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## The use of improved working clinical and prognostic classification of life-threatening arrhythmias and heart blocks in different cardiovascular diseases (reported and own findings)

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### Abstract

We suggested improved working clinic-prognostic classification of life-threatening arrhythmias and heart blocks in different cardiovascular diseases. And improved clinic-prognostic classification of cardiac rhythm and conductivity disturbances was developed on the basis of performed investigation and findings of literature. In CAD and arterial hypertension safe arrhythmias and heart-blocks were determined in 32 (9.5%), dangerous for life -in 18 (5.4%), malignant arrhythmias and heart blocks -in 20 (6.0%), fatal arrhythmias -in 17 (5.1%) patients. Described arrhythmias were not observed in 249 (74.7%) patients.

**Keywords:** arrhythmias and heart blocks, clinic-prognostic classification.

### 1. Introduction

Nowadays there are many various classifications of arrhythmias and heart blocks [2, 3, 4]. Each of them has certain meaning. The most complex is classification "Sicilian gambit"- mechanism of arrhythmias depending on susceptibility of parameters of cellular electrophysiological functions. This is the classification of the 21<sup>st</sup> century that cannot be used now as medical approaches of determination of abundance (ionic currents) in cardiomyocytes in clinical conditions have not yet been developed.

At the same time published classifications are complex, difficult for comprehension and they do not take into account severity of the course of arrhythmias and heart blocks. However, in clinical practice classifications are of great importance depending on clinical severity of their course and prognoses of appearance of different complications [1].

B. Lown [7] developed classification of heart rhythm damages including peculiarities of their development. The author distinguishes:

- 1) arrhythmias with electric instability (ventricular extrasystole, ventricular tachycardia);
- 2) arrhythmias that potentially may contribute to the development of electric instability (sinus bradycardia, nodal rhythms, AV-blocks);
- 3) arrhythmias reflecting deep abnormalities electro-physiological capabilities of heart (fibrillation of ventricles - FV, asystolia).

Prognostic classification of ventricular arrhythmias suggested by J.T. Bigger [6] is of some interest.

The author distinguishes such ventricular arrhythmias as safe, unsafe (malignant, lethal) and potentially dangerous (intermediate form). Safe arrhythmias are any extrasystoles and ventricular arrhythmias that do not cause hemodynamic disturbances in persons without organic changes in myocardium. Their prognosis is favorable and they do not have indications for performing medical therapy. Dangerous arrhythmias are ventricular arrhythmias (ventricular paroxysmal tachycardias -PT) with hemodynamic disturbances or onset of ventricular fibrillations. Potentially dangerous ventricular arrhythmias may result in bad complications.

A.V. Nedostup [4] distinguishes such life-threatening arrhythmias:

I. Depending on the site of formation of rhythm and conductivity disturbances:

- a) In sinus node;
- b) In atria;
- c) In AV-node;
- d) In ventricles.

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II. Depending on the kind of arrhythmias:

- a) Tachyarrhythmia;
- b) Brady arrhythmias;
- c) Extra systoles.

III. Depending on the degree of jeopardy to the patient's life:

- a) tachy- or bradyarrhythmias connected with hemodynamic disturbances;
- b) tachy- or bradyarrhythmias threatening to life under

- certain conditions with the development of atrial fibrillation (AF) in the background of mitral stenosis, myocardial infarction, acute left ventricular insufficiency;
- c) Prognostically unfavorable arrhythmias (extrasystoles of high grades by Lown, trifascial block, elongation of interval Q-T) etc.

Israel cardiologists distinguish 3 following groups of life-threatening arrhythmias.

**Table 1:** Classification of significant and non-significant and dangerous heart arrhythmias

Insignificant arrhythmias for the course and prognosis of disease 1st group	Significant arrhythmias for the course and prognosis of disease 2nd group	Arrhythmias dangerous for life 3rd group
Sinus tachycardia	Paroxysmal supraventricular tachycardia	Paroxysmal ventricular tachycardia
Sinus bradycardia AV-block of II degree His bundle branch blocks Single extrasystoles	AV-block of II degree with syncopal states Ventricular extrasystoles (frequent and dual)	Fibrillation of ventricles Ventricular flutter
Fibrillation of atria (AF) with heart rate (HR) less than 110 per minute	AF with HR more than 110 per minute	Total AV-block

Thus, given classifications insufficiently reflect their clinic dependence in prognosis of emergence of various complications, in which safe heart rhythm disturbances and fatal arrhythmias are not differentiated. Besides in classifications a number of cardiac arrhythmias types are not included. That's why there is a need to suggest improved classification of heart rhythm disturbances with elimination of afore mentioned gaps.

**Purpose** of the article is to evaluate the severity of arrhythmias and heart blocks and facilitate selection of medicamental antiarrhythmic drugs for prevention of life-threatening heart rhythm disturbances by means of use of advanced working clinico-prognostic classification of life-threatening in different diseases of cardiovascular system.

**2. Materials and methods** We examined 336 patients with various forms of CAD (coronary artery disease) and comorbid arterial hypertension (AH) in the age from 40 to 76 years. Among them stable angina of II-III functional classes (FC) was determined in 65(19.3%), unstable angina -in 143(42.6%), acute myocardial infarction -in 128(38.1%) CAD patients with

comorbid AH of II-III degrees occurred in 298 (88.7%) patients. Heart failure by classification of NYHA I-III FC was defined in 316 (94.1%) patients.

For diagnostics of arrhythmias and heart blocks we used ECG in 12 commonly accepted derivations and in 68 (20.2%) patients -ECG Holter Monitoring, lipid spectrum of blood, troponins T and I content.

**3. Results and Discussion.** 16 years ago we published clinical classification of threatening heart arrhythmias that has been reviewed, supplemented and significantly improved [1].

Improved working clinical classification of life-threatening arrhythmias has been given in table 2.

As one can see from the presented findings 4 groups of arrhythmias are distinguished: I -safe heart rhythm and conductivity disturbances; II -arrhythmias and heart blocks dangerous for life; III -malignant disorders of cardiac rhythm and conductivity; IV -fatal arrhythmias. Various types of arrhythmias and heart blocks are included in each of the mentioned groups.

**Table 2:** Improved working clinico-prognostic classification of life-threatening damages of rhythm and conductivity of heart in different cardiovascular diseases

Severity of damages of cardiac rhythm and conductivity	Type of arrhythmias and heart blocks
I. Safe heart rhythm and conductivity disturbances	<ul style="list-style-type: none"> <li>• Sinus arrhythmia</li> <li>• Moderately evident sinus tachy- and bradycardia</li> <li>• Incomplete and total His right His bundle branch block</li> <li>• Left anterior or posterior fascicular block</li> <li>• AV-block of first degree</li> <li>• Atrial, rare extrasystoles</li> <li>• Functional ventricular extrasystoles</li> </ul>
II. Arrhythmias and heart blocks dangerous for life	<ul style="list-style-type: none"> <li>• Migration of pacemaker with hemodynamic disorders</li> <li>• Tachy- and bradycardia with significant hemodynamic disorders</li> <li>• Atrial flutter and fibrillation with/without significant hemodynamic disorders</li> <li>• AV-block of second degree with syncopal condition</li> <li>• Supraventricular paroxysmal tachy-arrhythmia (PT) with hemodynamic damages</li> <li>• Accelerated ventricular rhythm with hemodynamic disorders</li> <li>• Syndrome WPW, CLC with frequent attacks of atrial flutter and fibrillation</li> <li>• Common supraventricular extrasystoles affected by hypertrophy and dilation of left atrium</li> <li>• Combined disorders of cardiac rhythm and conductivity (extrasystoles + AV-blocks; extrasystoles + Afib; extrasystoles + Afib)</li> </ul>

III. Malignant disorders of cardiac rhythm and conductivity	<ul style="list-style-type: none"> <li>• Extrasystoles of 3-5 grades by Lown</li> <li>• Total AV-block with syncopal conditions</li> <li>• Ventricular tachycardia (especially “torsades de pointes”) with growing hemodynamic disorders</li> <li>• Syndrome of elongated interval T-Q, syndrome of weakness of sinus node, Brugada syndrome</li> <li>• Idioventricular rhythm with hemodynamic disorders</li> </ul>
IV. Fatal arrhythmias	<ul style="list-style-type: none"> <li>• Fibrillations (flutter) of ventricles</li> <li>• Asystolia</li> <li>• Electromechanic dissociation</li> </ul>

On the basis of performed investigation in examined patients safe arrhythmias and heart blocks were determined in 32 (9.5%) patients, dangerous for life -in 18 (5.4%), malignant arrhythmias and heart blocks -in 20 (6.0%) and fatal arrhythmias -in 17 (5.1%) patients. Described arrhythmias were not determined in 249 (74.7%) patients.

**4. Conclusion** Hence, suggested improved clinic-prognostic classification of arrhythmias and heart-blocks in different form of CAD enables us to define the degree of severity and danger for the life, to prognose possible onset malignant and fatal arrhythmias, heart-blocks and to carry on secondary prophylaxis directed to prolongation of span of life and prevention of sudden cardiac death. It is advisable to introduce suggested clinic-prognostic classification of arrhythmias and heart-blocks in different forms of CAD into cardiologic and therapeutic practice of medical and educational institutions for selection of patients in groups of dangerous, malignant and fatal arrhythmias and taking measures in them, directed to their prevention. More detailed characteristics of clinic-prognostic arrhythmias and heart blocks of 4 described groups will be clarified in next publications.

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