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## OBJECTIVIZATION OF EFFICACY OF DIAGNOSTICS DESTABILIZATION OF ISCHEMIA UNDER THE CONDITIONS OF CREATING A REGISTER OF SMALL TOWNS

**Key words:** unstable angina, myocardial infarction, coronary reserve, stress-tests.

**Abstract.** For the purpose of a run studies of clinical and "interjacent" acute coronary syndromes under the conditions of creating a register of small towns 580 patients were examined. Use of transesophageal electrocardiostimulation, bicycle ergometry, 2D-Echocardiography allowed to prognose the definition of patients on the groups of different risk. Patients with acute non-Q-wave myocardial infarction differ from patients of more considerable decrease of coronary reserve according to the results of stress tests.

### Introduction

Clinical, morphological and functional determinants of the course of acute forms of ischemic heart diseases (IHD) are of considerable interest in contemporary cardiology. The later ones especially applied to «intermediate» forms of destabilization of IHD, such as unstable angina (UA) and acute non-Q-wave forms of myocardial infarction (non-Q-w AMI). Increased interest of investigators to this pathology is due to the high risk of acute myocardial infarction's morbidity. The disease is a major cause of mortality not only in Ukraine but also in the world (according to WHO it is 12.5% in the structure of mortality) [3].

Registers of AMI used in practice do not always express the information about long-term consequences of the disease [1, 5, 7, 9]. Thus, the assessment of the course of acute forms of IHD, improved diagnostic approaches in acute period of the disease will optimize treatment and achieve improved survival.

The use of stress tests in contemporary urgent cardiology assumes ever-greater spread; particularly they help give in the objectification of diagnostics, the studies of coronary reserve's state and peculiarities of circulatory dynamics in-patients with UA and non-Q-w AMI [2, 4, 6]. Stress tests used on the above mentioned groups were mainly transesophageal electrocardiostimulation (TEES) and bicycle ergometry (BE) which were more informative when carrying out stress-echocardiography (stress-EchoCG) examination [8,10].

### Purpose of the investigation

Objectification of diagnostics, the determination of coronary reserve and functional state of myo-

cardium in-patients with destabilization of IHD under conditions of using stress tests.

### Material and methods

580 patients, admitted in cardio reanimation unit and infarction department, were diagnosed according to the World Health Organization criteria of acute myocardial infarction (AMI), clinical evidence, data of ECG-examination and enzyme's level. UA was diagnosed in 385 patients within 2-3 days (males, mean age 50,7±1,3 years). Non-Q-w AMI was defined in 140 patients (males with a mean age of 57,6±2,6 years), in 55 patients the organic damage of myocardium was not confirmed and the case of functional pathology- neurocirculatory disthonia was diagnosed (NCD.) (Males mean age was 34,6±3,7 years). Patients with Q-w AMI and circulatory deficiency II, III stages were not included.

Patients with UA were distributed into subgroups taking into consideration their heterogeneous rank: The subgroup of subsequent prolonged stable course of angina at the stage of an annual follow-up (group S- 207 - 53,8% of patients), the subgroup with periodical episodes of destabilization at the early post hospital stage, which ultimately concluded with relative stabilization (group DS - 35 - 9,1% of patients), the subgroup with relative stabilization at the early post hospital stage which later on nevertheless tend to destabilization (group SD- 108 -28,0% of patients), the subgroup with constantly relapsing episodes of destabilization at the post hospital stage (group D- 35 - 9,1% of patients). Distribution of patients with UA was performed according to angina at onset (AO) and progressive

angina (PA) (group AO- 88 (22,8%) of patients) and angina, progressed against a background of previous anamnesis of ischemia (group AP- 297 - 77,3% of patients). The group of patients with UA, in which later on during hospital care AMI developed irrespective on adequate therapy was analyzed separately (group UA AMI- 33 - 8,6% of patients).

Survey of all patients was performed in 3-5 days under the conditions of angina attack absence, beginning with TEES as the safest and most informative stress test. BE as an exercise tolerance test was used after the definition of loading tolerance and coronary reserve's reduction. Stress-EchoCG test was performed during TEES and BE.

The investigation results were analyzed using the Student's *t*-criterion as a valid mathematical model in "Statistics for Windows" program, the 5.0 version (StatSoft, USA). The result was considered significant if the reliability coefficient was equal to or less than 0.05.

Each patient gave written consent for the study in compliance with the guidelines GSP (1996), the European Convention on Human Rights and Biomedicine (1997), the Declaration of Helsinki of the World Medical Association on ethical principles of scientific medical research involving human subjects (1964 - 2000).

### Discussion of the results

Results of TEES performed in 385 patients with UA, 112 patients with n-Q-w AMI and 22 patients with NCA are listed in table 1. The test was positive in 319 (82,8%) patients with UA, in 96 (85,7%) patients with n-Q-w AMI and negative in NCA patients. Already at first investigations it was noted, that the patients of AO-subgroup, as compared with patients of AP-subgroup, differed by reliably higher frequency of stimulation's cessation ( $p < 0,001$ ) as listed in table 1.

The above mentioned tend remained during a period of one year of observation, until the second investigation took place. The patients with UA, in whom later on an AMI developed reliably, differed already from the entire UA group according to the results of the first investigation, which remained henceforward. The subgroup DS differed from all analyzed subgroups of destabilization and destabilization course of illness on remote posthospital stage at the first investigation according to frequency data of TEES' cessation. That subgroup was approximated to patients with UA and AMI later on developed. The subgroup of patients with n-Q-w AMI was notable for the greatest reduction of coronary circulation during TEES, which was

Table 1

#### Results of transesophageal electrocardiostimulation and bicycle ergometry in patients with acute coronary accidents in 1st and 2nd studies

Group	Results	Stress-tests			
		TEES (beats/min)	p	BE (W)	p
NCD		158,0±0,5		153,4±4,3	
UA	1	145,5±1,9		80,6±2,8	
	2	138,9±1,8	<0,02	87,9±3,0	>0,05
non-Q-w AMI		133,3±3,0			
AO	1	154,0±2,2		105,2±4,1	
AO	2	148,9±2,5	>0,1	117,0±4,3	<0,05
PA	1	141,4±2,7		72,5±2,8	
PA	2	135,9±2,0	>0,1	78,1±3,1	>0,2
UA AMI	1	133,3±3,9		20,0±2,4	
UA AMI	2	120,0±3,4	<0,02	67,2±2,2	<0,001
S	1	147,0±2,6		87,7±3,3	
S	2	147,0±2,1	>0,5	105,4±4,2	<0,001
D	1	148,3±3,3		66,2±2,9	
D	2	125,4±2,4	<0,001	42,2±2,3	<0,001
SD	1	140,7±2,6		79,6±2,4	
SD	2	130,7±2,3	<0,01	68,7±2,3	<0,01
DS	1	128,1±2,4		43,2±2,1	
DS	2	127,5±2,1	>0,5	50,0±2,6	<0,05

**Note.** UA - unstable angina, NCD - neurocirculatory dystonia, non-Q-w AMI - non-Q-wave forms of myocardial infarction, AO - patients with UA was performed according to angina at onset, PA - progressive angina, UA AMI - group of patients with UA, in which later on during hospital care an AMI, S - subgroup of subsequent prolonged stable course of angina at the stage of an annual follow-up, D - subgroup with constantly relapsing episodes of destabilization at the post hospital stage, SD - subgroup with relative stabilization at the early post hospital stage which later on nevertheless tend to destabilization, DS - subgroup with periodical episodes of destabilization at the early post hospital stage

Table 2

**Ejection fraction as an integral index of contractility during performance of transesophageal electrocardiostimulation and bicycle ergometry in patients with acute coronary accident at the 1st and 2nd studies**

Groups	Results	Ejection fraction (%)		
		At rest	After stress tests	
			TEES	BE
UA	1	51,1±1,3	38,7±1,9	30,3±1,7
UA	2	56,4±0,7	40,1±1,2	41,6±0,9
AO	1	58,2±1,4	37,4±1,5	30,7±1,5
AO	2	61,7±1,3	48,7±1,6	48,8±1,6
PA	1	47,8±1,1	28,8±1,3	30,0±1,2
PA	2	54,3±0,7	37,9±1,2	38,9±1,1
UA AMI	1	49,0±2,5	19,7±2,4	17,7±2,9
UA AMI	2	45,5±2,6	28,7±3,0	29,0±3,1
S	1	52,5±0,7	32,1±1,3	29,4±1,2
S	2	58,7±0,8	44,6±1,2	45,4±1,1
D	1	49,0±1,7	26,2±2,1	31,0±2,3
D	2	52,4±1,9	31,4±2,4	33,6±2,5
SD	1	48,4±1,2	26,8±1,3	28,7±1,4
SD	2	51,8±1,2	36,5±1,4	37,4±1,3
DS	1	47,0±1,6	29,4±2,4	36,3±2,4
DS	2	53,9±1,9	29,6±2,5	31,7±2,1
non-Q-w AMI		47,7±1,8	38,5±2,0	

analogous to the patients with UA and in spite of therapy later on developed AMI (table 1).

According to the results of BE, already from the outset of the procedure, the subgroup S was characterized by having greater load level of tolerance when compared with the subgroup D ( $p<0,001$ ), SD ( $p<0,05$ ), DS ( $p<0,001$ ). Against a background of a long-term therapy, a reliable increase of BE's voltage was defined in the subgroup S ( $p<0,001$ ), DS ( $p<0,05$ ), decrease - in the subgroup D ( $p<0,001$ ) and SD ( $p<0,01$ ) as displayed in table 1. Already at the beginning, a load tolerance was higher in the AO-subgroup as compared with the AP-subgroup ( $p<0,001$ ), and a considerable decrease of carried out work in the subgroup with developed AMI as compared with AP ( $p<0,001$ ) increased ( $p<0,05$ ) later on in contrast to AP.

Echocardiography: Analysis of general ejection fraction (EF) as an integral index of contractility in different UA patients subgroups indicates, that in the presence of the same tend to decrease at a height of TEES and BE load in AO patients -subgroup, the values of EF reached their maximum at rest and modeling of ischemia, especially during TEES performance ( $p<0,001$ ), as listed in table 2.

The problem of "intermediate" forms of IHD at the stage of acute coronary accident formation, takes on a special significance in view of it's ability to influence the active etiopatogenetic correction of the state of such a patient, which is practically impossible in the case of a patient suffering from

AMI, where in terms of already formed necrosis areas the main interest is the limitation of it's expansion.

Task of modern cardiology may as well be the formation of two directions: prevention of AMI development during a population examination, active diagnostics of the "intermediate" form of destabilization with wide use of stress tests, including the cases of UA and non Q MI, reexamination of means of treatment for IHD by introducing the so called "aggressive" technology, which includes surgical myocardial revascularization methods.

### Conclusions

Patients with UA and AMI, revealed for the first time passes essential features in coronary reserve restriction, which determinates the course of illness as a whole and the subsequent destabilization process during a long term of observation, which in it's turn allows the objectification of clinical and functional UA classification.

### Perspectives of further investigation

There is no doubt about the need for further study of the peculiarities of acute forms of coronary artery disease with the evaluation parameters of stress tests during the hospital period, that will enable to improve treatment and a course of the disease.

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**ОБ'ЄКТИВІЗАЦІЯ ЕФЕКТИВНОСТІ  
ДІАГНОСТИКИ ДЕСТАБІЛІЗАЦІЇ ІШЕМІЇ В  
УМОВАХ СТВОРЕННЯ РЕЄСТРІВ МАЛИХ МІСТ**

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**Резюме.** З метою об'єктивізації діагностики в умовах створення Реєстру малих міст обстежено 580 пацієнтів. У 385 хворих була діагностована нестабільна стенокардія, у

140 пацієнтів виставлений не Q інфаркт міокарда, у 35 пацієнтів підтверджені функціональні порушення - нейроциркуляторна дистонія. Всім хворим були проведені через стравохідна електрокардіостимуляція, велоергометрія, стрес-ехокардіографія. Результати обстежень свідчать, що дестабілізація стану пацієнтів з гострими коронарними катастрофами детермінована обмеженням коронарного резерву та порушеннями функціонального стану міокарда, що дозволяє вже в гострому періоді прогнозувати подальший перебіг захворювання на етапі тривалого спостереження.

**Ключові слова:** нестабільна стенокардія, інфаркт міокарда, коронарний резерв, стрес-тести

**ОБЪЕКТИВИЗАЦИЯ ЭФФЕКТИВНОСТИ  
ДИАГНОСТИКИ ДЕСТАБИЛИЗАЦИИ ИШЕМИИ В  
УСЛОВИЯХ СОЗДАНИЯ РЕГИСТРОВ МАЛЫХ  
ГОРОДОВ**

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**Резюме.** С целью объективизации диагностики в условиях создания Регистров малых городов обследовано 580 пациентов. У 385 больных была диагностирована нестабильная стенокардия, у 140 пациентов выставлен не Q инфаркт миокарда, у 35 пациентов подтверждены функциональные нарушения - нейроциркуляторная дистония. Всем больным были проведены чрезпищеводная электрокардиостимуляция, велоэргометрия, стресс-эхокардиография. Результаты обследований свидетельствуют, что дестабилизация состояния пациентов с острыми коронарными катастрофами детерминирована ограничением коронарного резерва и нарушениями функционального состояния миокарда, что позволяет уже в остром периоде прогнозировать дальнейшее течение заболевания на этапе длительного наблюдения.

**Ключевые слова:** нестабильная стенокардия, инфаркт миокарда, коронарный резерв, стресс-тесты.

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