

Ministry of Health of Belarus
Gomel State Medical University

Department of Orthopedic, Trauma and military field surgery
with the course of Anesthesiology and Critical Care Medicine

Been approved by the Department of
№ ____ " ____ " ____ 2019

Head of the department: - MD, PhD Julia Cherniakova

**TOPIC: "Fundamentals anesthesiology and resuscitation.
United services anesthesiology and resuscitation "**

**Educational and methodical development
for 4th year students of medical faculty.**

Author: MD, PhD, Lyzikova TV

Gomel, 2019

Methodical development is designed for self-study. It provides:

- I. Relevance of the topic
- II. Purpose of the lesson
- III. Tasks
- IV. Basic Forums
- V. Remmended Reading
- VI. Questions for self-
- VII. Training Material
- VIII. Self-study
- IX. Clinical problems and test control

I. Relevance of the topic

Anesthesiology has traversed the path of development, the process of its formation and establishment as an independent branch of medicine was completed in the 50-60's of the XX century. Currently, anesthesia and resuscitation of the country is a full service structural unit of practical medicine. Its leading position in the structure of health care setting due to multidisciplinary specialty. Anesthetic management is just one of the features of modern anesthetic and intensive care services. Another task is to carry out its extensive set of measures to restore and maintain vital body functions disturbed due to disease, trauma, surgery and other critical states, regardless of the causes of these disorders. Specificity of anesthesiology and intensive care services requires knowledge of its principles and objectives, structure and characteristics of the organization of work.

II. Purpose of the lesson

Explore the history of the formation, the practical problems of anesthesiology, critical care medicine and critical care emergency conditions, the organization of the service, standards, intraoperative monitoring of the patient.

III. Tasks

The student should know:

- The history of the formation and development of anesthesiology and critical care medicine;
- The basic principles and objectives of modern anaesthesiology, resuscitation and intensive care;
- Legal aspects of anesthesiology and critical care medicine;
- The organization of the Department of Anesthesiology, Intensive Care;
- Duties of a physician anesthetist-resuscitator;
- The basic principles and objectives of intraoperative monitoring.

The student should be able to

- Comply with aseptic and antiseptic in the department of anesthesiology, intensive care and operating;
- Observe safety in the department of anesthesiology and intensive care when working with power tools, equipment, compressed gases;
- Draw up maps of monitoring patients in the department of anesthesiology, intensive care, intensive care sheets;
- Comply with the ethical-deontological norms of communication with colleagues,

patients and their relatives.

IV. Sections studied before and needed for the session

1. History of medicine;
2. Basis for the organization of health care;
3. Social hygiene;
4. General surgery (aseptic and antiseptic);
5. Medical deontology.

V. Recommended Reading

Books on the history of medicine, ethics, social hygiene, public health, general surgery for medical students.

Suggested Reading on lessons

Main Reading

1. Bunyatyan, AA Anaesthesia and Intensive Care / AA Bunyatyan [and others] Ed. Ed. AA Buniatian. - M., Medicine. - 1997. - 565 p.;
2. Dale, OA Anaesthesia and Intensive Care / O. Valley [and others] Ed. Ed. OA Valley - M., Medicine - 2008. - 574 p.
3. Lecture material.

Further Reading

1. Order № 615 from 08.06.2011 MOH;
2. Morgan Jr., JE Clinical Anesthesiology, Book One / JE Morgan Jr., MS Magid: Lane. from English. - M, Bean - 2005. - 431 p.;
3. Orders and decrees MOH to organize and improve anesthesiology and intensive care and critical care in the Republic of Belarus. (№ 184 from 05.10.1992; № 26 dated 09.02.1993; № 261 of 15.11.1993; № 29 dated 08.02.2005; № 615 from 08.06.2011).

VI. Questions for self-

Questions on basic knowledge

1. The history of the treatment of pain, emergency and acute care of critically ill patients;
2. Aseptic and antiseptic in surgical hospitals;

Questions on this topic:

1. The history of anesthesiology and critical care medicine;
2. Organization of the Department of Anesthesiology, Intensive Care (ICU). Regulations governing the service of Anesthesiology and Critical Care Medicine;
3. Indications for admission and transfer of patients in ICU;
4. The list required for monitoring during planned and emergency operations;
5. The list required for monitored during scheduled and emergency operations.
6. Monitoring of ventilation parameters
7. Monitoring of oxygenation parameters
8. Monitoring of circulatory parameters, periodicity.

Topics

1. The role of Russian scientists in the development of anesthesiology.

Teaching tools for organization of independent work of students

1. Computer database.

2. Objectives, test control.
3. Thematic patients.
4. Patient records and other documentation.
5. Safety instructions, aseptic and antiseptic.
6. self-study.

VII. Training Material

A short history of anesthesiology and critical care medicine.

Two ideas from ancient times possess the minds of mankind: to eliminate pain and return to life suddenly died. The idea of pain management has led to the emergence of Anesthesiology, the idea of returning to life - to the creation of resuscitation.

The civilization of ancient Egypt has left the oldest written evidence of an attempt to use anesthesia during surgery. In the Ebers Papyrus (5th century BC), reported on the use of preoperative mandrake, belladonna, opium, alcohol, can reduce feelings of pain. With slight variations, the same drugs are used alone or in various combinations in ancient Greece, Rome, China and India. In Egypt and Syria knew stunning by compression of the neck vessels, and used it for operations of circumcision. Was tested bold method of anesthesia by exsanguination before a dead faint due to anemia of the brain. Aurelio Saverino of Naples (1580-1639) recommended that in order to achieve local anesthesia rubbing snow in 15 minutes. before surgery. In the early 19th-century Japanese physician Hanaoka applied for pain medication consisting of belladonna, hyoscyamine, aconitine. Under this anesthesia have successfully amputated limb, breast, to conduct operations on the face.

The idea of pain does not belong to one person. Davy, studying nitrous oxide, found that it has exhilarating action, so he called it the "laughing gas" and suggested that it could be used for anesthesia during surgical operations. Englishman Henry Hickman (1800-1830) first realized that the task of anesthesia is not only pain relief, but also to prevent other harmful effects of the operation. It is used to restore breathing mechanical ventilation (ALV) specialized in furs, and the recovery of the heart - an electric current. However, his proposal was rejected by his contemporaries. Depressed Hickman died at the age of 30. Equally tragic is the fate of Horace Wells, who in 1844 experienced the effect of nitrous oxide on himself. He spent 15 successful anesthesia for dental extractions. However, the lack of knowledge about the mechanisms of action and clinical anesthesia, and the usual bad luck meant that the public demonstration of this method was unsuccessful. Wells in 1848, committed suicide. For 2 years before Wells anesthesia for removing tumors of the head used by Long, however, he did not appreciate the importance of his discovery and reported it only after 10 years. Therefore, we consider the opening day of anesthesia 16 October 1846 g when another dentist - Thomas Morton - publicly demonstrated ether anesthesia at tumor removal jaw and convinced those present that the production may painless surgery. This day is considered the anesthesiologist. A few months later, ether anesthesia were used in England and France, February 7, 1847 he was employed in Moscow FI Inozemtcev. The introduction of the surgical practice of anesthesia given the opportunity to expand the nature and volume of surgical procedures, the opportunity to perform not only in the limbs, but also the internal organs. Great contribution to the anaesthesiology made Pirogov (1810-1881) - he first

pointed out the negative features of anesthesia, the possibility of serious complications, the need to know the clinic anesthesia. His works are enclosed ideas of many modern methods: endotracheal, intravenous, rectal anesthesia, spinal anesthesia.

In the 20th century, it was created a lot of drugs for inhalation and intravenous anesthesia, which continues to improve and now. Played a decisive role in the application of 1942 Griffith and Johnson curare, a method called "anesthesia with muscle relaxants." He revolutionized the anesthesiologist. Complete relaxation of the muscles required artificial respiration replacement, was used for this ventilator. Thus were laid the foundations of modern multi anesthesia with mechanical ventilation, which is the principal at the present stage of development of anesthesiology. Increasing the opportunities for anesthetic management operations has greatly contributed to rapid growth in the arsenal of drugs, intended for general anesthesia. In particular, new to the time the funds were halothane (1956), viadril (1955), preparations for neyroleptanalgezii (1959), methoxyflurane (1959), sodium hydroxybutyrate (1960), propanidid (1964), ketamine (1965), propofol (70 -s.).

The idea of a local anesthetic (pain relief only place operations without turning consciousness patient) was proposed in 1880 by V.K.Anrep After applying Kohler in 1881 for cocaine anesthesia for eye surgery, local anesthesia has become commonplace. Were created by low-toxicity drugs, primarily procaine, developed different ways of local anesthesia: infiltration anesthesia, proposed in 1889 and Reclus in 1892 Schleich, conduction anesthesia, the founder of which was A.I.Lukashevich (1886) and Oberst (1888), spinal anesthesia (Bier, 1897). The most important role played by local anesthetic infiltration tight developed Vishnevsky and his numerous followers. It had a special significance for emergency and military surgery. The relative simplicity and safety of the method, the possibility of pain by the surgeon, the discovery of new, more effective and safe local anesthetic, make it very popular in our time.

In the first phase anesthesiology fastest growing in the UK and the U.S., as there specialization of physicians and nurses in the surgical anesthesia began in the prewar period. In other countries, including our own, training and organizational design of anesthesiology staff deployed in the early postwar decades. In the 50's for most surgeons of the country, it became apparent that the safety of the larger operations is largely dependent on their anesthetic management. This was a very important factor, which stimulated the formation and development of the national anesthesiology. Physicians are attracted at that time to provide a general anesthesia, became experts in this field. In our country, as in Western Europe and the U.S., the question of official recognition of anesthesiology as a clinical discipline, and an anesthetist - a specialist special profile. In the Soviet Union for the first time this issue was extensively discussed in 1952 on V Plenum of the Board of All-Union Scientific Society of Surgeons. Significant dependence on the further development of surgical anesthesia achievements prompted many large surgeons to actively participate in the training. In 1956-1957. clinics run by PA Kupriyanov and AN Bakulev, started to prepare anesthesiologists. In 1958, at the initiative of the PA Kupriyanov at the Military Medical Academy. SM Kirov the department of anesthesiology. Somewhat later, a similar department was organized in a number of Postgraduate Medical Institute. The process of formation and establishment of anesthesiology as a separate branch of medicine in the 50's and 60's by the creation of the national scientific societies of anesthesiology.

Resuscitation attempts were also carried out in ancient times. In written sources, 3000-5000 years ago mentioned the successful life using artificial respiration according to the "mouth-to-mouth." Asclepiades (124 BC) and Antilus (11 BC) recommended a tracheostomy (dissection of tissue on the front of the neck and the introduction of the tube into the trachea) with respiratory failure. In the early 16th century, Paracelsus offered special mechanism for artificial respiration by injection, were designed numerous devices. In the 18-19 centuries in England, Russia, America, successfully held "revival mnimoumershih" Drowning. But throughout this period, some reports containing information on best practices, drown in numerous publications such as the ignorant advice buried in the ground after a lightning strike.

The great discoveries of natural science of the 19th century will provide the scientific basis of resuscitation. Claude Bernard in his studies formulated the essential principle that determines the success of protecting the body from various injuries and their consequences, "the constancy of the internal environment is a prerequisite for the existence of an independent body." This idea is the basis of Transfusion (the science of transfusion of blood and blood products), parenteral (intravenous) nutrition, correction of water - electrolyte balance, acid-base balance of the body, control gas exchange and circulation. The practical importance of the normalization of the internal environment has been shown Latta in 1831 he successfully applied for the first time a transfusion of saline solutions in the treatment of cholera. Development in 1914, the stabilization method of blood sodium citrate (V.Ya.Yurevich), transfusion of cadaveric blood (V.N.Shamov in 1928), the base AABogdanov in 1926 the world's first institute of blood transfusion, This allowed the introduction of the intervention and to develop best practices to combat hypovolemic shock. Of equal importance to control the internal environment of the body have methods for determining the acid-base balance (KHS), electrolytes. Have developed products for parenteral nutrition, introduction of the artificial kidney, etc. In 1958 he was restored to the scientific basis of a simple but effective way to breath "mouth to mouth" and "mouth-to-nose." Methods of chest compressions and electrical defibrillation were grounded in 1939 and N.L.Gurvichem G.S.Yunevym. In 1924 and S.S.Bryuhonenko S.I.Chechulin constructed and used heart-lung machine, and in the 50's. 20th century, this technique has become firmly established in the practice of surgery. Nowadays resuscitation marry the concept of "the science of reviving the dead suddenly." It is closely connected with the surgery, internal medicine, neurology and other medical sciences. Resuscitation goal - providing body functions in critical condition, a set of measures to prevent and eliminate the critical state of it.

In the 60 years of critical care medicine has moved closer to the anesthesiologist. In that period, characterized by the emergence of clinical resuscitation, it became clear that the decision of its practical and scientific problems of the doctors of all profiles are most prepared anesthetists. This led to their involvement in intensive care patients after the first surgery, and then other categories of sick and injured. The positive experience of anesthesiologists to provide intensive care was so convincing that the Minister of Health August 19, 1969 issued an Order № 605 "On improving anesthetic and intensive care services in the country," according to which the anesthetic departments were transformed into the Department of Anesthesiology and Intensive Care and anesthesiologists are anesthesiology and intensive care.

The organization and equipment of anesthetic and intensive care services

Work anesthetic and intensive care services regulated by RB orders and decisions of MOH № 184 of 05.10.1992; № 26 dated 09.02.1993; № 261 of 15.11.1993; № 29 dated 08.02.2005; № 615 dated 08.06.2011.

The main requirement for resuscitation service is a constant readiness of personnel for immediate resuscitation in patients who are in critical conditions.

Pre-hospital care to persons in a state of clinical death, have immediately using simple techniques of cardio-pulmonary resuscitation (CPR mouth to mouth or mouth to nose, using S-and T-tubes or bags Ambu, closed cardiac massage) . Specialized teams "first aid", arrived at the scene connected to resuscitative measures and continue them during transport sick or injured to the nearest hospital. Machine specialist team "emergency" must be equipped with the necessary equipment and medication: Anaesthetic and respiratory devices, defibrillators, systems for intravenous infusion sets for tracheal intubation, central venous catheterization, venesection, etc.

An intensive care unit - an independent office, in which the set of measures for the restoration and maintenance of disturbed vital functions in patients in critical condition.

In accordance with the order of Ministry of Health of Belarus № 26 of 9.02.1993g.

Department of Anesthesiology and Intensive Care Department, or resuscitation and intensive care are organized in the health care setting and is its structural subdivision. As part of the Department of Anesthesiology and Intensive Care ICUs are organized in the following hospitals:

- In the regional, national hospitals for adults, regardless of power, and in the central district hospitals are centers indication of emergency, including and medical, care for adults;
- In urban hospitals with 500 or more beds, the presence in the hospital for at least 60 surgical beds, and is a center for emergency medical care;
- In the district hospitals of 200 beds or more in the presence of the hospital at least 60 surgical beds.

Resuscitation may be multidisciplinary (hospitalized patients with medical, surgical, neurological and other diseases), specialized (for cardiac, neurological, infectious diseases, etc.). In the big cities can be organized specialized centers (poison, burn, for patients with myasthenia gravis, etc.).

Number of beds in intensive care and intensive care is determined by the need for them, within 2% of the hospital beds institutions. The number of beds in one main compartment from 6 to 18.

In general hospitals with capacity of 1000 or more beds (including 500 surgical) in addition to the Department of Anesthesiology and Intensive Care allows the organization of specialized intensive care units and intensive care units with the operational needs and the profile of the hospital within 5-6% of hospital beds institutions.

Guide provides the head office, which reports directly to the chief physician of the medical institutions. Anesthesiologist subject head of department. In my work unit staff is guided by the relevant provisions laid down by superior administrative bodies with regard to the specific features of health care setting.

Tasks anesthetic and resuscitation services:

- 1) The implementation of a set of measures to prepare patients for surgery, determination of anesthetic risk, choice of sedation and anesthesia for a general, regional anesthesia during surgery, diagnostic and therapeutic procedures, childbirth, as well as

detoxification methods of intensive care:

2) a set of measures for the intensive care unit, intensive care and intensive care patients with acute disorders of the functions of vital organs and systems (or a real threat to their development) and stabilization of their activities

3) Increasing the level of theoretical knowledge and the training of medical staff of health care facilities, and especially specialized ambulance staff, as well as the training of different populations and groups of public employees practical skills for the first intensive care;

4) In the outpatient group provides anesthetic anesthetic for short-term operations and painful manipulation in surgical and dental practices, ensuring systematic training of medical, middle and junior medical staff

Typical structure of branches: 1) the resuscitation room, 2) intensive care units, and 3) procedural, and 4) hardware (storage and disinfection equipment), 5) rapid laboratory 6) office director of the department, 7) staffroom 8) room head nurse, 9) rooms for nurses, 10) linen, 11) showers, 12) sanitary facilities.

Equipment compartment. Rooms shall be provided with emergency lighting, have a sufficient number of power supplies (at least 3 rosettes on one bed), a reliable system ground, the source of oxygen in each bed, a sufficient number of electric and mechanical vacuum suction, germicidal lamps. It is desirable to have the air conditioning with high humidity. Office should be equipped with sufficient anesthetic and respiratory equipment. Centralized eyeliner every bed provides laundry supply of oxygen, nitrous oxide, compressed air (for respirators), vacuum system with 4 separate wiring for the connection of the aspiration catheter, gastric tube drainage tubes installed in the pleural and abdominal cavities. Of particular importance are the loudspeaker system with panic alarm threatening situations. They make life easier for staff, make monitoring a continuous, objective and in-depth.

The basic descriptive indicators to be monitored are the heart rate, blood pressure, central venous pressure (CVP), the frequency and volume of respiration, blood gases, acid-base status, electrolyte levels, blood coagulation, hemoglobin, hematocrit, minute and stroke volume heart, peripheral blood flow and vascular resistance, plasma osmolality, tests, reflecting the change of carbohydrate and protein metabolism, kidney and liver function, the state of consciousness. For this unit should be equipped with a diagnostic (electrocardiography, pulse oximetry, EEG, rheographs, portable x-ray machines, etc.) and medical (bronchoscopes, inhalers) equipment. In the intensive care unit should be equipped with movable tables or "resuscitation trolley tional" for the immediate provision of intensive care, not only from within the division, but also in other departments. The kit for CPR include a defibrillator, air bag, such as "outpatient", laryngoscopes, endotracheal tube, mechanical suction, Stomach, sets for central venous catheterization and venesection, disposable syringes, infusion systems, intracardiac injection needle, sterile material (balls, towels, tuffery), infusion medium (polyglukin, reopolyglukine, isotonic sodium chloride, sodium bicarbonate), a set of pharmacological agents (calcium chloride, calcium gluconate, Panangin, corticosteroids, cardiac glycosides, antihistamines, respiratory analeptics, cholinomimetic, sympathomimetic, holinoliticheskie, adrenolytic, antispasmodic, ganglioblokiruyuschie drugs, etc.). Unit staff should clearly know the storage location of any of the sets or sets and be able to handle them.

It is impossible to overestimate the possibilities of automated control and television, as no

one of the most advanced systems will not replace direct medical supervision, highlighting the initial pathophysiological changes on the basis of the patient's complaints, discoloration of the skin and the humidity changes of the mucous membranes, etc.

To provide patient care in full resuscitation should be in the required amount and infusion medications environment: 1) general and local anesthetics, opioids, 2) sedatives, hypnotics, narcotic analgesics, 3), tranquilizers, antipsychotics, and 4) antihistamines 5) central analeptics 6) means holinoliticheskie 7) adrenaline, and adrenomimeticheskim adrenoceptor blocking drugs, 8) ganglioblokiruyuschie facilities, 9), cardiovascular drugs (cardiac glycosides, antiarrhythmics, antispasmodics, vasodilators, antihypertensives, etc.), 10) muscle relaxants and anticholinesterase drugs, 11) dehydration, diuretics, 12) corticosteroids, enzyme inhibitors, anabolic, vitamins, 13) drugs that affect blood clotting, 14) antibiotics, mucolytic agents, and others, 14) isotonic sodium chloride solution, 5%, 10%, 20% and 40% glucose solution, Ringer's solution, sodium hydrogen carbonate, colloidal solutions, laktosol, mannitol, urea, etc.).

Express Lab. It is most convenient to place it in the intensive care unit. The laboratory must be equipped with equipment for rapid diagnosis of changes in acid-base balance, blood gas content, electrolytes, protein, glucose, and urine creatinine, urea, transaminases, amylase, coagulation status, hemoglobin, hematocrit, erythrocytes, leukocytes, and etc.

Indications for hospitalization of patients in the resuscitation department:

- Coma (head trauma, acute ischemic stroke, diabetic, hepatic coma, thyrotoxic crisis, etc.);
- Convulsive conditions (epilepsy, eclampsia, tetanus, etc.);
- Poisoning by alcohol, sleeping pills, sedatives, pesticides, acetic essence, toxic gases and vapors, etc.;
- Acute respiratory failure (multiple rib fractures, asphyxiation, asthma status, massive pneumonia, pulmonary atelectasis, postoperative respiratory depression, etc.);
- Acute cardiovascular failure (acute myocardial infarction, cardiac arrhythmias, pulmonary embolism, pulmonary edema, collapse, etc.);
- Shock (traumatic, hemorrhagic, anaphylactic, septic, etc.);
- Acute renal failure;
- Peritonitis, associated with severe paresis of the gastrointestinal tract, disorders of fluid and electrolyte and protein metabolism, acid-base status;
- Disturbances in blood coagulation system;
- Severe postoperative period (heart surgery, lung, large vessels, CNS, abdominal organs, spine, etc.);
- Condition after suffering clinical death (postresuscitation disease);
- Severe burns (if you can not admission to special centers), frostbite, radiation injuries.

Dates of stay in the intensive care unit and intensive care depend on the time required to stabilize the basic vital functions. It is totally unacceptable to consider the emergency department and intensive care as the seat of incurable patients to free up other branches of seriously ill patients in a hopeless condition.

Anesthetic equipment service.

Rooms shall be provided with special facilities for anesthesia, for storage and disinfection of equipment, storage of medicines, infusion and transfusion facilities, dressing, laundry, staff room office. The unit must be available anesthetic machines and respirators, test and diagnostic equipment (electrocardiographs, elektroetsefalografy, monitors, mobile X-ray machines, defibrillators, etc.), special tools and equipment (tracheal tube, ducting, laryngoscopes, bronchoscopes, catheters, etc.), sets of pharmaceutical products for general and local anesthesia, intensive care.

In the anesthetic department must have the following documents:

- The register of anesthesia;
- For those who register manipulation (central venous catheterization, venesection, tracheostomy and long.)
- Journal of Accounting and potent narcotic means;
- Journal of Accounting substitutes and intravenous fluids;
- Journal for the registration of transfusion of blood and blood components;
- Journal of the technical condition of the equipment;
- Anesthesia map the course of anesthesia, it is signed by the anesthetist and glued in history.

The official document should be considered history. It anesthetist-resuscitator registers the patient before the operation, determines the degree of anesthetic risk, preparing for surgery and anesthesia, during anesthesia, all medical activities at the stage of the operation and anesthesia and in the early postoperative period. Other documentation is a work which is of great importance to the clarity and continuity in the daily practice of anesthesia department.

Rights and duties of medical personnel department of anesthesia defined job descriptions and orders of higher authorities.

Standards of basic intraoperative monitoring.

Of the mandatory and optional intraoperative monitoring is regulated by Order № 615 from 08.06.2011 MOH year. The essence of it is this:

I. Qualified anesthesia personnel shall be with patients during the time of general anesthesia, regional anesthesia.

Purpose: as during anesthesia the patient is changing rapidly, it is necessary to the permanent presence of qualified anesthesia personnel for the conduct of monitoring and maintenance of anesthesia. In the case of manifest risk to personnel (eg, radiation), the patient can be observed only at a distance, or at regular intervals, it is necessary to use all available measures to ensure monitoring. If the responsible anesthesiologist asked to temporarily leave the operating room for help with any emergency situation, the solution will depend on the urgency of this situation compare with the state of the patient, and in that case, he must appoint a person to temporarily responsible for the conduct of anesthesia.

II. During anesthesia should be monitored:

1. Oxygenation (adequate concentration of oxygen in the blood during anesthesia).

- The color of the skin;
- The fraction of oxygen to breathe;
- Pulse oximetry (saturation value)

2. Ventilation (adequate ventilation during anesthesia)

- chest excursion,

- condition of breathing bag
 - The nature of the respiratory noise,
 - Monitoring of inhaled and exhaled gases
3. Circulation (adequate circulation during anesthesia) Methods:
- Pulse palpation, auscultation of the heart
 - ECG from the start of anesthesia prior to transport from the operating room.
 - Heart rate, blood pressure is not less than 1 time in 5 minutes.
 - Sometimes patient has indications for invasive monitoring of blood pressure, the measurement of central venous pressure, central hemodynamics.

Monitoring of oxygenation, ventilation and circulation is a mandatory amount of intraoperative monitoring.

Next parameters are not mandatory and monitored if patient has indications for this:

4. The body temperature

Each of the methods of termomonitoring has advantages and disadvantages. Temperature of the tympanic membrane is theoretically equal to the temperature of the brain, as the ear canal supplied with blood from the external carotid artery. Risk of injury when administered sensor as well as errors in the figures due to the insulating effect of the wax significantly limit the clinical application of tympanic sensors. Rectal probes slow to respond to changes in core temperature. Nasopharyngeal sensors can cause nosebleeding, but subject to the direct contact with the mucous membrane core temperature is measured with high accuracy. The correlation between the underarm and the central temperature varies depending on the perfusion of the skin. The liquid crystal adhesive strip that is placed on the skin, is not an adequate indicator of the central temperature during surgery. In esophageal temperature sensors are often embedded in the esophageal stethoscope with optimum efficiency, accuracy and safety. To eliminate the temperature measurement of tracheal gases, the temperature sensor should be placed behind the heart, in the lower third of the esophagus. The position of the sensor in this position indicates increased heart sounds

5. Diuresis

The indications for the introduction of a urinary catheter are heart failure, renal failure, severe liver disease and shock. Bladder always kateteriziruyut during operations on the heart, aorta, blood vessels of the kidneys, brain, more intervention on the abdomen, as well as in cases where the expected significant disorders of water balance. Prolonged surgery and intraoperative administration of diuretics also serve as an indication for catheterization. Sometimes the need for catheterization occurs when straining to urinate in the recovery room after general or regional anesthesia.

6. Intracranial pressure;

7. Cerebral oximetry;

8. Neuromuscular block.

VIII. Self-study

Job

At the regional hospital patient taken 42 years of therapeutic hospital district center, where she was treated for 2 weeks about asthma, infectious-allergic form. Sick with

asthma 17-18 years, systematically taking hormones. Severe attack began back in the day hospital. On admission notes shallow breathing with the auxiliary muscles, cyanosis of mucous, acrocyanosis. Confused consciousness. Periodically - dramatic excitement. Pulse - 130 per minute, rhythmic, tense. BP-170/90 mm Hg Muffled heart sounds. On ECG - overload of the right ventricle. In the lungs - percussion - box sound. Auscultation breath auscultated in the upper lobe, the rest over the weaker.

- Determine the severity of the patient;
- What is the unit must be up and treatment of the patient;
- Make a program of emergency care.

IX. Clinical problems:

Task

Planned MRI in 50-year-old man in connection with the recent seizures. The previous attempt of MRI failed because the severe claustrophobia. Before anesthesiologist task of ensuring deep intravenous sedation. What factors influence the decision on what kind of drugs in this case are to be preferred? What is the standard for mandatory monitoring in MRI?

Test control:

1. Adequacy of ventilation can be assessed by:

- a) excursions of the chest;
- b) pulse oximetry (saturation value);
- c) auscultation of heart sounds;
- d) the color of the skin.

2. Adequate oxygenation can be measured by:

- a) measurement of tidal volumes;
- b) monitor the breathing bag;
- c) The color of the skin;
- d) pulse oximetry.

3. The value of oxygen saturation (SpO₂) is influenced by:

- a) the operating temperature;
- b) painted nails;
- c) hypertension;
- d) microcirculation.

4. How frequently intraoperatively measured blood pressure, heart rate?

- a) at least 1 time per minute;
- b) not less than 1 time in 5 minutes;
- c) not less than 1 time in 10 minutes;
- d) defines an anesthesiologist himself, depending on the specific situation.

5. Oliguria - is decreased urine output less than:

- a) 1.5 ml / kg / h;
- b) 1.0 ml / kg / h;

- c) 0.5 ml / kg / h;
- d) 2.0 ml / kg / h.

6. During anesthesia for capnography registered hypocapnia. What to do?

- a) reduce the proportion of inspired oxygen;
- b) increase the tidal volume;
- c) reduce the flow of fresh gas in the breathing mixture;
- d) reduce the frequency of breathing.

7. Opening day of the anesthetic considered:

- a) October 16, 1846;
- b) February 7, 1847

8. The most accurate and safe temperature sensor is:

- a) skin;
- b) the tympanic;
- c) rectal;
- d) nasopharyngeal;
- e) esophageal.

9. The indications for catheterization is:

- a) the unconscious patient;
- b) phlebectomy;
- c) the introduction of intraoperative crystalloids;
- d) operation on the brain.

10. The indications for hospitalization in the intensive care unit is:

- a) the hopeless condition of the patient;
- b) thyrotoxic crisis;
- c) moderate alcohol poisoning;
- g) general hypothermia.

Answers:

Task

The choice of anesthetic to affect the probability of violation of the airway during deep sedation, general condition of the patient, as well as providing medical staff monitors. In this case, the possible short-sedation drugs not cause apnea (eg, midazolam). During the procedure, you must monitor the oxygenation, ventilation, circulation.

Test control:

1 a, 2 - c, d, 3 - a, b, g, 4 - B, 5 -, 6 - d, 7 - and 8 - d, 9 - a, i, 10 - b, g