

**MINISTRY OF HEALTH OF UKRAINE
POLTAVA STATE MEDICAL UNIVERSITY**

Department of general surgery

**METHODICAL INSTRUCTIONS
FOR STUDENT SELF-DIRECTED WORK
WHEN PREPARING FOR AND DURING PRACTICAL CLASS**

Study discipline	General surgery
Module №1	INTRODUCTION TO SURGERY. SURGICAL EMERGENCY CONDITIONS. FUNDAMENTALS OF ANESTHESIOLOGY AND INTENSIVE CARE
Content module 3.	Bases of anesthesiology and resuscitation.
Lesson theme №11	General anesthesia. Inhalation and non-inhalation anesthesia. Indications and contraindications. Complications and their prevention.
Years of study	<i>III</i>
Faculty	International

Poltava

Content module 3.	Bases of anesthesiology and resuscitation.
Lesson theme №11	General anesthesia. Inhalation and non-inhalation anesthesia. Indications and contraindications. Complications and their prevention.

1. Relevance of the topic :

In our time, from 85 to 90% of surgical procedures performed under general anesthesia. This method has a number of significant advantages over local anesthesia , allowing all beyond the scope, nature and duration of surgery , 3rd year students must obtain basic knowledge on the subject , as they are necessary for the study of surgery and anesthesiology at the undergraduate and medical practice surgeons and anesthesiologists .

2 . Learning Objectives :

1.Studenty should be aware of the concept of Anesthesiology and Intensive Care , anesthesiological steps to ensure prompt intervention, understand the principles of general and regional anesthesia , know the main drugs used during anesthesia , to know and distinguish the possible complications of anesthesiology .

2. Analased general state of the patient . The ability to perform one or the other type of anesthesia. Explain the choice of anesthesia.

3. Ask survey to select the method of anesthesia. Classify the methods of anesthesia, drugs for anesthesia. To analyze the patient's state , justify the choice of method of pain relief .

3 . Basic knowledge , skills, habits, necessary for studying the topic (inter-disciplinary integration)

<i>disciplie</i>	<i>know</i>	<i>be able to</i>
anatomy	1. Location for determining arterial pulse and blood pressure 2. Anatomy of the upper respiratory tract, especially placement of language and its effect on airway	1. Determine the pulse of the vessels 2. Ensure the airway
physiology	1. Physiology of the respiratory, cardiovascular and other systems, hemodynamic parameters and respiratory rate in	1. Assess whether violations of the respiratory system, blood circulation and other
Pat. physiology	Etiology and pathogenesis of pain and the typical pathological processes (inflammation, hypoxia, etc.) Methods of assessment of the patient of organs and systems.	
Propedeutics Internal Medicine pharmacology	Basic pharmacology of inhaled anesthetics and neingalyatsionnyh, facilities for sedation.	Conduct a survey of the patient's major organs and systems (respiratory, cardiovascular, gastrointestinal tract, dives, the evaluation of consciousness). Assign patient sedation

The student must have an idea :

- types of anesthesia .

- stage anesthetic management of surgical intervention .
- components of general anesthesia .
- inhalation anesthesia.
- intravenous anesthesia.
- base terminology , which are used during anesthesia.

The student should know :

1. The definition , terminology , classification and types of general anesthesia .
- 2 . Theories of anesthesia, preparation of patients for anesthesia , sedation scheme .
- 3 . The mechanism of action of narcotic drugs and muscle relaxants .
- 4 . Pre narcosis preparation.
- 5 . What is premedication and what and how to carry it out .

The student should be able to:

1. Know holding the mask anesthesia , its clinical stage , as well as methods of intratracheal , intravenous , intramuscular anesthesia .
2. Methods of introduction of oropharyngeal air spray .
3. Methods rehabilitation of upper respiratory tract with electric pumps .
4. To be able put indications and contraindications for anesthesia.

Mastering the skills of students:

1. Prepare apparatus and instruments for anesthesia , intubation instruments and methods of performing it.
2. Prepare to work of ventilator .
3. Prepare it set for endotracheal intubation.

4 . Tasks for independent work in preparation for the lesson .

4.1. The list of basic terms , parameters, characteristics, which the student must learn in preparation for the class:

Term	definition
general anesthesia	state of unconsciousness produced by anesthetic agents, with absence of pain sensation over the entire body and a greater or lesser degree of muscular relaxation; the drugs producing this state can be administered by inhalation, intravenously, intramuscularly, or rectally, or via the gastrointestinal tract.
inhalation anesthesia	anesthesia produced by the respiration of a volatile liquid or gaseous anesthetic agent.
anesthesiology	Provide comprehensive protection of the patient during surgical and other invasive procedures, including monitoring and support of vital functions of the patient, aimed at reducing the suffering from the disease or medical exposure.
noninhalation anesthesia	Anaesthetic agents may be administered by various routes, including injection (intravenous, intramuscular, or subcutaneous), oral, and rectal.

4.2 . Theoretical questions for the class :

1. The definition , terminology , classification and types of general anesthesia .
- 2 . Theories of anesthesia, preparation of patients for anesthesia , sedation scheme .

- 3 . The mechanism of action of narcotic drugs and muscle relaxants .
- 4 . The methodology of the mask anesthesia , its clinical stage , as well as methods of intratracheal , intravenous , intramuscular anesthesia .
- 5 . Apparatus and instruments for anesthesia , intubation instruments and methods of performing it.
6. Complication of anesthesia , nursing during and after anesthesia .
7. Methods of administration oropharyngeal povitrospryama .
8. Methods rehabilitation of upper respiratory tract with electric pumps .

4.3. Practical work (tasks) used in class:

1. Choose a method of local anesthesia and drugs to perform anesthesia .
2. Prepared to work ventilator .
3. Prepared set for endotracheal intubation.
4. Demonstrated noninhalation anesthesia techniques .

5. The content of the topic.

5.1. Structural and logic threads

induction anesthesia	Preparations for induction: a) inhalation (halothane, nitrous oxide); b) neingalyatsionnyh anesthetics (thiopental sodium, sodium hydroxybutyrate, ketamine, propofol), or combinations thereof..
Anesthesia support period	The main task - the effective protection of the patient from surgical stress and to ensure optimal conditions for the surgeon.
exit from anesthesia	The main task - the restoration of adequate spontaneous breathing and protective reflexes (gag, cough). The adequacy of the clinical signs of spontaneous breathing: - No signs of tachypnea, cyanosis while breathing air for 5-10 minutes; - The right rhythm of breathing.
Stage I - analgesia	A) It starts from the beginning of the administration of anesthesia at the time of loss of consciousness. B) the average duration of 3-8 minutes. B) Clinical stage analgesia: a) at the beginning of this step, the action manifested irritable ester: - Stuffiness; - Holding your breath, its irregularity; - Cough; - A significant salivation; - Abstentions dilated pupils; - A slight increase in the frequency or the acceleration of heart rate and AP.
Stage II - excitement	A) It starts from the moment of loss of consciousness. B) Clinical stage of excitation:

	<ul style="list-style-type: none"> - Restlessness and language stimulation; - Violation of the respiratory rhythm; - Increased blood pressure; - Quickens the pulse; - dilated pupils, reaction to light is stored; - Increased muscle tone and reflexes all; - Possible vomiting and ventricular fibrillation.
Stage III - Surgical:	<p>a) III1 - the level of eye movement or twilight anesthesia .</p> <ul style="list-style-type: none"> • It is characterized by the onset of restful sleep is a profound and even breathing : - Pupils constrict , reaction to light is stored ; - Eyeballs make slow circular movements or fixed eccentrically ; - Keep the corneal and pharynx , laryngeal reflexes (which prevents intubation) ; - Blood pressure and pulse rate are close to the original values; - Muscle tone is maintained ; - No reaction to painful stimuli are weak , but calls the proper motor and autonomic responses to pain ; <p>b) III2 - the level of the corneal reflex, expressed or anesthesia (possible implementation of most of the operations) .</p> <ul style="list-style-type: none"> • It is characterized by fixation of the eyeballs : - Further weakening of the reflex activity in response to painful stimuli ; - Eyeballs are located centrally, motionless ; - Pupils are narrow, poorly reactive to light ; - Cornea moist ; - Pharyngeal and laryngeal reflexes are absent ; - Corneal reflex disappears before the end of the second level; - Breathing even and deep ; - Blood pressure and pulse rate within the baselines ; - Reduced muscle tone ; <p>c) III3 - extension level of the pupils, or deep anesthesia .</p> <ul style="list-style-type: none"> • Begins to show toxic effects on the body of ether : - Eyeballs fixed centrally ; - Pupils dilate before the end of this level , do not react to light ; - Cornea is dry ; - There comes a pronounced relaxation of muscles , including respiratory ; - Breath for a long exhale.

The methodology of the anesthesia

Use a freshly prepared solution of barbiturates . For this formulation 1.0 (bottle 1.0) before anesthesia was dissolved in 100.0 isotonic sodium chloride solution (1% solution) . Dashed vein and the solution is administered at a rate of 1 ml for 10-15 seconds .

After introducing 3.5 ml for 30 seconds, the patient sensitivity to detect barbiturates, then administering drugs continue to step surgical anesthesia. The total dose should not exceed 1000 mg .

During anesthesia, the anesthesia nurse oversees the pulse, blood pressure , respiration , and an anesthesiologist - the state of the pupil, the movement of the eyeballs , the presence of corneal reflex.

In the surgical clinic intravenous anesthesia is used for short-term operations , the implementation of therapeutic and diagnostic procedures , for induction of anesthesia .

Contraindications:

- a) a history of allergic reactions to the drug ;
- b) the lack of an anesthetist and apparatus for ventilation .

Intramuscular anesthesia (injection)

At present, applying the restrictions on specific indications for induction of anesthesia . To this solution was used 10% hexenal , is introduced into the thigh muscles .

Care of patients during and after anesthesia

Question to fulfill operational, the department of anesthesiology and intensive care .

When conducting anesthesia continuously every 10 - 15 min. observe and evaluate the main hemodynamic parameters .

Nurse anesthesia is a patients map , which highlighted the pulse rate , blood and central venous pressure , respiratory rate , ventilator settings . The anesthesiologist monitors the patient's condition , the position of the eyeballs , the state of the pupil and corneal reflex .

In people with heart disease runs continuous monitoring of cardiac activity. To identify the level of anesthesia using electroencephalographic monitoring for control of pulmonary ventilation and metabolic changes during anesthesia to a study of the acid- base status .

During the patient out of anesthesia, the anesthesiologist necessary:

- Suck the mucus , saliva from the mouth , nose , pharynx , trachea patient;
- Determines the degree of restoration of breathing (the depth and frequency), the efficiency of gas exchange (skin and mucosa) ;
- Measures of blood pressure, central venous pressure , pulse, listens to heart sounds;
- Determines the extent of recovery of reflex activity (corneal , pupillary , laryngeal reflexes) and consciousness.

After the restoration of spontaneous breathing , reflex activity, muscle tone, full of consciousness and normalization of hemodynamics and gas exchange in the patient is transferred to the recovery room . In the recovery room , all patients within a few hours of prescribed oxygen inhalation . Anesthesiologist with ward doctor assess the general condition of the patient , prescribe therapy on the first day , painkillers and antihistamines , etc. These data are recorded in a map of observation and medical history. Obligatory in control of urination and as of electrolyte metabolism .

6. Materials for self-control.

1. The definition , terminology , classification and types of general anesthesia .

- 2 . Theories of anesthesia, preparation of patients for anesthesia , sedation scheme .
- 3 . The mechanism of action of narcotic drugs and muscle relaxants .

6.1. Tasks for self-control . questions

1. The methodology of the mask anesthesia , its clinical stage , as well as methods of intratracheal , intravenous , intramuscular anesthesia .
- 2 . Apparatus and instruments for anesthesia , intubation instruments and methods of performing it.
- 3 . Complication of anesthesia , nursing during and after anesthesia .
- 4 . Methods of administration oropharyngeal povitrospryama .
- 5 . Methods rehabilitation of upper respiratory tract with electric pumps .

assignments :

1. Methods of administration oropharyngeal povitrospryama .
- 2 . Methods rehabilitation of upper respiratory tract with electric pumps .

6.2 . Situational problems .

1. Surgery for acute appendicitis have decided to hold a hardware mask anesthesia. What is the breathing circuit apply : reversible or irreversible ? Why ? Recalculate the advantages and disadvantages of each.

2 . Patient K. , 51 years old , was admitted to hospital with signs of dislocation of the left shoulder. What method of anesthesia is advisable to apply in this case?

3 . In the surgical ward delivered to the affected F., 40 years old, who received a gunshot wound to the chest . What method of pain relief you apply for surgery ?

4 . Patient K., 57 years old, planned to carry out gastric resection for Billroth -II. What is the basis for anesthesia induction and can be applied ?

5 . Patient S. , 34 years old plan to reposition dislocated hip. Which , in your opinion, the method of anesthesia should be applied in this case?

Test problems in implementation of the " Step 1" and " Step 2" .

1. Side effects of fentanyl :
 - 1 respiratory depression
 - 2 suppression of the cough reflex
 - 3 acute renal failure
 - 4 acute liver failure
 - 5 brain hemorrhage
- 2 . What are the stages of ether anesthesia :

- 1 analgesia
- 2 overdose
- 3 inhibition
- 4 excitation
- 5 recovery

3 . By inhalation anesthetics are:

- 1 nitrous oxide
- 2 geksenal
- 3 halothane
- 4 thiopental sodium
- 5 ketamine

4 . By neingalyatsionnyh anesthetics include:

- 1 nitrous oxide
- 2 halothane
- 3 Live
- 4 thiopental sodium
- 5 ketamine

5 . The purpose of premedication are:

- 1 reduction of the analgesic effect of anesthetic
- 2 decrease in metabolism to reduce oxygen demand
- 3 providing sedation
- 4 increase in salivation
- 5 reduction in the protective effect of analgesia

6. For endotracheal intubation is used:

- 1 bronchoscope
- 2 stethoscope
- 3 laryngoscope
- 4 endotracheal tube
- 5 inhalation mask

6.3 Tests for self-control (basic knowledge)

1. For induction of anesthesia is used:

- 1 thiopental sodium
- 2 nitrous oxide
- 3 halothane
- 4 Live
- 5 sodium hydroxybutyrate

2 . The conclusion of anesthesia is to stop the flow of anesthetic to the end of the operation :

- March 1 minute
- February 10 minutes
- March 15 minutes
- April 20 minutes
- May 30 minutes

3 . Before intubation should be used :

- 1 hyperventilation mask
- 2 analgesics
- 3 sedatives
- 4 anti-inflammatory drugs
- 5 antibacterials
- 6 relaxants

4 . For sedation , the following preparations:

- 1 thiopental sodium
- 2 atropine sulfate
- 3 sodium hydroxybutyrate
- 4 droperidol
- 5 halothane
- 6 Kets

Tests and testing task source of knowledge .

1. At the time of surgery (opening postineksiynogo abscess) under mask anesthesia in a patient appeared motor activity in the limbs.

What stage of anesthesia occurred in a patient?

2 . From the operating room to the intensive care unit patient translated S., 62 years old, who suffered under the combined anesthesia gastrectomy , abdominal drainage . After 15 minutes of spontaneous breathing has stopped , cardiac function is preserved. Anesthetist derived lower jaw , introduced through the mouth duct - an independent not breathing . After rescue breathing mouth to mouth recovered spontaneous breathing . Which of the complications developed in this patient ?

3 . Patient K. , 67 years old, entered the hospital emergency room for acute intestinal obstruction . Sick with diabetes. Select and justify the method of anesthesia , make a diagram of anesthetic management .

4 . In the surgical ward admissions , P., 47 years old, with a diagnosis of bacteremia neck. The state difficult . The body temperature of 38,8 °. Sick for 5 days. Under what anesthesia is necessary to open the abscess ? Justify the choice of anesthesia .

Case studies for the source of knowledge .

1 Patient M. , 58, underwent surgery for cancer of the cecum - made right-gemikolektomiya . Concomitant disease - mitral valve stenosis . After waking observed rapid breathing with the fate of accessory muscles , cyanosis developed . Beginning to stand out from the trachea pink foam. What complication has arisen? What urgent measures need to be conducted?

2 Patient S., 46 years old, operated by peritonitis . During anesthesia ftorotanovogo found that pupils narrow, reaction to light is weak, absent corneal and pharyngeal reflexes , decreased blood pressure, bradycardia . What stage of anesthesia in a patient?

3 Patient T. , 65 years old, hospitalized for perforated ulcer , 12 duodenal ulcer. The patient also revealed hypertension . What type of anesthesia do you prefer ?

4 In the emergency department delivered the patient M. , aged 38, complained of intense pain throughout the abdomen , general weakness that increases with inspiration. On examination : the state of moderate severity. Pale skin . The body temperature of 36,9 ° C. Breathing surface 16 with a frequency of 1 minute. Pulse of 102 beats . in 1 minute, rhythmic , weak filling . Blood pressure 110/70 mm Hg Abdomen symmetrical , in the act of breathing does not take part . On palpation busy in all departments , according to the " doshkopodobnogo " sharply painful . Positive signs of peritoneal irritation . Hepatic dullness is absent. In a patient suspected perforated ulcer of the stomach or duodenum 12 . What method of pain relief you suggest ?

5 Patient M. 45, delivered to the emergency department with complaints of general weakness, dizziness , nausea, and vomiting " coffee grounds " . On examination : pale skin . Pulse 110 1 min. , Filiform . BP 80/40 mm Hg Complete blood count : HB - 80 g / l, er . - $2.8 \times 10^{12} / L$, Ht - 25%. Diagnosed with acute gastrointestinal bleeding . Conservative therapy for 4:00 effect failed. By nasogastric tube continued to flow , " coffee grounds " blood clots. Featured emergency surgery . Which type of anesthesia is better to use during surgery in this patient ?

6 Patient L. , 65 years old , was admitted with complaints of intermittent claudication , coldness and paresthesia in the feet , pain in the first finger of his right foot , raising the body temperature to 38,3 ° . He considers himself a patient for over 5 years , when the pain in the calf muscles when walking. Due to the deteriorating state appealed to the reception hospitalized. He suffers from hypertension atherosclerotic coronary cardiosclerosis flashing arrhythmia , H2a . On examination : general state of moderate severity. Reduced supply. Pale skin , acrocyanosis . breath weakened vesicular - individual dry wheezing. Pulse 86 for 1 min , arrhythmic . Blood pressure 140/90 mm Hg The abdomen is involved in breathing , symmetric. On palpation soft and painless in all departments. Locally : the first finger of his right foot in black. Foot is swollen , redness of the skin, local hyperthermia . Ripple on the femoral arteries reduced to hamstring - weakened , on the arteries of the stop is not defined . Gipotrofic muscles of the lower limbs , pale skin , reduced turgor , scalp dramatically depleted , dull nail plate , thickened .

Drug therapy has not given effect - increased symptoms of intoxication , the development of cellulitis foot and the lower third of the leg . Produced vital testimony to the amputation of the right lower extremity at the level of the middle third of the thigh. What is the best type of anesthesia used?

Tests III level of complexity

1. For sedation , the following preparations:
 - 1 chlorpromazine
 - 2 phenobarbital
 - 3 anti-inflammatory drugs
 - 4 fentanyl
 - 5 ketamine
 - 6 thiopental sodium

- 2 . The purpose of premedication are:
 - 1 increase metabolism to reduce oxygen demand
 - 2 elimination of sedation
 - 3 increase the analgesic effect of anesthetic
 - 4 decrease in salivation
 - 5 reduction in the protective effect of analgesia

- 4 . Contraindication for ketamine anesthesia are:
 - 1 hypertension
 - 2 shock
 - 3 bleeding
 - 4 eclampsia
 - 5 induction of anesthesia
 - 6 anesthesia delivery

- 5 . Noninhalation anesthetic can be administered :
 - 1 intravenously
 - 2 intradermally
 - 3 endotracheal
 - 4 nasotracheal
 - 5 intravenously
 - 6 intramuscular

6. Inhaled anesthetics can be administered :
 - 1 nasotracheal
 - 2 subcutaneously
 - 3 intravenously
 - 4 intramuscular
 - 5 intradermal
 - 6 endotracheal

7. References:

General:

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3. AA Simodeyko, SS Philip A. Boldizhar, V. Pant Practical skills in general surgery patient care. Uzhgorod, Uzhgorod National University. - 2001.
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8. The distribution points are awarded to students:

At mastering topic number 11 to content module 3 for training activities for students rated a 4-point scale (traditional) scale, which is then converted into points as follows:

rating	Points
5 (excellent)	5
4 (good)	4
3 (satisfactory)	3
2 (poor)	0

Guidelines prepared

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