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ANTITHROMBOTIC THERAPY IN ACUTE CORONARY SYNDROME: CURRENT RECOMMENDATIONS AND PRACTICAL ASPECTS

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ABSTRACT

The article presents a systematic review of modern approaches to antithrombotic therapy in acute coronary syndrome, taking into account current international and Russian clinical recommendations, as well as the results of a single-center observational study conducted on the example of a sample of patients treated in a multidisciplinary clinic in Novosibirsk.

The structure of prescribed antithrombotic therapy, the degree of compliance of therapeutic tactics with current recommendations, and the relationship of decisions made with immediate and long-term clinical outcomes are analyzed.

It is shown that the basic concept of modern therapy for acute coronary syndrome is based on the combined use of antiplatelet and anticoagulant drugs, individualization of the duration and intensity of therapy, taking into account ischemic and hemorrhagic risk, and integration of an antithrombotic strategy with reperfusion interventions.

Practical aspects of implementing the recommendations in the Russian context are discussed, including organizational and pharmacoeconomic constraints, routing features, and problems of adherence to therapy. Conclusions on the directions of optimization of antithrombotic therapy in acute coronary syndrome at the level of clinical practice are formulated.

KEYWORDS: acute coronary syndrome, antithrombotic therapy, dual antiplatelet therapy, anticoagulants, clinical recommendations, clinical practice.

INTRODUCTION

Acute coronary syndrome combines clinical conditions associated with sudden disruption of coronary blood flow due to unstable atherosclerotic plaque and thrombosis in the coronary arteries. This group includes ST-segment elevation myocardial infarction, non-stable ST-segment elevation myocardial infarction, and unstable angina; in all cases, thrombosis with plaque rupture or erosion is the pathogenetic core.

Antithrombotic therapy in this clinical situation is one of the key elements of complex treatment and includes a combination of antiplatelet and anticoagulant drugs at various stages of patient management. Current recommendations of the European Society of Cardiology and the Russian Society of Cardiology interpret antithrombotic therapy as a dynamic process that begins at the initial contact with the patient, continues during the inpatient period and forms the basis for secondary prevention after discharge [5].

In the Russian healthcare system, clinical guidelines for the management of patients with acute coronary syndrome have a regulatory status, are approved by the Ministry of Health of the Russian Federation and are used as a basis for assessing the quality of medical care. This determines the need to analyze to what extent the actual practice of prescribing antithrombotic therapy meets the set standards, especially in regional clinics, where the combination of high workload, limited resource base and heterogeneous availability of medicines can lead to deviations from optimal regimens [9].

In the context of this work, modern recommendations are understood to mean the current versions of the documents of the European Society of Cardiology on the management of patients with acute coronary syndrome and the Russian clinical guidelines for acute coronary syndrome without elevation and with elevation of the ST segment, approved by the Russian Society of Cardiology and the Ministry of Health of the Russian Federation. Antithrombotic therapy is interpreted as a set of pharmacological interventions aimed at suppressing platelet activation and aggregation, as well as the coagulation link of hemostasis, while striving to minimize the risk of clinically significant bleeding [13].

The real clinical practice in the framework of this study is considered as a set of actual prescriptions recorded in medical documentation, taking into account the organizational features of the hospital, the availability of certain drugs, the specifics of patient routing and the level of clinical experience of doctors. An important aspect is that, even with detailed recommendations, every decision on the choice and modification of an antithrombotic regimen is made in terms of an individual balance between the risk of ischemic and hemorrhagic complications. Therefore, the analysis of clinical practice makes it possible to identify not only the degree of formal compliance with the recommendations, but also typical strategic approaches to managing this balance.
The purpose of this article is to outline the key provisions of current recommendations for antithrombotic therapy in acute coronary syndrome.

MATERIALS AND METHODS OF RESEARCH

The sample includes data from the inpatient stage and subsequent outpatient follow-up for twelve months. For the purposes of educational analysis, a generalized database reflecting typical characteristics of patients and treatment practices in a regional hospital was used.
The inclusion criteria were the clinical picture of acute coronary syndrome, confirmed by typical changes in markers of myocardial damage and electrocardiographic signs of ischemia, as well as inpatient treatment in a specialized department. The analysis included patients with and without ST segment elevation, provided that diagnosis and outcomes can be verified according to inpatient and outpatient documentation.
Demographic characteristics, the main factors of cardiovascular risk and concomitant diseases, the type of acute coronary syndrome, the type of reperfusion strategy, as well as the structure of antithrombotic therapy at the hospital stage and upon discharge were recorded for each patient. Therapy changes during the first year of follow-up were evaluated separately, including discontinuation or modification of dual antiplatelet therapy, and administration or withdrawal of anticoagulants.
The criteria for compliance with the recommendations were considered to be the appointment of dual antiplatelet therapy in combination with parenteral anticoagulant in the acute stage and the continuation of dual antiplatelet therapy after coronary artery stenting with a duration appropriate to the type of stent and risk profile, as well as the individualized use of triple antithrombotic therapy in combination with acute coronary syndrome and indications for prolonged anticoagulant therapy, such as atrial fibrillation or prosthetic valves.
The outcome assessment included the frequency of recurrent coronary events, strokes, hospitalizations for unstable angina or decompensation of heart failure, as well as episodes of clinically significant bleeding. Mortality rates during the one-year follow-up period and the proportion of patients who continued continuous antithrombotic therapy in accordance with the recommended duration were considered as additional indicators.
Statistical data processing was descriptive in nature and was aimed at comparing the structural characteristics of therapy and outcomes in groups of patients with full and partial implementation of recommendations.
The results are presented in the form of tables reflecting the distribution of patients by key signs and treatment regimens, as well as in the form of a figure demonstrating the structure of antithrombotic therapy at the inpatient stage.

RESULTS AND DISCUSSION

The database included information about 200 patients with acute coronary syndrome who were admitted to the cardiology department of a multidisciplinary hospital in Novosibirsk during a one-year period. The sample was dominated by middle-aged and elderly people, while a significant proportion of patients had a combination of several risk factors, including hypertension, dyslipidemia, smoking and diabetes mellitus. Some of the patients were hospitalized again due to recurrent coronary events.
A summary table is provided to illustrate the sample structure.

Table 1. Characteristics of the sample of patients with acute coronary syndrome in the Novosibirsk clinic

Indicator	Value
Numberofpatients	200
Averageage, years	63
Men, %	62
Patients over 75 years of age, %	24
Arterialhypertension, %	81
Type 2 diabetesmellitus, %	28
Activesmoking, %	36
Previous history of myocardial infarction, %	22
Acute coronary syndrome with ST elevation, %	48
Acute coronary syndrome without ST elevation, %	52
Primary PCI wasperformed, %	71
Hospitalmortality, %	7

Data analysis showed that the vast majority of patients received a combination of antiplatelet drugs and parenteral anticoagulants in accordance with current recommendations. For a significant part of the patients who underwent

coronary artery stenting, double antiplatelet therapy was prescribed with a planned prolongation after discharge. In patients with a combination of acute coronary syndrome and atrial fibrillation, triple antithrombotic therapy of limited duration was used, followed by a transfer to a combination of an anticoagulant and one antiplatelet drug, which corresponds to the principle of minimizing the risk of bleeding while maintaining protection against thromboembolism.

At the same time, the sample included a group of patients who received suboptimal therapy, limited to monotherapy with one antiplatelet drug at the hospital stage, for reasons of late hospitalization, high risk of bleeding, or organizational constraints.

The generalized structure of antithrombotic therapy is presented in Table 2.

Table 2. Structure of antithrombotic therapy in acute coronary syndrome in the cardiology department of a multidisciplinary hospital in Novosibirsk

Antithrombotic therapy regimen	**Percentage of patients, %**
Recommended dual antiplatelet therapy in combination with anticoagulant at the acute stage	64
Triple antithrombotic therapy in the presence of indications for anticoagulation	14
Suboptimal therapy (monotherapy or incomplete implementation of recommended regimens)	22

A graphical representation of the structure of antithrombotic therapy is shown in Figure 1.

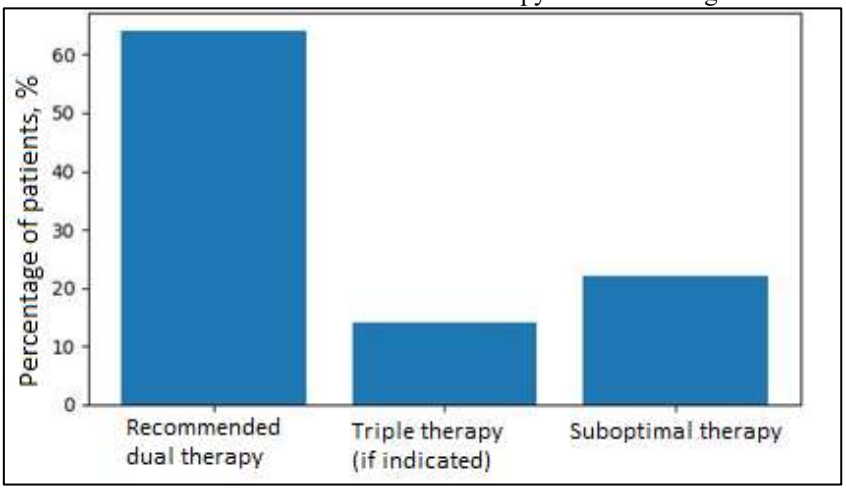

Fig. 1. The structure of antithrombotic therapy in acute coronary syndrome in the cardiology department of a multidisciplinary hospital in Novosibirsk

A comparison of the actual antithrombotic therapy regimens with the requirements of modern recommendations showed that in 64% of patients, therapy complies with the key provisions of international and Russian documents, including the use of dual antiplatelet therapy with parenteral anticoagulant at the acute stage, timely initiation of therapy and its continuation after stenting at the recommended time.

In the group of patients receiving triple antithrombotic therapy, there was a purposeful limitation of its duration, followed by a transition to a combination of an anticoagulant and one antiplatelet drug, which reflects the concept of de-escalation of treatment intensity as one moves away from an acute episode and while maintaining a high risk of bleeding.

The suboptimal therapy group was characterized by either insufficient intensity of antithrombotic effects or premature withdrawal of one of the components of the regimen. In some cases, this was due to the development of clinically significant bleeding or a significant increase in risk according to the scales, in others — to organizational factors, limited availability of certain drugs and decreased patient adherence.

The effect of the antithrombotic therapy regimen on clinical outcomes

To assess the possible relationship between the structure of antithrombotic therapy and outcomes, the sample was divided into groups depending on the degree of compliance of the prescriptions with the recommendations. The table shows the main indicators of annual outcomes in these groups based on the data presented.

Table 3. Clinical outcomes depending on the antithrombotic therapy regimen

Indicator (year of observation)	**Recommended therapy**	**Tripletherapy if indicated**	**Suboptimal therapy**
Number of patients in the group	128	28	44
Repeatedmyocardialinfarction, %	6	7	14
Hospitalizationforunstableangina, %	10	11	21
Stroke or transient ischemic attack, %	3	5	6
Clinicallysignificantbleeding, %	4	11	5

Total mortality during the year of observation, %	5	7	12
Maintaining the recommended scheme throughout the year, %	72	61	38

Analysis of the results shows that in the group recommended for antithrombotic therapy, the incidence of ischemic complications and mortality are lower than in the group of suboptimal therapy, with a moderate level of bleeding. In the triple therapy group, there is a slightly higher incidence of bleeding with a similar level of repeated ischemic events compared with the recommended dual therapy group, which is consistent with real-world research data on increased haemorrhagic risk when an anticoagulant is added to a dual antiplatelet regimen. The data obtained on the structure of outcomes are consistent with the results of Russian registries, which demonstrate that better compliance with clinical recommendations for the treatment of myocardial infarction is associated with better outcomes, while deviations towards low-intensity therapy led to an increase in the frequency of repeated events.

When discussing the practical aspects of antithrombotic therapy in a regional hospital setting, it should be borne in mind that the formal availability of recommendations does not guarantee their automatic implementation. At the Novosibirsk clinic level, several groups of factors can be identified that influence the choice and modification of antithrombotic regimens.

Firstly, the time factor plays an important role. A significant number of patients arrive with a delay in the onset of symptoms, which limits the possibilities of reperfusion therapy and changes the context of decision-making about the structure of antithrombotic therapy. With late admission, the focus shifts from the reperfusion strategy to secondary prevention and optimization of long-term antithrombotic protection.

Secondly, the assessment of individual haemorrhagic risk is essential. In elderly patients with multiple comorbidities, chronic kidney disease, or previous bleeding episodes, the doctor is often inclined to de-escalate therapy or abandon triple regimens, even if there are formal indications. This strategy reflects the desire to reduce the immediate risk, but in the long run may lead to insufficient protection against ischemic events.

Thirdly, pharmacoeconomic factors and the specifics of preferential drug provision programs have a significant impact. The availability of modern antiplatelet agents and anticoagulants, especially in the outpatient segment, is heterogeneous and depends on the regional budget and procurement structure. In the absence of guaranteed access to medications recommended at the inpatient stage, the doctor may consciously choose more conservative regimens to which the patient can have stable access after discharge.

Fourth, an essential practical aspect is the patient's commitment. Long-term combined antithrombotic therapy, which requires regular administration of several drugs, is perceived by some patients as excessively burdensome, especially in the absence of obvious symptoms after stabilization of the condition. The short duration of the standard consultation and limited opportunities for in-depth educational work with the patient and his relatives further complicate the formation of a sustainable commitment.

The experience of analysing the structure of antithrombotic therapy in acute coronary syndrome in the cardiology department of a large Novosibirsk city clinical hospital allows us to formulate a number of specific optimization directions aimed at achieving better compliance with modern clinical recommendations and reducing the frequency of adverse outcomes. Standardization of the initial stage of treatment becomes an important guideline. For each patient with suspected acute coronary syndrome, it is necessary to provide the earliest possible assessment of ischemic and haemorrhagic risk using validated scales recorded in the medical history. Such an assessment should not be perceived as a formal part of the documentation, but as a tool that determines the choice of intensity and combination of antithrombotic drugs at the hospital and post-hospital stages. Regular training of doctors of the emergency department and the cardiology department in the principles of risk stratification will reduce the proportion of suboptimal schemes based mainly on empirical concepts [1].

Special attention should be paid to the formation of standardized protocols for typical clinical situations encountered in the clinic's practice. We are talking about management schemes for patients with ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction on the background of multivessel damage, as well as patients with a combination of acute coronary syndrome and atrial fibrillation requiring long-term anticoagulant therapy. The availability of well-designed protocol cards integrated into the hospital's workflow will reduce the variability of decisions between shifts on duty and increase the reproducibility of therapeutic tactics [6].

An important direction is to build continuity of antithrombotic therapy during the transition from the hospital to the outpatient stage. Upon discharge of each patient with acute coronary syndrome, the cardiologist should formulate not only a list of prescriptions, but also the logical validity of the therapy structure, an indication of the planned duration of a double or triple antithrombotic regimen, as well as criteria for its possible modification. In the epicrisis, it is advisable to allocate a separate subtitle dedicated to antithrombotic therapy and the timing of control visits, so that the polyclinic doctor has clear guidelines for continuing treatment [3].

The patient information and training system requires separate reinforcement. Practice shows that decreased adherence to antithrombotic therapy is often associated with a lack of understanding of the importance of long-term medication in the absence of symptoms. To bridge this gap, it is advisable to introduce short standardized educational sessions before discharge, conducted by a doctor or a specially trained nurse. During such a conversation, the purpose of antithrombotic therapy, possible risks of unauthorized withdrawal, signs of bleeding requiring medical attention, and the order of subsequent visits are explained to the patient and his relatives in an accessible form [10].

To improve the quality of antithrombotic therapy solutions, it is advisable to develop an in-department clinical audit system. We are talking about a periodic review of cases of repeated coronary events, clinically significant bleeding and deaths within a year after acute coronary syndrome with a mandatory assessment of the structure of antithrombotic therapy. Such reviews should not be punitive, but educational in nature, forming stable ideas among doctors about typical mistakes and possible ways to prevent them [8].

A promising area is the creation of an electronic registry of patients with acute coronary syndrome treated at the clinic. The availability of such a database, which includes information on antithrombotic therapy regimens and annual outcomes, will allow not only to track trends over time, but also to compare our own results with published data from Russian and international registries. Based on the register, it is possible to form local quality indicators related to the proportion of patients receiving the recommended combination therapy, the duration of maintenance of dual antiplatelet therapy and the frequency of unjustified de-escalation of treatment. The integration of the hospital with the polyclinic unit is of particular importance [4]. It is advisable to arrange the routing in such a way that patients after acute coronary syndrome are observed in the first months by a cardiologist who is familiar with modern recommendations and the logic of prolonged antithrombotic therapy. In the future, it is possible to transfer these patients under the supervision of a general practitioner or therapist, however, while maintaining clear criteria for referral to a second cardiologist consultation in case of complications or the need to revise the treatment regimen [9].

The implementation of these areas requires organizational support from the clinic administration, but does not involve radical financial investments. Most of the proposed solutions are based on rationalizing existing processes, strengthening the educational component, and building systematic quality monitoring. Together, they can lead to an increase in the proportion of patients receiving antithrombotic therapy in accordance with current recommendations, a decrease in the frequency of recurrent coronary events and a decrease in unjustified bleeding [7].

Table 4. Main directions of improvement of antithrombotic therapy for ACS in the Novosibirsk clinic

Direction of implementation	Content of recommendations	Expected clinical and organizational effect
Standardization of the initial stage of management of patients with ACS	Introduction of mandatory early assessment of ischemic and hemorrhagic risk with a record in the medical history, training of doctors of the emergency department and the cardiology department on the principles of risk stratification and selection of antithrombotic therapy regimens	Reducing the frequency of suboptimal regimens, reducing the variability of solutions, and better matching the intensity of therapy to the individual patient profile
Development of local antithrombotic therapy protocols	Creation and regular updating of protocol charts for typical clinical scenarios of acute coronary syndrome, integration of these documents into clinical workflow and quality control system	Improving reproducibility of treatment tactics, reducing the number of deviations from recommendations for no objective reason, improving continuity between different shifts on duty
Ensuring continuity between inpatient and outpatient stages	Inclusion of a separate section on antithrombotic therapy in the discharge epicrisis, indicating the planned duration of the regimen, modification criteria and timing of control visits; information exchange with polyclinics	Reducing the likelihood of premature discontinuation of therapy, increasing the coherence of hospital and polyclinic actions, improving control over the duration of double and triple therapy
Development of educational programs for patients	Organization of short standardized conversations before discharge, during which the goals of antithrombotic therapy, possible risks of unauthorized withdrawal and signs of complications requiring medical attention are explained to the patient and his relatives.	Increasing patient adherence to long-term treatment, reducing the frequency of unauthorized drug withdrawal, improving early detection of complications
Optimization of preferential drug provision	Analysis of patients' needs for modern antiplatelet agents and anticoagulants, interaction with regional health authorities to include priority drugs in preferential lists, taking into account the actual availability of medicines when forming protocols	Reducing the proportion of forced de-escalation of therapy due to financial reasons, increasing the stability of prescribed regimens after discharge, equalizing access to modern therapy

Implementation of clinical audit and registry of patients with ACS	Creation of an electronic patient registry with recording of antithrombotic therapy regimens and outcomes, regular review of cases of recurrent coronary events and bleeding with an assessment of the correctness of decisions made	Formation of local quality indicators, identification of typical errors and growth areas, the ability to compare clinic results with data from regional and national registers

Taking these factors into account, it is advisable to develop structured management routes for patients with acute coronary syndrome in the Novosibirsk clinic, including a standardized assessment of ischemic and hemorrhagic risk, the use of prescribing templates for antithrombotic regimens consistent with recommendations, as well as training programs before discharge. A promising direction is the creation of registers of patients with acute coronary syndrome at the institution or regional level, which make it possible to systematically monitor the structure of therapy and outcomes.

Modern European recommendations emphasize the need for early initiation of antithrombotic therapy, individualization of its duration and intensity, widespread use of scales for assessing ischemic and hemorrhagic risk, and regular review of strategies depending on the dynamics of the clinical condition [11]. Russian clinical guidelines, adapting these approaches, take into account the specifics of the domestic healthcare system, including the structure of vascular centers, the availability of interventional care and the availability of drug support programs.

In the practice of the Novosibirsk clinic, based on the data presented, there is a desire to implement these principles, which is reflected in a high proportion of patients receiving the recommended regimens, however, certain gaps remain. At the hospital stage, doctors more often follow the recommendations, whereas in the outpatient period, the severity of deviations increases, reflecting the influence of external factors beyond the direct control of the hospital.

An important task is the integration of inpatient and outpatient stages, including the transfer of information on the recommended duration of antithrombotic therapy, the use of standard epicrisis with clearly defined goals and timing of therapy revision, as well as the development of interaction between hospital cardiologists and primary care physicians.

CONCLUSION

A systematic review of current recommendations for antithrombotic therapy in acute coronary syndrome and an analysis of the practice of the Novosibirsk clinic allow us to formulate several key provisions.

Antithrombotic therapy is a central component of the comprehensive treatment of patients with acute coronary syndrome and relies on a combination of antiplatelet agents and anticoagulants integrated with reperfusion interventions and secondary prevention. International and Russian clinical guidelines offer detailed patient management algorithms based on an assessment of the balance between ischemic and hemorrhagic risk and involving individualization of the duration and structure of therapy.

An analysis of a sample of patients hospitalized in a Novosibirsk clinic shows that with sufficient organizational support, it is possible to achieve a high proportion of compliance with prescribed antithrombotic therapy with current recommendations, which is associated with more favorable clinical outcomes. At the same time, there remains a significant group of patients receiving suboptimal therapy, which is accompanied by an increase in the frequency of recurrent coronary events and mortality.

The main reasons for deviations from the recommendations in practice are related to late hospitalization, high hemorrhagic risk in some patients, limited availability of modern medicines in the outpatient segment, as well as insufficient patient commitment to long-term therapy. An additional factor is the limited consultation time and insufficient use of structured educational programs for patients.

To optimize antithrombotic therapy in acute coronary syndrome in a regional clinic, it seems promising to develop registries, systematically audit compliance with therapy recommendations, introduce standardized patient management routes, expand continuing medical education programs aimed at practical development of modern algorithms, as well as strengthen preferential drug provision programs.

The sampling modeling method presented in this paper demonstrates the possibility of analyzing and interpreting the structure of antithrombotic therapy and its relationship to outcomes without access to personalized medical information, which is important for educational and scientific and methodological purposes. In the future, similar approaches can be implemented based on real registers and databases, which will make it possible to more accurately assess the effectiveness of antithrombotic therapy in various regions of the Russian Federation and formulate targeted strategies for its improvement.

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