

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

12.08. 2023

Reg # UD- L.15/2324 /edu. sub.

EMERGENCY CARDIOLOGY AND OTHER EMERGENCY
CONDITIONS

Curriculum of educational institution in the educational discipline for the
specialty 1-79 01 01 «General Medicine»
Sub-Residency «General Clinical Practice»

Minsk 2023

Curriculum is based on the educational program of educational institution in the educational discipline «Emergency cardiology and other emergency conditions» for the Sub-Residency «General Clinical Practice (for foreign citizens)», approved 11.08.2023, registration # УД-L. 15/2324/уу. сүс.

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RECOMMENDED FOR APPROVAL:

by the Department of Cardiology and Internal Diseases of the Educational Institution «Belarusian State Medical University»
(protocol # 13 of 14.07.2023);

by the Scientific and Methodological Council of the Educational Institution «Belarusian State Medical University»
(protocol # 7 of 10.08.2023)

EXPLANATORY NOTE

«Emergency cardiology and other emergency conditions» is the educational discipline containing systematized scientific knowledge about the most common urgent conditions in cardiology and other sections of internal diseases, which are often life-threatening and require specialists to provide emergency and urgent medical care.

The aim of teaching the educational discipline «Emergency cardiology and other emergency conditions» for the sub-residency «General Clinical Practice (for foreign citizens)» consists of formation of academic, social, personal and professional competencies for providing medical care in case of emergency conditions with cardiovascular and other diseases of internal organs and (or) with exacerbation of chronic diseases.

The tasks of teaching the discipline are to form scientific knowledge about the etiology, pathogenesis, clinical manifestations of emergency conditions, skills and abilities necessary for:

examination and drawing up a diagnostic plan for critical and terminal conditions;

interpretation of the results of laboratory and instrumental research methods in patients with emergency conditions in cardiovascular pathology;

conducting intensive therapy and resuscitation.

Teaching and successful studying of the educational discipline «Emergency cardiology and other emergency conditions» for sub-residency «General Clinical Practice (for foreign citizens)» is carried out on the basis of knowledge acquired by the student in the following disciplines:

Biological chemistry. The main parameters of homeostasis of internal environment. Biological role, structure and regularities of metabolism of proteins, fats, carbohydrates, vitamins, minerals and trace elements.

Human anatomy. Structure and functions of organs and systems of the body. Age features of morphological structures. Classification of internal organs by their topography, origin, structure and performed functions. Anatomy and topography of the digestive system, respiratory system, urogenital system, hematopoiesis, cardiovascular system.

Pathological anatomy. Structural basics of diseases and pathological processes, characteristic morphological changes in internal organs in human diseases. Morphogenesis and pathomorphosis of diseases. Principles of classification of diseases.

Pathological physiology. Causes, basic mechanisms of development and outcomes of typical pathological processes. Patterns of organs and systems dysfunctions under the influence of environmental factors. Reactivity of the organism and its importance in pathology. Pathophysiology of hemostasis, metabolism, endocrine system, blood system, cardiovascular and respiratory systems. Pathophysiology of the gastrointestinal tract, kidneys. Outcomes of diseases. Inflammation, the acute phase response. Fever, stages, biological significance.

Typical metabolic disorders (vitamins, proteins, carbohydrates, lipids, nucleic acids, acid-base composition). Extreme conditions (collapse, shock, coma).

Topographic Anatomy and Operative Surgery. Layered structure of anatomical regions. Interdependence (syntopia) of organs, their projection to the skin (holotopia), relation to the skeleton (skeletontopia). Blood supply, innervation and lymph flow in normal and pathological conditions.

Internal diseases. Causes and mechanisms of development of typical diseases of internal organs. The most important manifestations of diseases of the cardiovascular and respiratory systems, gastrointestinal tract, urinary tract, musculoskeletal system, blood system. Risk factors for development and exacerbation of diseases of internal organs. Complex treatment, rehabilitation of patients and prevention of major diseases of internal organs.

Propaedeutics of internal diseases. Anamnesis and techniques of patient examination. Clinical methods of examining a patient with diseases of internal organs. Laboratory and instrumental studies (thermometry, spirometry, determination of arterial pressure, venous pressure, blood flow velocity, gastric and duodenal probing, analysis of sputum, blood, urine, stool, gastric juice, electrocardiography (ECG), endoscopy, radioisotope study, echocardiography, biopsy data, sternal puncture, examination of respiratory function). The main clinical symptoms of diseases of the respiratory system, blood circulation, digestion, liver, kidney, blood system, musculoskeletal system.

Outpatient Therapy. Organization and provision of medical care for the population in outpatient settings. Preventive and rehabilitation measures. Expertise of temporary work disability, medical and social expertise. Clinical examination of the population. Standards for the scope of the patients' examination at the outpatient stage of medical care. Indications and contraindications for sanatorium treatment. Methods of out-patient-polyclinic rehabilitation, treatment in the conditions of day hospital, hospital at home. Dispensary observation population groups.

Anesthesiology and resuscitation. Methods of diagnosis and emergency medical care in critical conditions. Principles of regulation and methods for correcting disturbances of hemodynamics, respiration, metabolism in terminal and critical states. The main types of disturbances, assessment methods and principles of correcting the acid-base state.

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

Clinical pharmacology. Clinico-pharmacological characteristics (pharmacokinetics, pharmacodynamics, indications for use, dosage regimen, contraindications, side effects and drug interactions) of essential medicines. The strategy of choosing the most effective and safe drugs. Dangerous combination of medicines. Basics of pharmacotherapy of inflammation and allergies. Principles of pharmacological correction of metabolic disorders. Chemotherapy standards for bacterial, viral, fungal, protozoal, parasitic diseases.

As a result of studying the educational discipline «Emergency cardiology and other urgent conditions» the sub-residency «General Clinical Practice (for foreign citizens)», the student should

know:

definition of the concept and principles of medical ethics and deontology;
measures to ensure epidemiological safety in the provision of medical care;
the main causes and signs of primary arrest of blood circulation and respiration;

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 dissection and rupture);

general symptomatology and classification of shock states;

specific features of differential diagnosis and functional research methods in cardiology;

modern aspects of emergency diagnosis and emergency treatment in urgent conditions in cardiology and other internal diseases;

be able to:

identify signs of circulatory and respiratory arrest;

restore airway patency;

perform artificial ventilation (by mouth-to-mouth, mouth-to-nose, using an Ambu bag) and indirect cardiac massage;

implement the activities of a specialized resuscitation complex (electrical defibrillation of the heart, provision of venous access and administration of drugs);

collect anamnesis and conduct a physical examination of the patient;

make an examination plan in case of emergency conditions in cardiology;

interpret the results of laboratory and instrumental research methods;

make a diagnosis;

provide medical care in case of major acute pathological conditions;

draw up medical documentation;

master:

methods of measuring blood pressure, assessing pulse characteristics, percussion, auscultation, palpation;

taking the electrocardiogram;

techniques for restoring the patency of the respiratory tract;

methods of indirect heart massage, artificial lung ventilation, electrical defibrillation of the heart, provision of venous access and administration of medicines.

Total number of hours for study of the discipline is 56 academic hours. Classroom hours according to the types of studies: practical classes – 35 hours, student independent work (self-study) – 21 hours.

Intermediate certification is carried out in accordance with the curriculum of the educational institution in the specialty in the form of a credit (12 semester).

Form of higher education - full-time.

THEMATIC PLAN

Section (topic) name	Number of class hours
	practical
1. Sudden cardiac death, resuscitation in cardiology. Methods of investigation in emergency conditions in cardiology. Interventional technologies in cardiology. Indications for cardiosurgical interventions	7
2. Hypertensive crises. Primary and secondary prevention of acute cardiovascular events	7
3. Acute cardiovascular insufficiency in patients of therapeutic profile. Acute coronary syndrome in comorbid patients	7
4. Syncopal conditions in patients of the therapeutic profile. Life-threatening disorders of rhythm and conduction of the heart	7
5. Differential diagnosis and emergency medical care in case of acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure, bleeding; prevention of chronic organ pathology progression	7
Total hours	35

CONTENT OF THE EDUCATIONAL MATERIAL

1. Sudden cardiac death, resuscitation in cardiology. Methods of investigation in emergency conditions in cardiology. Interventional technologies in cardiology. Indications for cardiosurgical interventions

Sudden cardiac death, etiology, pathogenesis of cessation of cardiac activity, risk factors. Clinical, biological, «brain» death. Asystole. Ventricular tachycardia. Ventricular fibrillation. Emergency medical care for ventricular tachycardia, ventricular fibrillation, asystole. Sequence and technique of the main resuscitation measures in case of cardiac arrest. Typical mistakes during resuscitation. Cardiovascular postresuscitation complications. Primary and secondary prevention of sudden cardiac death.

A differentiated approach to the use of functional, instrumental, interventional and cardiosurgical technologies in emergency cardiology (echocardiography, Holter monitoring, stress tests, single-photon emission computed tomography, magnetic resonance imaging). Coronary angiography, indications for intervention manipulations and cardiac surgery in patients with cardiovascular pathology.

Examination of patients who underwent ventricular tachycardia, ventricular fibrillation, asystole, as well as intervention manipulations or cardiac surgery: collection of patient complaints and taking a case history, conducting a physical examination, making up a plan for laboratory and instrumental examination, interpreting the results of laboratory and instrumental research methods, formulating the diagnosis, making a treatment plan.

Carrying out (on simulation equipment) cardiopulmonary resuscitation (algorithm of cardiopulmonary resuscitation for ventricular tachycardia without pulse and ventricular fibrillation, with asystole).

2. Hypertensive crises. Primary and secondary prevention of acute cardiovascular events

Classifications, mechanisms of formation and clinical and diagnostic criteria of hypertensive crises, emergency medical care, indications for hospitalization. Hypertensive crises complicated by acute coronary syndrome, acute left ventricular failure, aortic aneurysm dissection, subarachnoid, intracerebral hemorrhage. Primary and secondary prevention of cerebral infarction.

Basic approaches to the stratification of cardiovascular risk. Principles of primary prevention of cardiovascular diseases. Non-medication methods of prevention, the importance of reducing table salt in the diet, complex modification of the diet, principles of physical training. Secondary prevention of cardiovascular events. Commitment to drug therapy. Groups of drugs that reliably reduce the death rate of people with postinfarction atherosclerosis. Ways to reduce mortality from diseases of the circulatory system, the experience of foreign countries, the problems of the national health system.

Examination of patients with a hypertensive crisis: stratification of cardiovascular risk, preparation of a plan of measures aimed at primary and secondary prevention of cardiovascular events, determination of optimal therapy and necessary speed lowering blood pressure depending on the complications that have developed. Drawing up an action plan aimed at primary and secondary prevention of cardiovascular disasters.

3. Acute cardiovascular insufficiency in patients of therapeutic profile. Acute coronary syndrome in comorbid patients

Acute cardiovascular insufficiency: classification, etiology, diagnostic criteria. Differentiated approach to emergency medical care in acute cardiovascular insufficiency. Clinical picture and diagnosis of acute left ventricular failure, differential diagnosis, emergency medical care (reduction of preload on the heart, pressure in the pulmonary circulation, reduction of circulating fluid volume). Pulmonary embolism: etiology, risk factors, pathogenesis, clinical manifestations, differential diagnosis, therapeutic tactics. Management tactics in acute coronary syndrome with and without ST segment elevation in comorbid patients at the prehospital stage and during hospital treatment, risk stratification with the GRACE scale, emergency medical care (differentiated approach), methods of reperfusion therapy. Drug therapy depending on the method of reperfusion of the infarct-related artery. Thrombolytic, antiplatelet and anticoagulant therapy. Indications for percutaneous coronary intervention and cardiac surgery.

Examination of patients with acute coronary syndrome with and without ST segment elevation: determination of optimal management tactics, interpretation of the results of laboratory and instrumental research methods, diagnosis formulation, preparation of treatment plan.

4. Syncopal conditions in patients of the therapeutic profile. Life-threatening disorders of rhythm and conduction of the heart

Syncope: diagnostic criteria, classification. Algorithm of diagnosis and treatment of syncopal conditions. Stratification of the risk of sudden death in patients with syncope. Causes of neuroreflex and orthostatic syncopal syndrome. Syncope of cardiovascular genesis. Special syncope. The examination program for differential diagnosis in syncope. Scheme of diagnostic search in a patient with a prolonged loss of consciousness. Emergency medical care in case of syncope. The main etiological and pathogenetic aspects of rhythm and conduction disorders. Stratification criteria for the severity of arrhythmia. Extrasystole, paroxysmal tachycardia, atrial fibrillation/flutter: diagnosis, therapeutic tactics. Sinoatrial, atrioventricular blockages: diagnostics, therapeutic tactics. Wolf-Parkinson-White syndrome (WPW): pathogenesis, ECG criteria, classification, diagnostic and therapeutic tactics. Pacemakers, cardioverter-defibrillators, resynchronizing devices: principles of operation, indications and contraindications for the installation.

Examination of patients with arrhythmias, syncopal conditions: collection of patient complaints and anamnesis of the disease, physical examination, interpretation of the results of laboratory and instrumental research methods, diagnosis formulation, preparation of treatment plan. Determination of indications for implantation of intracardiac devices (pacemaker, cardioverter defibrillator, resynchronizing device).

5. Differential diagnosis and emergency medical care in case of acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure, bleeding; prevention of chronic organ pathology progression

Acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal insufficiency, peculiarities of diagnosis and treatment. The concept of multiple organ failure. Treatment and diagnosis tactics in various combinations of acute cardiovascular, acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal insufficiency. Diagnosis and emergency medical care in case of bleeding from various sources.

Shock: pathogenesis, classification, diagnostic criteria. Stages, manifestations and basic mechanisms of shock development. Cardiogenic, anaphylactic, hypovolemic, septic shock: emergency medical care.

Examination of patients with acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal insufficiency, shock: interpretation of laboratory and instrumental research results, diagnosis formulation, preparation of treatment plan.

EDUCATIONAL METHODOLOGICAL CARD OF EDUCATIONAL DISCIPLINE «EMERGENCY CARDIOLOGY AND OTHER EMERGENCY CONDITIONS» FOR THE SUB-RESIDENCY «GENERAL CLINICAL PRACTICE (FOR FOREIGN CITIZENS)»

Section, topic #	Section (topic) name	number of hours	Self-studies	Means of education	Literature	Form of control
		practical				
1.	Sudden cardiac death, resuscitation in cardiology. Methods of investigation in emergency conditions in cardiology. Interventional technologies in cardiology. Indications for cardiocirculatory interventions	7	4	1-6	1-6	1-4, 6, 7
2.	Hypertensive crises. Primary and secondary prevention of acute cardiovascular events	7	4	1, 3, 4, 5	1, 2, 5, 9, 14	1-4, 6
3.	Acute cardiovascular insufficiency in patients of therapeutic profile. Acute coronary syndrome in comorbid patients	7	4	1, 3, 4, 5	1, 2, 4, 5, 6, 7, 12, 13	1-4, 6
4.	Syncopal conditions in patients of the therapeutic profile. Life-threatening disorders of rhythm and conduction of the heart	7	4	1, 3, 4, 5	1, 2, 4, 5, 6, 7, 12, 13	1-4, 6
5.	Differential diagnosis and emergency medical care in case of acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal failure, bleeding; prevention of chronic organ pathology progression	7	5	1, 3, 4, 5	1, 2, 5	1-4, 5, 6

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. Герасименко, Д. С. Использование симуляционной технологии в неотложной медицине: сердечно-легочная реанимация = Medical simulation in emergency medicine: CPR training : учеб.-метод. пособие / Герасименко, Дмитрий Станиславович. – Минск : БГМУ, 2020. – 22 с.

4. Основы электрокардиографии = Basics of electrocardiogram : практикум / Э. А. Доценко, М. В. Шолкова, М. Н. Антонович [и др.]. – Минск : БГМУ, 2020. – 96 с.

5. Foster, Th. Cardiology. Crash course / Foster, Thomas , Shen, Jasmine. – Edinburgh : Elsevier, 2019. – 294 p.

6. 2022 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: Developed by the task force for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death / K. Zeppenfeld et al // European Heart Journal, 2022. – Vol. 43, Issue 40. – P. 3997–4126.

7. 2021 ESC Guidelines on cardiac pacing and cardiac resynchronization therapy: Developed by the Task Force on cardiac pacing and cardiac resynchronization therapy / M. Glikson et al // European Heart Journal, 2021. – Vol. 42, Issue 35. – P. 3427–3520

8. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure / T. A McDonagh et al. // European Heart Journal, 2021. – Vol. 42, Issue 36. – P. 3599–3726.

9. 2021 ESC Guidelines on cardiovascular disease prevention in clinical practice / F. L J Visseren et al. // European Heart Journal, 2021. – Vol. 42, Issue 34. – P. 3227–3337.

10. 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation / Jean-Philippe Collet et al. / European Heart Journal, 2021. – Vol. 42, Issue 14. – P. 1289–1367.

11. 2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society / S. V Konstantinides et al. // European Heart Journal, 2020. – Vol/ 41, Issue 4. - P. 543–603.

12. 2019 ESC Guidelines for the management of patients with supraventricular tachycardia / J. Brugada et al. // *European Heart Journal*, 2020. - Vol. 41, Issue 5. – P. 655–720.

13. 2018 ESC Guidelines for the diagnosis and management of syncope / M. Brignole et al. // *European Heart Journal*, 2018. – Vol. 39, Issue 21. – P. 1883–1948.

14. 2018 ESC/ESH Guidelines for the management of arterial hypertension / B. Williams et al. - *European Heart Journal*, 2018. – Vol. 39, Issue 33. – P. 3021–3104.

15. Fourth universal definition of myocardial infarction (2018) / K. Thygesen et al. // *European Heart Journal*, 2019. – Vol. 40, Issue 3. – P. 237–269.

CHARACTERISTICS OF THE USED TRAINING METHODS

In the educational process traditional methods of teaching the academic discipline: practical exercises, as well as elements of self-directed independent work of students are used.

It is recommended to organize the educational process using traditional and modern educational technologies (simulation training technologies, various forms of communication, variation models of independent work, test and other systems for assessing the level of competences).

Practical classes are conducted on the basis of cardiology departments and intensive care units of health organizations, in the simulation center. In practical exercises under the supervision of the teacher, students independently record patient complaints and taking a case history, conduct a physical examination, learn to make a plan for laboratory and instrumental examination, correctly interpret the results of laboratory and instrumental research methods, formulate a diagnosis, make a plan for treatment or surgical intervention, and prepare medical records. Students' practical training is based on solution of situational tasks, test tasks, development of patient examination skills, diagnosis and differential diagnosis of diseases, medical interventions using electronic-mechanical simulators.

Independent extracurricular work consists in studying basic and additional literature, monographs and periodicals, preparing reports, review papers, presentations and brief reports on the most urgent problems of emergency cardiology, independent study of certain topics, preparing for practical exercises, credit.

Students get acquainted with safe working conditions, international requirements and ethical standards when conducting the examination and treatment of patients.

LIST OF TRAINING MEANS

1. Multimedia presentations.
2. Educational videos.
3. Educational posters, stands.
4. Medical records of inpatient (outpatient) patient.
5. Results of examination methods (laboratory, functional, radiation, etc.).
6. Simulation equipment.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

Evaluation of the student's academic achievements is carried out using the fund of evaluation tools and technologies of higher education institutions. The fund of evaluation tools of the student's academic achievements includes:

standart tasks in various forms (oral, written, test, situational, simulation);
 topics for review papers;
 inpatients' and outpatients' medical cards and the results of additional examination methods (laboratory, functional, radiological).

To diagnose competencies, the following forms of knowledge control are used:
 Oral form:

1. Interviewing.
2. Report on the practical lesson.

Written form:

3. Review papers.

Oral-written form:

4. Situational tasks
5. Credit.

Technical form:

6. Electronic tests.

Simulation form:

7. Evaluation using electronic-mechanical simulators and robot simulators.

LIST OF PRACTICAL SKILLS

1. Registration of an electrocardiogram with interpretation.
2. Assessment of the severity of the patients' condition and the construction of an algorithm for urgent diagnostic and therapeutic measures.
3. Identification of symptoms of oppression of the main vital functions.
4. Ensuring airway patency, respiratory support.
5. Carrying out cardiopulmonary resuscitation (basic resuscitation measures).
6. Carrying out activities of a specialized resuscitation complex (electrical defibrillation; provision of venous access and administration of medicines).
7. Diagnosis of acute coronary syndrome, hypertensive crisis.
8. Determination of indications and timing of coronary angiography in acute coronary syndrome with and without ST segment elevation.
9. Provision of emergency medical care to patients with acute coronary syndrome.
10. Diagnosis and provision of emergency medical care for threatening rhythm and conduction disorders.
11. Assessment of the severity of patients' condition and the construction of an algorithm for urgent diagnostic and therapeutic measures for hypertensive crises, acute cardiovascular insufficiency, syncopal conditions, acute respiratory failure, acute ischemic encephalopathy, acute hepatic and renal insufficiency, shock conditions.
12. Monitoring the condition of critically ill patients.

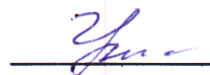
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Curriculum content, composition and accompanying documents comply with the established requirements.

Dean of the Medical Faculty for International Students of the educational institution «Belarusian State Medical University»

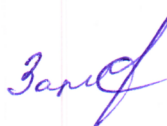
09.08. 2023



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