A Randomized Open Clinical Study of the Atherosclerosis Treatment Information Video Effect on Adherence to Long-Term Therapy in Patients with Cardiovascular Diseases

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Aim. Study the effect of a study video, which was created by researchers and devoted to the atherosclerosis development and the effect of statin therapy on atherosclerotic plaque, on adherence to long-term therapy in patients with high or very high risk of cardiovascular complications.
Material and methods. 120 patients admitted to hospital with cardiovascular diseases were included in the study. Patients were randomized into 2 groups: in the main group (n=60), the information video edited by the researchers was shown to patients on the eve of discharge, in addition to a printed brochure on lifestyle and diet modification, and in the control group (n=60), patients were given only a standard brochure. The motivating video shows the damage to the cardiovascular system by the atherosclerotic process and the beneficial effect on the body of constant intake of statins. After 1 and 3 months after discharge from the hospital, telephone calls were made, after which the patients had to visit the center for an objective examination by a researcher and control of laboratory parameters. After 1 month, 110 patients visited the center, after 3 months, 98 respondents visited the center.
Results. The group with the information video demonstration noted more frequent adherence to medical recommendations compared to the control: after 1 month, 52 (96%) patients continued treatment versus 48 (86%) patients, 3 months after discharge 48 (96%) patients continued treatment versus 38 (79%) patients ($p<0.05$). After 1 month, 38 (70%) patients in the intervention group continued taking statins versus 29 (43%) respondents in the control group ($p<0.05$), 3 months after discharge, 40 (80%) patients in the intervention group continued to take statins versus 33 (69%) control patients ($p<0.09$).
Conclusion. Demonstration of a motivating video about the effect of statins on the atherosclerosis course increases patient adherence to medicinal therapy, including adherence to statins.

Keywords: cardiovascular disease, adherence, statins, educational video, cholesterol.

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Introduction

The problem of low adherence to treatment in patients with cardiovascular diseases (CVD) is very urgent. According to Rosstat data, more than 24 million people have heart and vascular diseases in Russia, and mortality from diseases of the circulatory system in June 2019 was 614.6 per 100 thousand people [1]. One of the leading causes of high CVD mortality is low long-term adherence of patients to therapy [2-10]. Long-term adherence of patients after discharge from the hospital, regardless of their disease, is low and does not exceed 50% [3-10]. Low adherence to long-term medicinal therapy is associated with a decrease in the therapeutic effect severity, a decrease in the life quality and entails significant financial losses [4-15]. After discharge from the hospital, patients with CVD most often stop taking statins on their own [4-10]. In 2016, the total economic damage from hypercholesterolemia in the Russian Federation amounted to more than 1 trillion rubles [8]. A variety of ways to improve adherence have been used [3-11], but the most effective interventions were those aimed at the behavioral responses of the patient himself, rather than any other actions emanating from the attending physician or hospital staff [4-16]. Visual accompaniment of spoken information improves its perception and is generally more favorably perceived by people [5,6,13]. As of 2018, US adults spend about 6 hours a day watching videos [16]. This includes watching short videos on TVs, mobile devices, social networks and the Internet, which is becoming increasingly popular [16]. A 2017 marketing study, Video Marketing Platform Twenty Three, found that 80% of respondents chose to watch videos <5 minutes in length. Therefore, we can assume that demonstrating a short video about the benefits of continuous statin therapy in relation to the atherosclerosis course can be a simple and effective way to optimize adherence to therapy.

The study aim was to study in a randomized open study the effect of a video created by researchers about atherosclerosis development and the effect of statin therapy on the atherosclerotic plaque, on adherence to long-term therapy in patients with a high or very high risk of cardiovascular complications.

Materials and methods

The study was carried out in the Cardiology Department of the Clinical Hospital of the Saratov Medical University. The study protocol was approved by the Ethics Committee at Saratov State Medical University named after V.I. Razumovsky.

Inclusion criteria: inpatient CVD treatment, high or very high risk of cardiovascular complications, written informed consent to participate in the study.

Exclusion criteria: chronic heart failure (CHF) of NYHA functional class IV, uncontrolled arterial hypertension (AH), severe encephalopathy of any genesis, cancer, alcohol or drug abuse, uncontrolled bronchial asthma, exacerbation of the chronic obstructive pulmonary disease, statin intolerance in history.

The hospitalization reasons were heart failure decompensation, hypertensive crisis, unstable angina pectoris, myocardial infarction. All included patients had indications for statin therapy. Most of the included patients were admitted to the hospital on an emergency basis due to the occurrence of the CVD course decompensation, therefore, the inclusion was performed after stabilization of their condition 1-2 days before the planned discharge for the outpatient stage.

Patients were randomly assigned [17,18] to the intervention group (n=60), in which an information video was shown in addition to the standard brochure on non-medicinal treatment, and to the comparison group (n=60), in which only the standard brochure was issued. This brochure is freely available for patients, it was developed by the Center for Medical Prevention of the Kirov Medical Information and Analytical Center of the National Medical Research Center for Preventive Medicine of the Russian Ministry of Health [19]. The brochure briefly explains what «atherosclerosis» and «cholesterol» are, as well as recommendations for correcting nutrition in order to prevent the atherosclerosis progression.

The information video was edited by medical researchers, using the experience of colleagues who are engaged in advertising and educational activities in order to improve the population health [11-16,20,21]. Editing was done using a video editor and illustrated images that are freely available in the stock image libraries. The video showed an atherosclerotic plaque inside the artery, which, increasing in size, blocked the lumen and led to a deterioration in health and the possible development of an acute coronary event, the appearance of an ambulance and a hospital corridor in the frame. The video goes on to show a box labeled «statin» but no specific statin has been shown either by the nomenclature or by the commercial name. After that, the video displayed the reverse

development and stabilization of the atherosclerotic plaque. At the end of the video, it's said that the constant use of statins reduces the risk of vascular accidents and increases life expectancy. The maximum assimilation of the material by a person is available when the video is about 1.5 minutes [16], so the total duration of this motivating video was 1 minute 22 seconds. The video is superimposed with a voice, voicing the text agreed by the researchers, about atherosclerosis and the effect of statins on this process, which makes it easier to understand the illustrated illustrations.

At discharge from the hospital, patients were recommended to take statins in doses according to current recommendations [22,23].

After 1 and 3 months after discharge from the hospital, telephone calls were made, after which the patients had to visit the center for an objective examination and control of laboratory parameters (lipid profile and transaminases). During control visits, questions were also asked about changes in the lives of respondents, the degree of satisfaction with treatment. Close attention was paid to the continuation of therapy in general and the use of statins in particular, the therapy regularity, the presence of CVD decompensation, hospitalizations, calls to emergency medical teams during the observation period, and tracking of side effects. A comparison was made between the recommendations and the actual therapy of the patients. If patients continued to take more than 80% of the recommended drugs, this was interpreted as adherence to the entire therapy. When the patient stopped taking the drugs, the reasons for ending the treatment were investigated. If there were no objective reasons, and the decision to discontinue therapy was made by the patient independently, this was regarded as non-adherence to treatment. Continuation of statin use was assessed by comparing appointments at visits 1 and 3 months after discharge, as well as according to the results of respondents' lipid profile in dynamics.

Statistical processing of the results was carried out using the Statistica 8.0 software (StatSoft Inc., USA) using the cross-tabulation method (building tables of absolute frequencies of paired observations) using the chi-square test and the method of variation statistics, that is, using stepwise logistic regression. Statistically significant differences were considered at $p<0.05$. Basic descriptive statistics methods (percentages and median) were used to characterize the study groups.

Table 1. Baseline clinical and demographic characteristics of the study groups

Parameter	Intervention group (n=60)	Control (n=60)	p
Age, years	69 [59; 74]	67 [59; 71]	0.964
Have reached retirement age, n (%)	48 (80)	48 (80)	1.000
Men, n (%)	24 (40)	20 (33)	0.449
High cardiovascular risk, n (%)	6 (10)	3 (5)	0.553
Very high cardiovascular risk, n (%)	54 (90)	57 (95)	0.298
Obesity, n (%)	40 (67)	42 (70)	0.695
Smoking, n (%)	6 (10)	6 (10)	1.000
Arterial hypertension, n (%)	60 (100)	60 (100)	-
Type 2 diabetes mellitus, n (%)	20 (33)	22 (37)	0.702
Exertional angina, n (%)	26 (43)	34 (57)	0.144
History of myocardial infarction, n (%)	18 (30)	25 (42)	0.183
ACS on admission, n (%)	42 (70)	42 (70)	1.000
CHF of NYHA functional class I-III, n (%)	34 (57)	44 (73)	0.056

ACS – acute coronary syndrome, CHF – chronic heart failure, NYHA – New York Heart Association

Results

207 patients were invited to the study, 167 respondents gave their prior consent to participate, 120 were included. After 1 month, 110 patients visited the center, after 3 months, 97 people visited the center. Patients in both groups were comparable in terms of baseline characteristics (Table 1).

One month after discharge, 54 patients of the intervention group and 56 patients of the control group visited the center, after 3 months, 50 and 48 people visited the center, respectively. The proportion of patients adhering to treatment after 1 and 3 months of follow-up are presented in Table 2.

The proportions of patients in the study groups, depending on the adherence to pharmacotherapy who needed re-hospitalization within 3 months of observation after discharge, are presented in Table 3, and the proportion of patients who needed to call an ambulance team are presented in Table 4.

Discussion

The tendency in the modern information space to increase the number of information sources and shorten

Table 2. Adherence to pharmacotherapy

Treatment	After 1 month			After 3 months		
	Intervention group (n=54)	Control (n=56)	p	Intervention group (n=50)	Control (n=48)	p
All drugs, n (%)	52 (96)	48 (86)	0,054	48 (96)	38 (79)	0,011
Statins, n (%)	38 (70)	24 (43)	0,003	40 (80)	33 (69)	0,202

Table 3. Repeated hospitalizations in groups depending on adherence to treatment after 3 months

Re-hospitalizations	Intervention group			Control		
	Adherent (n=48)	Non-adherent (n=2)	p	Adherent (n=38)	Non-adherent (n=10)	p
Yes, n_1 (%)	5 (10)	2 (100)	0,001	8 (21)	6 (60)	0,015
No, n_1 (%)	43 (90)	0 (0)		30 (79)	4 (40)	

n_1 – number of re-hospitalizations

Table 4. Emergency calls in groups depending on adherence to treatment after 3 months

Ambulance calls	Intervention group			Control		
	Adherent (n=48)	Non-adherent (n=2)	p	Adherent (n=38)	Non-adherent (n=10)	p
Yes, n_1 (%)	11 (23)	2 (100)	0,014	10 (26)	10 (100)	0,001
No, n_1 (%)	37 (77)	0 (0)		28 (74)	0 (0)	

n_1 – number of ambulance calls

the time spent on viewing them confirms the priority of short information videos, which corresponds to the literature data [6,9,10,15,16,20,21]. Various platforms, video hostings and social networks such as Instagram, YouTube and Tik Tok are becoming more and more popular, in which videos of various duration are used as a means of transmitting information. The most popular are videos with a duration of about 1 min due to the greatest accessibility of the material assimilation [15,16,20,21]. We applied this influence variant, that is, a short video with a duration of 1 min 22 sec. This intervention was found to be much less time-consuming for the doctor than, for example, conducting health education, writing educational programs, using telephone calls or sending out messages with reminders, and it was more positively received by patients due to its high visibility, ease of perception and short duration. Probably, it was the adverse effect of the treatment lack, which is illustrated by the video, that motivated patients to more often follow the doctor's recommendations on an outpatient basis, which was confirmed by our study.

Works that studied the effect of just short videos as a way to increase adherence to treatment in cardiology have not been found in the literature available to us, despite the telemedicine development and the presence of a publication large number about its various methods [5,6,10-16,20,21]. Demonstration of videos films, as a way to increase adherence to treatment, was used among patients with various diseases [12-15,20,21] but all the videos found are in a "lecture format": they last at least 20 minutes and are devoted to a detailed explanation of the epidemiology, the etiology nuances, pathogenesis and treatment approaches. The video we have created is a concisely presented key information aimed at briefly explaining the treatment benefits to the patient. Our video is closer in character and structure to video clips, and perhaps that is why it turned out to be effective.

Study limitations. A relatively small number of patients were included in this study. This may be underpowered but the data we received have the potential to be studied in large samples.

Conclusion

Demonstration of a video about the effect of statins on the atherosclerosis course improves the adherence of patients to medicinal therapy in general and to statins in

particular. Intervention is associated with a decrease in the number of ambulance calls, hospital readmissions, exacerbations of diseases and deterioration in well-being.

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