

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

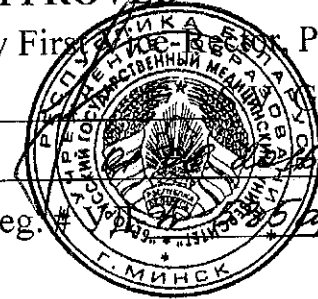
Контрольный
экземпляр

APPROVED

by First Deputy Professor

Subkin

Reg. 2/16/17/уч.



ANESTHESIOLOGY AND REANIMATOLOGY

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

1-79 01 01 General Medicine

Minsk, BSMU 2016

Curriculum is based on the standard educational program “Anesthesiology and Reanimatology”, approved 29.04.2016 registration # TRD-1.535/mun

COMPILERS:

R.E. Rzheutskaya, Ph.D., Associate Professor

RECOMMENDED FOR APPROVAL:

by the Anesthesiology and Reanimatology Department of the Educational Institution “Belarusian State Medical University”
(protocol # 10 of 22.04.2016);

by the Methodological Commission of Surgical disciplines of the Educational Institution “Belarusian State Medical University”
(protocol #6 of 27.04. 2016)

EXPLANATORY NOTE

“Anesthesiology and Reanimatology” is the educational discipline containing systematized scientific knowledge and techniques of an organism protection from surgical trauma with application of anaesthesia, management or temporary replacement of the patient's vital functions during surgical interventions in the immediate postoperative period; treatment methods of patients with severe impairment of vital functions in terminal and critical conditions.

The Curriculum in Anesthesiology and Reanimatology includes the latest scientific data on diagnosis of critical conditions, pharmacology of medication for anaesthesia and intensive therapy (IT) and new techniques of anaesthesia, monitoring and respiratory support. The specific feature of present Curriculum is studying and teaching directed at the formation of the academic, social and professional competence in students.

The aim of teaching and learning the discipline “Anesthesiology and Reanimatology” is to provide the students with the scientific knowledge about optimisation of anesthetic management in medical practice, concerning the reasons of occurrence and development of terminal and critical conditions, fundamentals of Resuscitation and Intensive Care.

The tasks of studying the discipline are to develop the students' academic competences, based on the ability to self-search educational and information resources, as well as acquire and understand the knowledge of:

- the basic concepts of anesthesiology and reanimatology care providing in the Republic of Belarus;
- the causes and mechanisms of general and local anaesthesia, terminal and critical conditions;
- the most important manifestations of typical vital functions impairment.

The tasks of teaching the discipline include the formation of students' social, personal and professional competences, based on the knowledge and application of:

- the methods, contributing to the formation of clinical thinking according to medical ethics and deontology rules;
- the methods of carrying out anaesthesia, intensive care and resuscitation;
- indications and contra-indications for application of various anaesthesia, intensive care and resuscitation methods.

Specific features of training doctors in the specialty 1-79 01 01 General Medicine require purposeful study of typical pathological processes in case of impairment of vital functions, pathophysiological substantiation of the most widespread diseases intensive care principles.

Teaching and successful learning of the discipline “Anesthesiology and Reanimatology” is carried out on the basis of the knowledge and skills previously acquired by the students in the following disciplines:

General Chemistry. Electrolytic blood composition, blood buffer systems. Acid-base balance.

Biological Chemistry. Blood coagulation and anticoagulative systems. Hemostasis mechanisms.

Normal Physiology. Principles of cells, tissues, organs and systems functioning and mechanisms of their regulation. Functional parameters of the healthy organism, used in practical medicine and their normal range.

Pathological Anatomy. The reasons, mechanisms and the major displays of typical general pathological processes. Body adaptation and compensation mechanisms, arising in response to influence of pathogenic factors and changing environmental conditions.

Pathological Physiology. Haemodynamics and gas exchange infringements in case of shock.

As a result of studying the discipline (name of the discipline) the student should

know:

- the basic concepts of Anesthesiology and Reanimatology;
- the causes and mechanisms of typical vital functions impairment;
- types and methods of anesthesia, anesthesia complications;
- Medicines and methods of anesthesia maintenance in case of invasive and surgical methods application;
- regulation principles and correction methods of haemodynamics, breath and metabolism dysfunctions in terminal (cardiopulmonary resuscitation) and critical conditions, surgical interventions, etc.;
- fundamentals of infusion treatment, parenteral nutrition;
- methods of diagnosis, emergency care and medical behavior in critical conditions;
- methods of treatment in case of poisoning with medicinal and toxic substances.

be able to:

- define indications for resuscitation and criteria of its termination, to make the ‘brain death’ diagnosis;
- provide resuscitation in case of clinical death with application of the closed and open-chest cardiac massage, artificial ventilation of lungs with the elementary methods (a mouth - to - mouth, a mouth - to - nose), manually through a mask, with the help of AMBU –bag, intravascular injections;
- check the central venous pressure (CVP);
- define and correct deficiency of water and electrolyte balance, pathology in protein and carbohydrate metabolism, in the acid-base balance;
- define indications for mechanical ventilation (MV);
- cope with a painful syndrome.

master:

- the methods of Cardio-Pulmonary Resuscitation (CPR).

The structure of the curriculum in the educational discipline “Anesthesiology and Reanimatology” includes 2 Sections: “The General Anesthesiology and Reanimatology” and “Clinical Anesthesiology and Reanimatology”.

Total number of hours for the study of the discipline is 154 academic hours. Classroom hours according to the types of studies: lectures - 10 hours, practical classes - 65 hours, student independent work (self-study) - 79 hours.

Current assessment is carried out according to the syllabus of the specialty in the form of examination (8 semester).

Form of higher education – full-time.

ALLOCATION OF ACADEMIC TIME 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	practical classes		
1-79 01 01 General Medicine	7	70	40	10	30	30	-
	8	84	35	-	35	49	examination
		154	75	10	65	79	

THEMATIC PLAN

Section (topic) name	Number of class hours	
	lectures	practical (laboratory or seminars)
1. General Anesthesiology and Reanimatology	4	30
1.1. Basic concepts of Anesthesiology and Reanimatology: concept, the purposes, problems. History of Anesthesiology and Reanimatology.	1	1
1.2. Organisation of Anesthesiology and Reanimatology Service	-	3
1.3. Methods of the patient's condition objective control, applied in anesthesiology and intensive care. Concept of haemodynamic, respiratory and functional monitoring. Control of anesthesia efficiency	-	5
1.4. General anesthesia (GA)	1	8
1.5. Local Anesthesia (LA)	-	4
1.6. Cardio-pulmonary resuscitation (CPR)	2	7
1.7. Post-cardiac arrest syndrome: intensive care, complications.	-	2
2. Clinical Anesthesiology and Reanimatology	6	35
2.1. Preparation for anesthesia	-	2
2.2. Resuscitation and intensive care of the early postoperative period	-	7
2.3. Intensive therapy of Acute Circulatory Disorders	2	7
2.4. Intensive therapy of Acute Respiratory Failure (ARF)	2	7
2.5. Intensive therapy of comatose states	-	6
2.6. Intensive therapy in toxicology	2	6
Total hours	10	65

CONTENT OF THE EDUCATIONAL MATERIAL

1. General Anesthesiology and Reanimatology

1.1. Fundamentals of Anesthesiology and Reanimatology

Anesthesiology and Reanimatology: concept, the purposes, problems. History of Anesthesiology and Reanimatology. Pain physiology. Theories of general anesthesia.

1.2. **Organisation of Anesthesiology and Reanimatology Service.** Statutory Acts regulating work of Anesthesiology and Reanimatology Service.

Organisation of Intensive Care Unit (ICU). Indications for hospitalisation to the ICU.

1.3 Methods of the patient's monitoring applied in anesthesiology and intensive care.

Methods of the patient's condition objective control, applied in anesthesiology and intensive care. Concept of haemodynamic, respiratory and functional monitoring (body temperature control, hydrobalance, the central nervous system function monitoring, etc.). The list of necessary monitoring parameters for elective and emergency surgery. Control of anesthesia efficiency.

1.4. General Anesthesia (GA)

Common and special components of the GA. The common components - loss of consciousness, amnesia, analgesia, muscle relaxation, suppression of reflex activity, maintenance of adequate gas exchange, blood circulation and metabolism. Special components - use of devices for artificial blood circulation, hypothermia, hypothermic and pharmacological cardioplegia, controlled hypotension.

Types of modern GA.

Stages and clinical signs of GA.

Inhalation general anaesthesia. Clinical Pharmacology of inhalation anesthetics: Halothane, Isoflurane, Sevoflurane, Nitrous Oxide. Concept of the Minimum Alveolar Concentration (MAC). Methods, indications, contraindications to application of inhalation GA. Complications, their prevention and treatment.

Types of General Anesthesia depending on the Mode of Ventilation: spontaneous breathing (using Face mask, Laryngeal Mask Airway (LMA) and Controlled Ventilation (using Endotracheal tube, LMA).

Equipment for inhalation anaesthesia. The scheme of an anesthetic machine. The System's crucial components: a means of supplying gases from attached cylinders, methods of measuring gases flow rate, apparatus for vaporizing of volatile anaesthetic agents, breathing systems and a ventilator for vapours and gases delivery from the machine to the patient, the apparatus for scavenging anaesthetic gases.

Types of breathing circuits: open, closed, semiopen, semiclosed, rebreathing or nonrebreathing. Accessory Kit and devices.

Anesthetic machine preparation and operation rules. The prevention of explosions, safety precautions for work with compressed gases, electrical equipment.

Noninhalation General Anesthesia. Clinical Pharmacology of noninhalation anesthetics: Barbiturates, Benzodiazepines, Opioids, Propofol, Ketamine, Etomidate. Types and methods of noninhalation general anesthesia: intravenous, intramuscular, intrabone, etc. Methods of noninhalation general anesthesia application using different anesthetics and their combinations. Indications, contraindications. Complications, their prevention and treatment.

Clinical application of neuromuscular blocking agents. Indications, contraindications. Complications, their prevention and treatment.

Balanced General Anesthesia, types and methods. Balanced general anesthesia with neuromuscular blocking agents, neuroleptanalgesia, ataralgesia, balanced general electroanesthesia. Periods of general anesthesia: induction of anesthesia, maintenance of anesthesia, recovery.

1.5. Local Anesthesia (LA)

Types of Local Anesthesia: topical, infiltration, intrabone, regional anesthesia. Epidural and Spinal anesthesia. Indications, contraindications. Complications, their prevention and treatment. Clinical Pharmacology of local anesthetics (Novacaine, lidocaine, bupivacaine, ropivacaine). Indications, contraindications to application of local anesthetics. Complications, their prevention and treatment.

1.6. **Cardio-pulmonary resuscitation (CPR)**

Types of terminal conditions: death agony, clinical death. Pathologic physiology and clinical signs.

Types of cardiac arrest, signs and diagnosis.

Main principles and ways of Basic Life Support (BLS).

Airway management. The Safar triple method. Artificial lung ventilation with the elementary methods (a mouth - to - mouth, a mouth - to - a nose, manually through a mask, with the help of Ambu - bag). Application of closed and open-chest cardiac massage. Methods, complications. Indicators of resuscitation efficiency.

Main principles of Advanced Life Support (ALS).

Drugs used during the treatment of cardiac arrest. Routes for drug delivery (intravenous access, intraosseous route, tracheal administration)

Methods of cardiac defibrillation. Indications, contraindications.

Intravenous fluids during resuscitation.

Criteria for CPR cessation. The ethical and socially-legal problems connected with resuscitation cessation.

1.7. **Post-cardiac arrest syndrome.**

Post-cardiac arrest syndrome: pathologic physiology, intensive care. Complications, their prevention and treatment. Clinical signs of 'brain death'.

2. **Clinical Anesthesiology and Reanimatology**

2.1. **Preparation for anesthesia**

Preoperative patients' physical status assessment. Anesthetic technique choice. The standard of preoperative assessment. Preparation of patients for elective and emergency surgery and anesthesia (improve, where feasible, any existing factors which may increase the risk of an adverse outcome: treatment of underlying disease complications, fasting before anesthesia). The objectives of premedication. Drugs for premedication.

2.2. **Resuscitation and intensive care in the early postoperative period**

Phases of the postoperative period. Importance of a painful syndrome in the mechanism of functional disorders development in the postoperative period.

Correction of functional disorders in patients operated because of acute intestinal obstruction, pylorostenosis, intestinal fistulas.

Specific features of infusion-transfusion therapy in the postoperative period in patients after abdominal surgery.

The basic forms of acid-base balance disorders, pathophysiology. Clinical manifestations, correction principles.

The main types of water and electrolyte balance disorders, pathophysiology. Clinical signs, intensive therapy.

Parenteral nutrition. Purposes, indications, types, intravenous nutrients. Control of parenteral nutrition.

2.3. Intensive therapy of Acute Circulatory Disorders

Parametres of central haemodynamics (Stroke volume, Cardiac Output, Systemic Vascular Resistance, Blood volume).

Shock. Classification of shock (Hypovolemic, Cardiogenic, Distributive), pathophysiology, principles of diagnostics and intensive therapy.

Intensive therapy in Cardiology. Intensive therapy in case of complicated myocardial infarction (cardiogenic shock, pulmonary edema, heart rhythm disorders).

Artificial circulatory support. Electrical cardioversion in case of heart rhythm disorders.

Hypertonic crisis. Pathogenesis, clinical manifestations, diagnosis and intensive therapy.

Pulmonary embolism. Pathogenesis, clinical manifestations, diagnostics and intensive therapy.

2.4. Intensive therapy of Acute Respiratory Failure (ARF).

Definition, types and pathophysiology of acute respiratory failure (ARF).

Monitoring of the respiratory function (pulse oximetry, arterial blood gas (ABG) analysis, capnography).

Principles of ARF treatment.

Mechanical Ventilation (MV). Methods of mechanical ventilation. Indications and technique. Complications, their prevention and treatment. Continuous positive airways pressure (CPAP). Positive end expiratory pressure (PEEP). Basic types and modes of mechanical ventilation (MV). Noninvasive Positive Pressure Ventilation (NIPPV). Indications and technique. Complications, their prevention and treatment.

Methods of oxygen therapy. Indications and technique.

Indications for tracheostomy and conicotomy. Complications. Care of patients with tracheotomy tubes.

Hyperbaric oxygenation therapy. Indications and contraindications.

Intensive therapy of severe community-acquired pneumonia (CAP). Intensive therapy of Severe Life-Threatening Asthma. Intensive therapy of pulmonary oedema and acute respiratory distress syndrome (ARDS). Resuscitation and intensive therapy of Foreign-body airway obstruction (FBAO).

2.5 Intensive therapy of comatose states

Definition of coma, classification by etiology and severity, pathophysiology. Differential diagnosis of different types of coma (diabetic coma, kidney, liver, brain coma). Intensive therapy and monitoring of patients in coma. Complications in patients with coma.

2.6. Intensive therapy in toxicology

General Toxicology. Classification of poisoning. Stages of poisoning: toxicogenic (primary toxic effect) and somatogenic (the period of consequences in case of poisoning), pathophysiology.

General principles of acute poisoning treatment (gastric lavage, method of forced diuresis, antidote use, extracorporeal detoxication).

General principles of acute poisoning treatment (gastric lavage, method of forced diuresis, antidote use, extracorporeal detoxication).

Specific features of various acute poisoning treatment (alcohol and its substitutes intoxication, carbon monoxide poisoning, mushroom poisoning, drug poisoning, narcotic poisoning, tranquilizer poisoning; organic phosphorus agent poisoning, cauterant poisoning, intensive care for snake and insect bites).

EDUCATIONAL DISCIPLINE CURRICULAR CHART

Section, topic #	Section (topic) name	number of hours		Self-studies ¹	Form of control
		lectures	practical		
7 Semester					
1	General Anesthesiology and Reanimatology	4	30	30	
1.1	Basic concepts of Anesthesiology and Reanimatology: concept, the purposes, problems. History of Anesthesiology and Reanimatology.				seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
		1	1	4	
1.2	Organisation of Anesthesiology and Reanimatology Service				seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
		-	3	4	
1.3	Methods of the patient's monitoring applied in anesthesiology and intensive care				seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
		-	5	4	
1.4	General anesthesia (GA)				seminar reports; examination; situational tasks and tests; evaluation
		1	8	4	

¹ the column is absent for part-time students

					based on modular rating system
1.5	Local Anesthesia (LA)	-	4	4	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
1.6	Cardio-pulmonary resuscitation (CPR)	2	7	5	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
1.7	Post-cardiac arrest syndrome: intensive care, complications.		2	5	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
8 Semester					
2	Clinical Anesthesiology and Reanimatology	6	35	49	
2.1	Preparation for anesthesia	-	2	9	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
2.2	Resuscitation and intensive care of the early postoperative period	-	7	8	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
2.3	Intensive therapy of Acute Circulatory Disorders	2	7	8	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system

2.4	Intensive therapy of Acute Respiratory Failure (ARF)	2	7	8	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
2.5	Intensive therapy of comatose states	-	6	8	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system
2.6	Intensive therapy in toxicology	2	6	8	seminar reports; examination; situational tasks and tests; evaluation based on modular rating system

INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE²

Basic (relevant):

1. «Anaesthesiology and Intensive Care=Анестезіологія та інтенсивна терапія: підручник» под ред. Ф.С. Глумчера. –К.: ВСВ «Медицина», 2010. – 312 с.
2. European Resuscitation Council Guidelines for Resuscitation 2010. - Resuscitation 81 (2010) 1219–1276. // www.elsevier.com/locate/resuscitation
3. Gwinnutt, C.L. Clinical Anaesthesia Lecture Notes / C.L. Gwinnutt – 2-nd ed. – Blackwell, 2004. – 160 p.
4. Intensive care medicine: short textbook for english-speaking students (in English). / К.М. Bushma, O.S. Bushma. – Grodno: GrSMU, 2010. – 60 p.
5. Oxford Handbook of Acute Medicine, 2nd Edition /Ed.: Ramrakha, Punit S.; Moore, Kevin P. 1997, 2004 Oxford University Press. – 952 p.
6. Oxford Handbook of Critical Care, 2nd Edition /Ed.: Singer, Mervyn; Webb, Andrew R. - 1997, 2005. Published in the United States by Oxford University Press Inc. – 582 p.
7. Sullivan, P. Anaesthesia for Medical Students / P. Sullivan - 1999. Published by Ottawa Clinic Hospital – 261 p.: ill.

Additional:

8. Introduction to Clinical Emergency Medicine / Ed.: S.V. Mahadevan, G.M. Garmel. - Cambridge University Press, 2005. – 798 p.
9. Pulmonary Pathophysiology: the essentials / Jonh B. West -7 th. ed.- Philadelphia: Lippincott Williams&Wilkins,2008.-199 p.
10. Textbook of Anesthesia / Ed.: A.R. Aitkenhead, G. Smith. – 4-th ed. – Edinburgh: Churchill Livingstone, 2001. – 806 p.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

1. Oral form:
 - seminar reports;
 - examinations;
 - situational tasks and tests.
2. Written form:

² It is recommended to indicate not more than 10 sources, published over the past 5-10 years (except fundamental scientific background literature)

- tests;
- evaluation based on modular rating system.

LIST OF LECTURES

6 Semester:

1. Basic of Anesthesiology and Reanimatology. General anesthesia.
2. Cardio-pulmonary resuscitation (CPR)
3. Acute Circulatory Disorders
4. Acute Respiratory Failure
5. Intensive therapy in toxicology

LIST OF PRACTICAL STUDIES

6 Semester:

1. Basic of Anesthesiology and Reanimatology. Organisation of Anesthesiology and Reanimatology Service
2. Methods of the patient's monitoring applied in anesthesiology and intensive care.
3. General anesthesia
4. Local anesthesia
5. Cardio-pulmonary resuscitation (CPR)
6. Cardio-pulmonary resuscitation (CPR). Post-cardiac arrest syndrome: intensive care, complications.

7 Semester:

1. Preparation for anesthesia. Resuscitation and intensive care of the early postoperative period
2. Resuscitation and intensive care of the early postoperative period. Intensive therapy of Acute Circulatory Disorders
3. Intensive therapy of Acute Circulatory Disorders. Intensive therapy of Acute Respiratory Failure (ARF)
4. Intensive therapy of Acute Respiratory Failure (ARF)
5. Intensive therapy of coma
6. Intensive therapy in toxicology

**PROTOCOL OF THE CURRICULUM APPROVAL
BY OTHER DEPARTMENTS³**

Title of the discipline requiring approval	Department	Amendments to the curriculum of the academic discipline	Decision of the department, which designed the curriculum (date, protocol #) ⁴
1. Pathologic Physiology	Pathologic Physiology	No additions and modifications	No additions and modifications Minutes # 10, dated April 22, 2016
2. Propaedeutics of Internal Diseases	Propaedeutics of Internal Diseases	No additions and modifications	No additions and modifications Minutes # 10, dated April 22, 2016
3. Biological Chemistry	Biological Chemistry	No additions and modifications	No additions and modifications Minutes # 10, dated April 22, 2016
4. Normal Physiology	Normal Physiology	No additions and modifications	No additions and modifications Minutes # 10, dated April 22, 2016
5. General Chemistry	General Chemistry	No additions and modifications	No additions and modifications Minutes # 10, dated April 22, 2016

³ The content of the curriculum should be approved by the departments for which the study of this particular discipline is required.

⁴ If applicable.

COMPILERS/AUTHORS:

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Head of the Anesthesiology and
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signature

A.T. Prasmytski

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

Dean of the Medical Faculty of
International Students
el. 08 2016



V.V. Davydov

Methodologist of Educational
Institution
"Belarusian State medical
University"
01. 08 2016



S.A. Kharytonava

Head of the Foreign Languages
Department



M.N. Petrova

⁵ If the Head of the Department is the author, additional approval is not required.

Information about the authors (compilers) of the curriculum

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