

**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS
EDUCATIONAL INSTITUTION
BELARUSIAN STATE MEDICAL UNIVERSITY**

Контрольный
экземпляр



APPROVED

by First Vice-Rector, Professor

I.N.Moroz

20. 11. 2020

Reg. # UD-L. 79-83/2021/edu.

ACUTE CARDIAC CARE

**Curriculum of higher educational institution
in the educational discipline for the specialty:**

1-79 01 01 «General Medicine»

Curriculum is based on the educational program of higher education for the specialty 1-79 01 01 «General medicine», approved 30.08.2013 by the Decree of the Ministry of Education of the Republic of Belarus, registration # 88, with amendments approved 28.10.2017 by the Decree of the Ministry of Education of the Republic of Belarus, registration # 150

COMPILERS:

N.P.Mitkovskaya, Head of the Department of Cardiology and Internal Diseases of the Educational Institution «Belarusian State Medical University», Doctor of Medical Sciences, Professor;

E.A.Grigorenko, Professor of the Department of Cardiology and Internal Diseases of the Educational Institution «Belarusian State Medical University», PhD, Associate Professor;

D.S.Gerasimenok, Associate Professor of the Department of Cardiology and Internal Diseases of the Educational Institution «Belarusian State Medical University», PhD, Associate Professor

RECOMMENDED FOR APPROVAL:

by the Department of Cardiology and Internal Diseases of the Educational Institution «Belarusian State Medical University»
(protocol # 3 of 21.10.2020);

Scientific and Methodological Council of the Educational Institution «Belarusian State Medical University»
(protocol # 13 of 18.11.2020)

EXPLANATORY NOTE

«Acute cardiac care» is the educational discipline that contains systematic scientific knowledge about the etiology, mechanisms of development, clinical manifestations, laboratory and instrumental diagnostics and emergency medical care for the most common emergency conditions in cardiology.

The curriculum of the academic discipline «Acute cardiac care» is aimed at studying the latest scientific data on the most common emergency conditions in cardiology, which are life-threatening and require specialist doctors to provide emergency medical care.

The purpose of teaching and studying the discipline «Acute cardiac care» is to form and improve students' academic, social, personal and professional competencies for providing primary, specialized, high-tech medical care to patients with emergency conditions in cardiology.

The objectives of the course are to deepen and systematize the knowledge about the etiology, pathogenesis, clinical manifestations of emergency conditions in cardiology, to improve practical skills necessary for the diagnosis of critical and terminal conditions, for the interpretation of the findings of instrumental diagnostic technologies, as well as for intensive care and reanimation.

Teaching and successful learning of the academic discipline «Acute cardiac care» is carried out on the basis of the knowledge and skills acquired by the student in the main sections of the following disciplines:

Internal diseases. Causes and mechanisms of the development of emergency conditions. The most important manifestations of diseases of the respiratory system and blood circulation. Risk factors for the development and exacerbation of diseases of internal organs. Combined treatment of patients and prevention of the main diseases of the internal organs.

Propaedeutics of internal diseases. Taking a case history and methods of examining patients. Laboratory and instrumental methods of investigation (thermometry, determination of blood pressure, venous pressure, blood flow rate, blood, urine, electrocardiogram (ECG), radioisotope examination, echocardiography, biopsy data). The main clinical symptoms characteristic of diseases of the respiratory system, blood circulation, digestion, liver, kidney, blood system, musculoskeletal system.

Anesthesiology and reanimatology. Methods of diagnosis, emergency medical care in patient critical condition. Principles of regulation and methods of correction of hemodynamic, respiratory, and metabolic disorders in terminal and critical conditions. The main types of impairment, methods of assessment and principles of correction of the acid-base balance.

Pharmacology. Classification of medicines. Pharmacodynamics and pharmacokinetics. Mechanisms of drug action, side effects.

Clinical pharmacology. Clinical and pharmacological characteristics (pharmacokinetics, pharmacodynamics, indications for administration and dosage regimen, contraindications, side effects and drug interactions) of the main drugs. The strategy of choosing the most effective and safe medicines for the treatment of diseases, taking into account the pharmacological properties of medicines, the nature of the pathological process, the functional state of the body, pharmacological and allergic history, and the economic aspects of pharmacotherapy. Dangerous drug combinations.

Biological chemistry. The main parameters of homeostasis of the internal environment.

Human anatomy. Structure and functions of organs and systems of the body. Age-related features of morphological structures. Classification of internal organs by topography, origin, structure, and function. Anatomy and topography of the respiratory and cardiovascular systems.

Pathological anatomy. Structural basis of diseases and pathological processes, characteristic morphological changes of internal organs in human diseases. Morphogenesis and the variability of the disease. Principles of classification of diseases.

Pathological physiology. Causes, main mechanisms of development and outcomes of typical pathological processes. Regularities of functional impairment of organs and systems under the influence of environmental factors. Reactivity of the body and its significance in pathology. Pathophysiology of hemostasis, metabolism, endocrine system, blood system, respiration. Emergency conditions (collapse, shock, coma).

Topographic anatomy and operative surgery. Layered structure of anatomical areas. Position of organs in relation to each other (syntopy), their projection on the skin (holotopy), relation to the skeleton (skeletopy). Blood supply, innervation, and lymph outflow (drainage) in normal and pathological conditions.

The study of the discipline «Acute cardiac care» should ensure the formation of students' academic, social, personal and professional competencies.

Requirements for academic competencies

A specialist should:

- be able to apply basic scientific and theoretical knowledge to solve theoretical and practical problems;
- master systematic and comparative analysis;
- be able to work independently;
- master an interdisciplinary approach to problem solving.

Requirements for social and personal competencies of a specialist

A specialist should:

- be capable of social interaction;
- have the ability to interpersonal communication;
- be capable of criticism and self-criticism;

- be able to work in a team.

Requirements for professional competencies of a specialist

A specialist should be able to:

Preventative care:

- apply the knowledge about the structure and function of the body in normal and pathological conditions, as well as about the peculiarities of the population level of life organization;
- use the knowledge of the basic physical, chemical, biological and physiological laws of the human body's vital activity in normal and pathological conditions.

Health care:

- provide medical care for the most common diseases, injuries, disorders, including urgent and life-threatening conditions of the patient;
- use medical and diagnostic equipment;
- apply modern methods of diagnosis and treatment of diseases at various stages of medical care.

As a result of studying the educational discipline «Acute cardiac care», the student should

know:

- the main causes and signs of primary circulatory and respiratory arrest;
- principles of primary cardiopulmonary resuscitation;
- etiological factors and pathogenesis of the main acute pathological conditions in cardiology (sudden cardiac death; acute coronary syndrome; acute heart failure; cardiogenic shock; pulmonary edema; cardiac rhythm and conduction disorders; hypertensive crisis; pulmonary embolism; aortic aneurysm dissection and rupture);
- general symptomatology and classification of major emergency conditions in cardiology;
- characteristic features of differential diagnostics and methods of functional investigations in cardiology;
- modern aspects of emergency diagnosis and treatment in acute pathological conditions in cardiology;

be able to:

- restore airway patency; perform artificial lung ventilation and indirect heart massage;
- to carry out a set of specialized resuscitation activities (electric defibrillation of the heart; provision of venous access and administration of medicines);
- provide medical care for the main acute pathological conditions that occur in cardiology;

master the skills of:

- taking a case history;
- carrying out physical examination of the patient (taking blood pressure, assessment of pulse characteristics, percussion, auscultation and palpation);

- taking an electrocardiogram;
- interpreting the results of laboratory and instrumental studies;
- monitoring vital functions of the body;
- diagnosing clinical death and determining indications for resuscitation in patients who are in a terminal state;
- performing indirect heart massage and artificial lung ventilation.
- conducting electro-pulse therapy.

The structure of the curriculum includes 4 sections.

Total number of hours for the discipline study is 54 academic hours. Classroom hours according to the types of studies: practical classes – 28 hours, student independent work (self-study) – 26 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of a credit (12 semester).

Form of higher education - full-time.

ALLOCATION OF ACADEMIC HOURS ACCORDING TO SEMESTERS OF STUDY

Code, name of the specialty	Semester	Number of academic hours					Form of current assessment
		total	in-class	including		out-of-class self-studies	
				lectures	laboratory classes (practical classes or seminars)		
1-79 01 01 «General Medicine»	12	54	28	-	28	26	credit

THEMATIC PLAN

Section (topic)	Number of classroom hours
	practical classes
1. Differentiated approach to risk stratification and prevention of sudden cardiac death. Cardio-pulmonary resuscitation. Preventive cardiology. Ways to reduce mortality from diseases of the circulatory system	7
2. Differential diagnosis and emergency care for syncopal conditions, acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure in diseases of the circulatory system; prevention of the progression of chronic organ pathology. Complicated hypertensive crises, secondary prevention of adverse cardiovascular events	7
3. Instrumental diagnostic technologies in cardiology: ultrasound examination of the heart and blood vessels, Holter monitoring, daily monitoring of blood pressure, radionuclide diagnostics, stress tests	7
4. Differentiated approach to the use of interventional and cardiac surgery technologies in diseases of the circulatory system	7
Total hours	28

CONTENT OF THE EDUCATIONAL MATERIAL

1. Differentiated approach to risk stratification and prevention of sudden cardiac death. Cardio-pulmonary resuscitation. Preventive cardiology. Ways to reduce mortality from diseases of the circulatory system

Sudden coronary death, etiology, the basis of the pathogenesis of cardiac arrest, risk factors. Clinical, biological, «brain» death. Asystole. Ventricular tachycardia. Ventricular fibrillation. Emergency care. The sequence and methodology of the main resuscitation measures in cardiac arrest. Typical mistakes during resuscitation. Cardiovascular post-resuscitation complications. Implementation of the algorithm of cardiopulmonary resuscitation and various clinical scenarios for providing assistance in patients with life-threatening rhythm and conduction disorders on simulation equipment. Basic approaches to the stratification of cardiovascular risk. Principles of primary prevention of cardiovascular diseases. Non-drug methods of prevention. The value of reducing table salt in the diet. Combined change of the nutrition regime. Principles of physical training. Secondary prevention of cardiovascular disasters. Adherence to drug therapy. Groups of drugs that significantly reduce the mortality of people with post-infarction atherosclerosis. Ways to reduce mortality from diseases of the circulatory system, international experience, problems of the national health care system.

2. Differential diagnosis and emergency care for syncopal conditions, acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure in diseases of the circulatory system; prevention of the progression of chronic organ pathology. Complicated hypertensive crises, secondary prevention of adverse cardiovascular events

An algorithm for the diagnosis and treatment of syncopal conditions. Stratification of the risk of sudden death in syncope. The most common causes of short-term loss of consciousness. Pathogenesis and classification of syncopal conditions. Critical ischemia of brain structures. Neuroreflex causes of syncope syndrome. Syncope of cardiovascular origin. Special syncope. Examination program for differential diagnosis of syncope. Scheme of diagnostic search in a patient with prolonged loss of consciousness. Emergency care. Acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure in diseases of the circulatory system, characteristic features of diagnosis and treatment. Classification, mechanisms of formation, clinical and diagnostic criteria of hypertensive crises. Emergency care. Indications for hospitalization. Hypertensive crises complicated by acute coronary syndrome, acute left ventricular failure, dissecting aortic aneurysm, subarachnoid, intracerebral hemorrhage. Etiology, pathogenesis, classification of acute cardiovascular insufficiency. Clinical picture and diagnosis of pulmonary edema. Emergency care. Cardiogenic shock. Classification, diagnostic criteria. Differential diagnosis of various variants of cardiogenic shock. Principles of treatment. Secondary prevention of complications. Indications for interventional and cardiac surgery.

3. Instrumental diagnostic technologies in cardiology: ultrasound examination of the heart and blood vessels, Holter monitoring, daily monitoring of blood pressure, radionuclide diagnostics, stress tests

Echocardiography, Holter monitoring, daily monitoring of blood pressure (BP), exercise tests. Ultrasound diagnostic systems: physical principles and methods. Ultrasound diagnostics of the pathology of the valvular apparatus of the heart, congenital heart defects. Echocardiography of prosthetic heart valves. Measurement of pressure in the pulmonary artery. Diagnosis of systolic and diastolic heart dysfunction. Stress echocardiography. Ultrasound diagnostics of the pathology of myocardium, pericardium, endocardium, heart tumors, aortic diseases. Transesophageal echocardiography. Holter monitoring in identifying coronary heart disease in the differential diagnosis of syncopal conditions. Assessment of heart rate variability. Indications for the daily monitoring of blood pressure. Tests with physical activity (bicycle ergometry, treadmill).

4. Differentiated approach to the use of interventional and cardiac surgery technologies in diseases of the circulatory system

Single-photon emission computed tomography and magnetic resonance imaging in the differential diagnosis of coronary heart disease. Indications, investigation methods, interpretation of the results. Non-invasive diagnosis of coronary artery calcification, criteria for selecting patients for coronary angiography. Coronary angiography, indications for interventional and cardiac surgery in patients with pathology of the cardiovascular system. Management of patients after interventional and cardiac surgery.

EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section, topic #	Section name	Number of classroom hours		Equipment	Form of control
		practical	Self-studies		
1	Differentiated approach to risk stratification and prevention of sudden cardiac death. Cardio-pulmonary resuscitation. Preventive cardiology. Ways to reduce mortality from diseases of the circulatory system	7	8	air duct; SB 50015U simulator (Virtual simulator for cardiopulmonary resuscitation); the Ambu bag; laryngeal mask airway; peripheral / central vein catheterization kit; syringe dispenser; defibrillator; ECG; echocardiography; blood pressure monitor; stethoscope; first aid kit for emergency care; posters; slides; computer program Intecard-3	assessment using electronic-mechanical simulators and robotic simulators

<p>2 Differential diagnosis and emergency care for syncopal conditions, acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure in diseases of the circulatory system; prevention of the progression of chronic organ pathology. Complicated hypertensive crises, secondary prevention of adverse cardiovascular events</p>	<p>7</p>	<p>6</p>	<p>peripheral / central vein catheterization kit; syringe dispenser; defibrillator; ECG; echocardiography; blood pressure monitor; stethoscope; first aid kit for emergency care; set for thoracocentesis; couch. Multimedia projector; posters; computer program Intecard-3</p>	<p>electronic tests</p>
<p>3 Instrumental diagnostic technologies in cardiology: ultrasound examination of the heart and blood vessels, Holter monitoring, daily blood pressure monitoring, radionuclide diagnostics, stress tests</p>	<p>7</p>	<p>6</p>	<p>ECG; echocardiography; blood pressure monitor; stethoscope; couch. Intecard-3 computer program, slides</p>	<p>control questioning;</p>
<p>4 Differentiated approach to the use of interventional and cardiac surgery technologies in diseases of the circulatory system</p>	<p>7</p>	<p>6</p>	<p>ECG; echocardiography. Intecard-3 computer program, slides</p>	<p>interview; credit</p>
<p>Total hours</p>	<p>28</p>	<p>26</p>		

INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE

Basic:

1. Internal medicine : textbook for English-speaking students of higher medical educational establishment. P. 1 : Cardiology. Rheumatology. Hematology / ed. by M.A.Stanislavchuk, V.K.Sierkova. – Vinnytsya : Nova Knyha, 2019. – 407 p.
2. Internal medicine : textbook for English-speaking students of higher medical educational establishment. P. 2 : Pulmonology. Gastroenterology. Nephrology. Diseases of the internal organs in countries with hot climate / ed. by M.A.Stanislavchuk, V.K.Sierkova. – Vinnytsya : Nova Knyha, 2019. – 359 p.

Additional:

3. Foster, Thomas / Cardiology. Crash course / Foster, Thomas , Shen, Jasmine. – 5th ed. – Edinburgh : Elsevier, 2019. – 294 p.
4. Internal medicine: critical care : textbook / O.Ya.Babak; ed. by. O.Ya.Babak, O.M.Bilovol. – Kyiv : AUS Medicine Publishing, 2018. – 368 p.
5. Ashar, B.H. The Hopkins internal medicine board review.- Philadelphia, 2012. – 654 p.
6. Kumar & Clark's Clinical Medicine / ed. by Parveen Kumar, Michael Clark; editor, Online Content Adam Feather. – 9th ed. – Edinburgh [etc.] : Elsevier, 2017. –XIV, 1437 p.
7. Davidson's Principles and Practice of Medicine / ed. by Brian R. Walker [et al.]. – 22nd ed. – Edinburgh [etc.] : Churchill Livingstone Elsevier, 2014. –XIX, 1372 p.

LIST OF EQUIPMENT AND VISUAL AIDS

1. Equipment:

- 1.1. Air duct (oral, transnasal).
- 1.2. Simulator SB 50015U «Virtual simulator for cardiopulmonary resuscitation» (SMART STAT Basic), Ambu bag.
- 1.3. Laryngeal mask airway.
- 1.4. Laryngoscope.
- 1.5. Tracheostomy kit.
- 1.6. Peripheral / central vein catheterization kit.
- 1.7. Dispenser syringe.
- 1.8. Defibrillator.
- 1.9. Electrocardiograph.
- 1.10. Echocardiograph.
- 1.11. Tonometer (pulsimeter).
- 1.12. Stethoscope.
- 1.13. Set for thoracocentesis.

1.14. First aid kit for emergency assistance.

1.15. Couch.

1.16. Multimedia projector.

2. Posters:

2.1. Technique of cardiopulmonary resuscitation.

2.2. Sudden cardiac death.

2.3. Classification and pathogenesis of acute cardiovascular insufficiency.

2.4. Assessment of the degree of consciousness impairment (confusion) on the Glasgow scale.

3. Computer programs:

3.1. Intecard-3.

4. Slides:

4.1. Set of electrocardiograms for acute coronary syndrome.

4.2. Set of electrocardiograms for rhythm/conduction disorders.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used to diagnose competencies:

1. Oral form:

- interviews;

2. Written form:

- control questioning;

3. Oral and written form:

- credit.

4. Technical form:

- electronic tests.

5. Simulation form:

- knowledge assessment using electronic and mechanical simulators and robotic simulators.

LIST OF PRACTICAL SKILLS

1. Registration of an electrocardiogram with defining life-threatening changes.

2. Ensuring the patency of the respiratory tract, respiratory support.

3. Parenteral administration of drugs.

4. Conducting analgesia at the prehospital stage.

5. Identification of symptoms of impairment of basic vital functions.

6. Conducting cardiopulmonary resuscitation.

7. Assessment of the severity of the patients' condition and construction of an algorithm for emergency diagnostic and therapeutic measures.

8. Monitoring patients in critical conditions.

9. Selection and determination of the sequence of actions for the diagnosis of emergency conditions in cardiology.

10. Provision of emergency medical care in acute conditions in cardiology.

11. Selection and determination of the sequence of actions for the emergency diagnosis of acute respiratory failure.

12. Providing emergency medical care in acute respiratory failure.
13. Selection and determination of the sequence of actions for emergency diagnosis of syncopal states.
14. Providing emergency medical care in acute disorders of cerebral circulation.
15. Selection and determination of the sequence of actions for emergency diagnosis of shock states.
16. Providing emergency medical care in cases of shock.
17. Management of patients after performing interventional and cardiac surgery.

AUTHORS:

Associate Professor of the Department of
Cardiology and Internal Diseases of the
Educational Institution «Belarusian State
Medical University», PhD, Associate
Professor

D.S.Gerasimenok

Professor of the Department of
Cardiology and Internal Diseases of the
Educational Institution «Belarusian State
Medical University», PhD, Associate
Professor

E.A.Grigorenko

Head of the Department
of Cardiology and Internal Diseases of
the Educational Institution «Belarusian
State Medical University», Doctor of
Medical Sciences, Professor

N.P.Mitkovskaya

Curriculum content, composition and accompanying documents comply with
established requirements.

Dean of the Medical Faculty for
International Students of the
Educational Institution «Belarusian
State Medical University»

19.11. 2020

O.S.Ishutin

Methodologist of the Educational
Institution «Belarusian State
Medical University»

19.11. 2020

S.V.Zaturanova

Head of the Foreign Languages
Department

M.N.Petrova

Information about the authors (compilers) of the curriculum

Last name, first name, patronymic	Gerasimenok Dmitry Stanislavovich
Position, academic degree, academic title	Associate Professor, PhD, Associate Professor
☎ office	+375172878902; +375293299142
Fax:	
<i>E-mail:</i>	modimu@tut.by
Last name, first name, patronymic	Grigorenko Elena Aleksandrovna
Position, academic degree, academic title	Professor, PhD, Associate Professor
☎ office	+375172878902; +375296793007
Fax:	
<i>E-mail:</i>	
<i>Last name, first name, patronymic</i>	Mitkovskaya Natalia Pavlovna
<i>Position, academic degree, academic title</i>	Head of the Department, DSc., Professor
<i>☎ office</i>	+375172878904; +375296315092
<i>Fax:</i>	
<i>E-mail:</i>	