], because patients reduce control of the signs of the clinical worsening of CHF and tend to seek care late [2, 20, 22, 31].

ISSN 0022-9040. Kardiologiia. 2020;60(5). DOI: 10.18087/cardio.2020.5.n1022

*KRKA – лидер в области кардиологии!**

Роксатенз-инда

индапамид/периндоприл/розувастатин

1.25 мг/**4** мг/**10** мг
1.25 мг/**4** мг/**20** мг
2.5 мг/**8** мг/**10** мг
2.5 мг/**8** мг/**20** мг

3 ЛИДИРУЮЩИЕ МОЛЕКУЛЫ
ИНДАПАМИД ПЕРИНДОПРИЛ РОЗУВАСТАТИН

2 ВАЖНЕЙШИХ ФАКТОРА РИСКА
ГИПЕРТОНИЯ ДИСЛИПИДЕМИЯ

1 ТАБЛЕТКА
УПРОЩЕНИЕ ЛЕЧЕНИЯ ДЛЯ ЛУЧШЕЙ ПРИВЕРЖЕННОСТИ

Первый в Европе и России полипилл такого состава[4]

Источники информации: 1. ИМП по препарату Роксатенз-инда. **2.** Индапамид, периндоприл и розувастатин являются лидирующими молекулами по объему продаж в рублях в своих соответствующих классах (по данным IQVIA на 02.2020). **3.** Williams B, Mancia G, Spiering W et.al. ESC Scientific Document Group; 2018 ESC/ESH Guidelines for the management of arterial hypertension, European Heart Journal 2018; 39 (33): 3021–104. **4.** Состав Роксатенз Инда - индапамид/периндоприл/розувастатин. В РФ – согласно данным сайта ГРЛС от 03.2020. в Европе - 1. Roxiper (Perindopril/Indapamide/Rosuvastatin 4 mg/1.25 mg/10 mg), flm-coated tablet, Marketing Authorisation No: 5756812, Portugal Roxiper (Perindopril/Indapamide/Rosuvastatin 4 mg/1.25 mg/20 mg), flm-coated tablet, Marketing Authorisation No: 5756838, Portugal Roxiper (Perindopril/Indapamide/Rosuvastatin 8 mg/2.5 mg/10 mg flm-coated tablet, Marketing Authorisation No: 5756820, Portugal Roxiper (Perindopril/Indapamide/Rosuvastatin 8 mg/2.5 mg/20 mg), flm-coated tablet, Marketing Authorisation No: 5756846, Portugal

ОПЕРЕЖАЯ ВРЕМЯ

* Премия XXIII Российского национального конгресса «Человек и лекарство», май 2016, г. Москва.

Информация предназначена для медицинских и фармацевтических работников.

Заказчик размещения рекламы ООО «КРКА ФАРМА»
125212, г. Москва, Головинское шоссе, д. 5, корп. 1
Тел.: (495) 981-10-95, факс: (495) 981-10-91. e-mail: info.ru@krka.biz, www.krka.ru

KRKA

Just a small number of patients in all groups were adherent to salt restriction and diet, which proves that it is challenging to correct diet and eating behavior in elderly and comorbid patients, who were found in all study groups.

In all study groups, the percentage of patients who followed the guidelines for PR on the outpatient basis was extremely low. Low adherence to physical activity in patients with CHF has been shown in other studies [32–37]. Low physical activity is known to increase the risk of death and re-hospitalization by 48% [23]. Thus, it is necessary to find new strategies to keep patients physically active.

The analysis of the real-life rate of administration of CHF-modifying agents showed the poorest adherence in the group receiving long-term observation in the local outpatient clinics (Group 2).

The example of Group 3 shows that the lack of specialized observation in the second year of the study negated the results achieved in the first year. The adherence to CHF-modifying treatment was comparable to that of Group 2 by the end of the second year of observation. The example of the administration MCRAs and eplerenone in Group 3 shows that only long-term follow-up at the CHFC is a framework for proper adherence to treatment with drugs of this class. This may be due to the low awareness of primary care physicians about the relevance and effects of MCRAs for the treatment of CHF and the perception of MCRAs as additional diuretics.

It should be noted that adherence to self-control and treatment in Group 4 was found to be better than in Group 3. This fact also shows the importance of regular medical supervision in a specialized institution.

Based on our findings, it can be concluded that training at CHF patient school during hospitalization and over-the-phone follow-up are insufficient measures for increasing patient adherence to self-control and treatment over a long-term outpatient observation period. There is no hope for the long-term retention of knowledge after CHF patient school, which has already been shown in the SHANS study [25]; the available training programs for patients with CHF should be supplemented with personal physician contacts [38].

Ultimately, the evidence presented indicates that adherence to treatment in the study patient groups closely correlates with adherence to both visiting the CHFC and the self-control of BP, HR, weight, and non-drug treatment guidelines. The best results for both adherence to observation and self-control and treatment were shown in the group of patients who continued to be followed up in the CHFC throughout the study period.

Conclusions

1. Low adherence to follow-up in the CHFC, self-control and to treatment is associated with patients' age, baseline clinical severity, and comorbidities.
2. Only specialized follow-up and regular contact with the CHFC physician ensured sufficient long-term adherence to self-control, non-drug, and drug treatment of CHF.
3. Patient adherence to the recommendations on PR is low both under specialized and nonspecialized observation. Thus, it is necessary to develop approaches to the arrangement of outpatient PR for patients after decompensated HF.

Limitations of the study

International practice shows that patients enrolled in registers or studies are usually under the researcher's strict supervision and are more adherent to treatment. Our findings should be interpreted in this context.

No conflict of interest is reported.

The article was received on 01/02/20

REFERENCES

1. Maggioni AP, Dahlström U, Filippatos G, Chioncel O, Crespo Leiro M, Drozdz J et al. EURObservational Research Programme: regional differences and 1-year follow-up results of the Heart Failure Pilot Survey (ESC-HF Pilot). European Journal of Heart Failure. 2013;15 (7):808–17. DOI: 10.1093/eurjhf/hft050
2. Polyakov D. S., Fomin I. V., Valikulova F. Yu., Vaisberg A. R., Kraiem N., Badin Yu. V. et al. The EPOCHA-CHF epidemiological program: decompensated chronic heart failure in real-life clinical practice (EPOCHA-D–CHF). Russian Heart Failure Journal. 2016;17 (5):299–305. [Russian: Поляков Д. С., Фомин И. В., Валикулова Ф. Ю., Вайсберг А. Р., Краием Н., Бадин Ю. В. и др. Эпидемиологическая программа ЭПОХА-ХСН: Декомпенсация хронической сердечной недостаточности в реальной клинической практике (ЭПОХА-Д-ХСН). Журнал Сердечная Недостаточность. 2016;17 (5):299–305]. DOI: 10.18087/rhfj.2016.5.2239
3. Kapoor JR, Kapoor R, Ju C, Heidenreich PA, Eapen ZJ, Hernandez AF et al. Precipitating Clinical Factors, Heart Failure Characterization, and Outcomes in Patients Hospitalized with Heart Failure With Reduced, Borderline, and Preserved Ejection Fraction. JACC: Heart Failure. 2016;4 (6):464–72. DOI: 10.1016/j.jchf.2016.02.017
4. Arutyunov A. G., Dragunov D. O., Arutyunov G. P., Sokolova A. V. Impact of the dosing of basic drugs on the risk of re-hospitalization in patients with chronic heart failure. Therapeutic Archive. 2016;88 (1):29–34. [Russian: Арутюнов А. Г., Драгунов Д. О., Арутюнов Г. П., Соколова А. В. Влияние величины дозы основных препаратов на риск повторной госпитализации пациентов с хронической сердечной недостаточностью. Терапевтический Архив. 2016;88 (1):29–34]. DOI: 10.17116/terarkh201688129–34
5. De Peuter OR, Lip GYH, Souverein PC, Klungel OH, de Boer A, Büller HR et al. Time-trends in treatment and cardiovascular events in patients with heart failure: a pharmacosurveillance study. European Journal of Heart Failure. 2011;13 (5):489–95. DOI: 10.1093/eurjhf/hfq228
6. Gislason GH, Rasmussen JN, Abildstrom SZ, Schramm TK, Hansen ML, Buch P et al. Persistent Use of Evidence-Based Pharmaco-

ISSN 0022-9040. Kardiologiia. 2020;60(5). DOI: 10.18087/cardio.2020.5.n1022

therapy in Heart Failure Is Associated with Improved Outcomes. Circulation. 2007;116 (7):737–44. DOI: 10.1161/CIRCULATIONAHA.106.669101
7. Belenkov Yu. N., Mareev V. Yu., Ageev F. T., Fomin I. V., Badin Yu. V., Polyakov D. S. et al. Veritable prevalence of CHF in the European part of Russian Federation (EPOCHA trial, hospital stage). Russian Heart Failure Journal. 2011;12 (2):63–8. [Russian: Беленков Ю. Н., Мареев В. Ю., Агеев Ф. Т., Фомин И. В., Бадин Ю. В., Поляков Д. С. и др. Истинная распространенность ХСН в Европейской части Российской Федерации (ЭПОХА, госпитальный этап) Журнал Сердечная Недостаточность. 2011;12 (2):63–8]
8. Belenkov Yu. N., Mareev V. Yu., Ageev F. T., Fomin I. V., Badin Yu. V., Polyakov D. S. et al. Modern character of CHF patients in the European part of the Russian Federation (hospital stage). Russian Heart Failure Journal. 2011;12 (5):255–9. [Russian: Беленков Ю. Н., Мареев В. Ю., Агеев Ф. Т., Фомин И. В., Бадин Ю. В., Поляков Д. С. и др. Современный образ пациента с ХСН в европейской части российской федерации (госпитальный этап). Журнал Сердечная Недостаточность. 2011;12 (5):255–9]
9. Fomin I. V. Chronic heart failure in Russian Federation: what do we know and what to do. Russian Journal of Cardiology. 2016;8:7–13. [Russian: Фомин И. В. Хроническая сердечная недостаточность в Российской Федерации: что сегодня мы знаем и что должны делать. Российский Кардиологический Журнал. 2016;8:7–13]. DOI: 10.15829/1560-4071-2016-8-7-13
10. Scherbinina E. V., Mareev V. Yu., Fomin I. V., Shustova T. S. The use of beta-blockers in patients with heart failure in the Nizhny Novgorod region. Actual practice data (1998-2000). Russian Heart Failure Journal. 2001;2 (2):52–3. [Russian: Щербинина Е. В., Мареев В. Ю., Фомин И. В., Шустова Т. С. Применение бета-блокаторов у больных с сердечной недостаточностью в Нижегородской области. Данные реальной практики (1998–2000 годы). Журнал Сердечная Недостаточность. 2001;2 (2):52–3]
11. Fomin I. V., Mareev V. Yu., Zherbinina E. V. Indicators of the prevalence of heart failure and the effectiveness of its therapy, depending on the severity of the disease. Russian Heart Failure Journal. 2002;3 (2):69–70. [Russian: Фомин И. В., Мареев В. Ю., Щербинина Е. В. Показатели распространенности сердечной недостаточности и эффективности ее терапии в зависимости от тяжести заболевания. Журнал Сердечная Недостаточность. 2002;3 (2):69–70]
12. Fomin I. V., Polyakov D. S. Beta-blockers, and real clinical practice in Russia: the gap between the understanding of the doses of beta-blockers and subsequent prognosis in patients with cardiovascular disease. Systemic Hypertension. 2017;14 (3):36–41. [Russian: Фомин И. В., Поляков Д. С. β-Адреноблокаторы и реальная клиническая практика в России: пропасть между пониманием до β-адреноблокаторов и последующим прогнозом у больных с сердечно-сосудистыми заболеваниями. Системные гипертензии. 2017;14 (3):36–41]
13. Shah KS, Xu H, Matsouaka RA, Bhatt DL, Heidenreich PA, Hernandez AF et al. Heart Failure With Preserved, Borderline, and Reduced Ejection Fraction. Journal of the American College of Cardiology. 2017;70 (20):2476–86. DOI: 10.1016/j.jacc.2017.08.074
14. Maggioni AP, Anker SD, Dahlström U, Filippatos G, Ponikowski P, Zannad F et al. Are hospitalized or ambulatory patients with heart failure treated in accordance with European Society of Cardiology guidelines? Evidence from 12440 patients of the ESC Heart Failure Long-Term Registry. European Journal of Heart Failure. 2013;15 (10):1173–84. DOI: 10.1093/eurjhf/hft134
15. Komajda M, Anker SD, Cowie MR, Filippatos GS, Mengelle B, Ponikowski P et al. Physicians' adherence to guideline-recommended medications in heart failure with reduced ejection fraction: data from the QUALIFY global survey: Adherence to heart failure guidelines. European Journal of Heart Failure. 2016;18 (5):514–22. DOI: 10.1002/ejhf.510
16. Mureddu GF, Agabiti N, Rizzello V, Forastiere F, Latini R, Cesaroni G et al. Prevalence of preclinical and clinical heart failure in the elderly. A population-based study in Central Italy. European Journal of Heart Failure. 2012;14 (7):718–29. DOI: 10.1093/eurjhf/hfs052
17. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. European Heart Journal. 2016;37 (27):2129–200. DOI: 10.1093/eurheartj/ehw128
18. Mareev V. Yu., Fomin I. V., Ageev F. T., Begrambekova Yu. L., Vasyuk Yu. A., Garganeeva A. A. et al. Russian Heart Failure Society, Russian Society of Cardiology. Russian Scientific Medical Society of Internal Medicine Guidelines for Heart failure: chronic (CHF) and acute decompensated (ADHF). Diagnosis, prevention and treatment. Kardiologiia. 2018;58 (6S): 8–164. [Russian: Мареев В. Ю., Фомин И. В., Агеев Ф. Т., Беграмбекова Ю. Л., Васюк Ю. А., Гарганеева А. А. и др. Клинические рекомендации ОССН – РКО – РНМОТ. Сердечная недостаточность: хроническая (ХСН) и острая декомпенсированная (ОДСН). Диагностика, профилактика и лечение. Кардиология. 2018;58 (6S): 8–164]. DOI: 10.18087/cardio.2475
19. Polyakov D. S., Fomin I. V., Shkarin V. V., Gurvich E. V., Kraiem N. EPOCHA-D–CHF: gender differences in prognosis for acute decompensated heart failoure in real clinical practice (part 1). Women's health problems. 2017;12 (2):11–21. [Russian: Поляков Д. С., Фомин И. В., Шкарин В. В., Гурвич Е. В., Краием Н. ЭПОХА-Д-ХСН: гендерные особенности прогноза при острой декомпенсации ХСН в реальной клинической практике (часть 1). Проблемы женского здоровья. 2017;12 (2):11–21]
20. Wolfel EE. Can we predict and prevent the onset of acute decompensated heart failure? Circulation. 2007;116 (14):1526–9. DOI: 10.1161/CIRCULATIONAHA.107.729608
21. Solomon SD, Dobson J, Pocock S, Skali H, McMurray JJV, Granger CB et al. Influence of Nonfatal Hospitalization for Heart Failure on Subsequent Mortality in Patients With Chronic Heart Failure. Circulation. 2007;116 (13):1482–7. DOI: 10.1161/CIRCULATIONAHA.107.696906
22. Setoguchi S, Stevenson LW, Schneeweiss S. Repeated hospitalizations predict mortality in the community population with heart failure. American Heart Journal. 2007;154 (2):260–6. DOI: 10.1016/j.ahj.2007.01.041
23. Van der Wal MHL, van Veldhuisen DJ, Veeger NJGM, Rutten FH, Jaarsma T. Compliance with non-pharmacological recommendations and outcome in heart failure patients. European Heart Journal. 2010;31 (12):1486–93. DOI: 10.1093/eurheartj/ehq091
24. Van der Wal MHL, Jaarsma T, Moser DK, van Gilst WH, van Veldhuisen DJ. Qualitative examination of compliance in heart failure patients in The Netherlands. Heart & Lung. 2010;39 (2):121–30. DOI: 10.1016/j.hrtlng.2009.07.008
25. Mareev V. Yu., Begrambekova Yu. L., Danielyan M. O., Ageev F. T., Gilyarevskiy S. R., Belenkov Yu. N. et al. What questions are asked and answered by studies of non-drug treatment in patients with heart failure. Lessons from the CHANCE study. Russian Heart Failure Journal. 2014;15 (6):383–96. [Russian: Мареев В. Ю., Беграмбекова Ю. Л., Даниелян М. О., Агеев Ф. Т., Гиляревский С. Р., Беленков Ю. Н. и др. Какие вопросы задаются и на какие вопросы способны ответить исследования по немедикаментозному лечению пациентов с сердечной недостаточностью. Уроки исследования ШАНС. Журнал Сердечная Недостаточность. 2014;15 (6):383–96]
26. Lainscak M, Blue L, Clark AL, Dahlström U, Dickstein K, Ekman I et al. Self-care management of heart failure: practical recommendations from the Patient Care Committee of the Heart Failure Asso-

ciation of the European Society of Cardiology. European Journal of Heart Failure. 2011;13 (2):115–26. DOI: 10.1093/eurjhf/hfq219
27. La Rovere MT, Traversi E. Role and efficacy of cardiac rehabilitation in patients with heart failure. Monaldi Archives for Chest Disease. 2019;89 (1). DOI: 10.4081/monaldi.2019.1027
28. von Scheidt W, Zugck C, Pauschinger M, Hambrecht R, Bruder O, Hartmann A et al. Characteristics, management modalities and outcome in chronic systolic heart failure patients treated in tertiary care centers: results from the EVIdence based TreAtment in Heart Failure (EVITA-HF) registry. Clinical Research in Cardiology. 2014;103 (12):1006–14. DOI: 10.1007/s00392-014-0743-x
29. McAlister FA, Stewart S, Ferrua S, McMurray JJJV. Multidisciplinary strategies for the management of heart failure patients at high risk for admission. Journal of the American College of Cardiology. 2004;44 (4):810–9. DOI: 10.1016/j.jacc.2004.05.055
30. Sochalski J, Jaarsma T, Krumholz HM, Laramee A, McMurray JJV, Naylor MD et al. What Works In Chronic Care Management: The Case of Heart Failure. Health Affairs. 2009;28 (1):179–89. DOI: 10.1377/hlthaff.28.1.179
31. Formiga F, Chivite D, Manito N, Casas S, Llopis F, Pujol R. Hospitalization due to acute heart failure. Role of the precipitating factors. International Journal of Cardiology. 2007;120 (2):237–41. DOI: 10.1016/j.ijcard.2006.10.004
32. Evangelista LS, Berg J, Dracup K. Relationship between psychosocial variables and compliance in patients with heart failure. Heart & Lung. 2001;30 (4):294–301. DOI: 10.1067/mhl.2001.116011
33. Strömberg A, Mårtensson J, Fridlund B, Levin L-A, Karlsson J-E, Dahlström U. Nurse-led heart failure clinics improve survival and self-care behaviour in patients with heart failure: results from a prospective, randomised trial. European Heart Journal. 2003;24 (11):1014–23. DOI: 10.1016/S0195-668X (03) 00112-X
34. Artinian NT, Magnan M, Sloan M, Lange MP. Self-care behaviors among patients with heart failure. Heart & Lung. 2002;31 (3):161–72. DOI: 10.1067/mhl.2002.123672
35. O'Connor CM, Whellan DJ, Lee KL, Keteyian SJ, Cooper LS, Ellis SJ et al. Efficacy and Safety of Exercise Training in Patients with Chronic Heart Failure: HF-ACTION Randomized Controlled Trial. JAMA. 2009;301 (14):1439–50. DOI: 10.1001/jama.2009.454
36. Tierney S, Mamas M, Woods S, Rutter MK, Gibson M, Neyses L et al. What strategies are effective for exercise adherence in heart failure? A systematic review of controlled studies. Heart Failure Reviews. 2012;17 (1):107–15. DOI: 10.1007/s10741-011-9252-4
37. van der Wal MHL, Jaarsma T, Moser DK, Veeger NJGM, van Gilst WH, van Veldhuisen DJ. Compliance in heart failure patients: the importance of knowledge and beliefs. European Heart Journal. 2006;27 (4):434–40. DOI: 10.1093/eurheartj/ehi603
38. Begrambekova Yu. L., Mareev V. Yu. Will a patient with heart failure become an «expert patient»? Russian Heart Failure Journal. 2014;15 (2):110–20. [Russian: Беграмбекова Ю. Л., Мареев В. Ю. Станет ли пациент с сердечной недостаточностью «пациентом-экспертом»? Журнал Сердечная Недостаточность. 2014;15 (2):110–20]

ISSN 0022-9040. Kardiologiia. 2020;60(5). DOI: 10.18087/cardio.2020.5.n1022