



## **LECTURE COMPLEX**

**Discipline: "General Surgery"**

**Discipline code: GS3304**

**EP name: 6B10101 "General Medicine"**

**Amount of study hours/credits: 120 hours (4 credits)**

**Course and semester of study: 3rd year, V semester**

**Volume of lectures: 10**

The lecture complex was developed in accordance with the OP "Medicine" and discussed at the meeting of the department

Protocol №


Head of the Department.

Candidate of Medical Sciences.

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## Lecture No. 1

### 1. Topic: Antiseptics.

2. Purpose: To consolidate and expand students' knowledge on general issues of asepsis. To teach to recognize different types of infections, ways of their spread. Teach preventive measures aimed at preventing pathogens from entering the body and methods to combat them. To familiarize students with the types, principles of asepsis, manipulations performed and methods of sterilization. To familiarize students with the types of autoclave, the principles of operation of sterilizers. They will strictly follow the principles of sterilization according to the requirements of asepsis.

### 3. Lecture theses:

There are mechanical, physical, chemical and biological antiseptics.


Mechanical antiseptics. The basis of mechanical antiseptics is the removal from an infected, purulent wound, purulent focus of non-viable tissues, pus, fibrin, which are the habitat and nutrition of microbial flora. It is known that healthy tissue is not damaged by the action of purulent microflora and does not contain it. The removal of de-vitalized tissues, although it is not a direct, but an indirect effect on the microflora, contributes to the sterilization of the wound.



Variants of mechanical antiseptics provide for primary surgical treatment of infected wounds, the purpose of which is to excise the edges, walls and bottom of the wound within healthy tissues (see Wounds). Together with the excised tissues, hemorrhages, hematomas, blood clots, foreign microtelae, as well as the microflora contained in them are removed from the wound. The earlier such an operation is performed, the more likely it is to achieve sterility of the wound.

If microbial flora has begun to develop in an infected wound, which is possible with untimely or incomplete primary surgical treatment, or the wound has a purulent character from the very beginning (after opening abscesses, phlegmon), secondary surgical treatment of the wound is used. Excision of the edges, walls, and bottom of the wound is not performed, but removed from it mechanically (scalpel, scissors, vacuuming, rinsing with a jet of liquid under pressure) necrotizing tissues, pus, fibrin, open purulent pockets. At the same time, the microbial flora is also removed and, although it is not possible to achieve sterility of the wound, the amount of microflora in it decreases and favorable conditions for wound healing are created. Any wound dressing has elements of mechanical antiseptics (wound toilet). Removal of blood-soaked, pus-soaked bandages, tampons,



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washing the wound with a stream of liquid, removal of free-lying necrotic tissues, sequestration, drying the wound with balls and tampons contribute to the removal of microbial flora from it, the amount of which decreases by 10-20 times.

Physical antiseptics. Methods of physical antiseptics are based on the use of the laws of capillarity, hygroscopicity, diffusion, osmosis, the siphon principle, laser exposure, ultrasound. Drainage of wounds, purulent foci (abscesses, empyema) provides for the creation of conditions for the outflow of wound discharge into the external environment (in a bandage, special dishes with antiseptic solutions). A gauze swab is used as drainage in the treatment of wounds. Tampons of various sizes are prepared from a strip of gauze and loosely injected into the wound; due to its hygroscopicity, the tampon absorbs blood, exudate, pus. Its draining properties manifest themselves up to 8 hours, after which it can turn into a "plug" that clogs the wound and disrupts the outflow of exudate from it. To increase the draining properties of the dressing, tampons are moistened with a hypertonic (5-10%) sodium chloride solution. This contributes to the creation of high osmotic pressure, which leads to an increase in the outflow of fluid from the wound into the bandage. In addition to the usual tampon, Mikulich's tampon is used. A large gauze napkin with a thread sewn to its middle is inserted into the wound. The napkin is placed on the bottom and walls of the wound, forming a "bag", which is filled with gauze swabs. When the tampons are soaked with wound separable, they are removed, leaving a gauze cloth, and the formed cavity is filled with new tampons. Tampons are changed several times — until the outflow of purulent discharge stops, after which the napkin is also removed by pulling the thread.

Drainage can be performed using rubber, chlorvinyl and other tubes of different diameters, which are injected into the wound, the cavity of the abscess, the joint (with purulent arthritis), the pleura (with purulent pleurisy), into the abdominal cavity (with purulent peritonitis). The resulting pus, tissue decay products, and with them microorganisms are released into the dressing through one or more drains. The drainage can be connected by a tube to a vessel into which an antiseptic solution is poured; then the wound discharge will be released into the vessel, thereby reducing contamination of the dressing. Chemical antiseptics, antibiotics, and proteolytic enzymes are injected into the wound or purulent cavity through drainage. For more effective washing of wounds and purulent cavities in them (in addition to drainage for the outflow of wound discharge), another tube is inserted and an antibacterial drug solution is injected through it, together with which tissue decay products, pus, blood and fibrin are removed from the wound through drainage (Fig. 8). Thus, combining physical and chemical methods antiseptics, create conditions for flow-washing drainage. This method is also used in the treatment of purulent pleurisy and peritonitis. To increase the effectiveness of the method, proteolytic enzymes are used as a washing solution, which contribute to a faster melting of non-viable tissues, pus, fibrin (the method of flow enzymatic dialysis). If the drained cavity is sealed (a wound sewn with stitches, pleural empyema, purulent arthritis, an abscess cavity), active aspiration (vacuum drainage) is used. The vacuum in the system can be created using a Janet syringe, which removes air from a sealed jar with a drainage connected to it, or using a water jet suction or a three-tank system. This is the most effective method of drainage, it also helps to reduce the wound cavity, to close it more quickly and eliminate inflammation, and with pleural empyema — to straighten the lung compressed by exudate. Aseptic conditions in the wound can be created by placing the limb with the wound or the patient himself (with extensive burns) in a special chamber in which the using the installation, they create an abacterial environment. Laser radiation in the form of a low-power beam has a bactericidal effect and does not have a damaging effect on tissues. Mainly a carbon-acid laser is used, the focused beam of which has an evaporating effect on necrotic tissues and microorganisms. A very thin coagulation film forms on the walls and bottom of the wound, preventing the penetration of microorganisms and their toxins into the tissues. Laser radiation is used to treat wounds. Low frequency ultrasound has a bactericidal effect. In a liquid medium (wound,



closed cavity), ultrasound exhibits physical and chemical properties. In the environment exposed to ultrasound, the effect of cavitation is created - shock waves occur in the form of short pulses with the formation of cavitation bubbles. At the same time, under the influence of ultrasound, ionization of water occurs with the formation of  $H^+$  and  $OH^-$ , under the influence of which redox processes stop in the microbial cell. Ultrasound cavitation is used to treat wounds.




##### 5. Literature:

- Durmanov, K. D. General surgery: Textbook/ . - Kagandy: AKNUR, 2017. - 608 page. S
- Gostischev V.K. General surgery: textbook and CD.— 4th ed. – M., 2016. – 832 p.;

##### 6. Control questions (feedback)

1. What does the term "Antiseptics" mean?
2. Who is the founder of asepsis and antiseptics?
3. What types of antiseptics do you know?
4. List the classification of antiseptic drugs.
5. What are the methods of using antiseptic drugs.
6. Explain the rules for the use of types of antiseptics?

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## Lecture No. 2

### 1. Subject: Bleeding and hemostasis

2. Purpose: To consolidate and expand students' knowledge on bleeding and hemostasis. To teach to determine indications and contraindications to various types of bleeding and hemostasis. To teach to recognize the degree of bleeding and to provide timely assistance to the patient with various complications.

3. Lecture theses:

Bleeding is the outpouring of blood from the bloodstream into the external environment or internal organs. Normally, a person has about 4-5 liters of blood, of which 60% circulates through the vessels, and 40% is in the blood depot (liver, spleen, etc.). The loss of 1/3 of blood is life-threatening, but patients can die with less blood loss if it expires quickly. Men suffer blood loss worse, women are more adapted to blood loss.

There are internal and external bleeding. Depending on the type of damaged blood vessels, bleeding can be

- arterial,
- venous,
- capillary,
- parenchymal,
- mixed

Arterial bleeding is characterized by the release of blood from the wound by a pulsating jet. With venous bleeding, the blood is darker and is abundantly released from the wound in a continuous stream without a tendency to stop independently. A crossed vein can be seen in the wound. Capillary bleeding is observed in skin and muscle injuries. Blood is released less intensively than when a large vein is wounded, it tends to stop independently, the amount of blood pouring out depends on the size of the wound.

For a reason:

1. Post-traumatic - as a result of injury or wounds, including surgery;
2. Arrosive – due to the corroding of the vessel wall by a pathological process: stomach ulcer, decaying tumor, purulent melting of tissues and vessel walls;
3. Diapedesis – bleeding without damaging the integrity of the vessel walls — in blood diseases (hemophilia), vitamin deficiency (scurvy), etc.

By the nature of communication with the external environment: there are external, internal and latent bleeding.

1. External – blood flows directly into the external environment, so it is easy to diagnose.
2. Internal – the bleeding blood has no communication with the external environment. Varieties: bleeding in the body cavity and in the tissue.

In the body cavity:


- a) into the abdominal cavity – hemoperitoneum, most often with damage to parenchymal organs;
- b) into the pleural cavity – hemothorax, more often with rib fractures or stab wounds;
- c) into the joint cavity – hemarthrosis;
- d) into the cavity of the cardiac sac – hemopericardium, the accumulation of a significant amount of blood in the pericardial cavity causes compression of the heart — tamponade of the heart.

In the body tissue:

- a) hemorrhage – diffuse impregnation of tissues with blood;
- b) hematoma – accumulation of blood in the tissues with the formation of a cavity;

What are the clinical manifestations of acute blood loss?



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The victim with acute blood loss is pale, covered with cold sweat, usually sluggish, indifferent to the surroundings, speaks in a low voice, complains of dizziness and flashing "flies" or darkening before the eyes when lifting the head, asks for a drink, notes dry mouth. The pulse is frequent, low filling, blood pressure is lowered, and with a rapid outpouring of a large amount of blood, a picture of hemorrhagic shock with persistent hypotension develops.

#### Arterial bleeding

What are the basic principles of stopping external arterial bleeding?

The main urgent measure, often saving the life of the victim, is a temporary stop of external bleeding. Arterial bleeding from the vessels of the upper and lower extremities, as well as from the stumps of the limbs during traumatic amputations, is stopped in two stages: first, the artery is pressed above the injury site to the bone protrusion to stop blood flow to the injury site, and then a standard or improvised tourniquet is applied.

A note is placed under the tourniquet indicating the time of applying the tourniquet. The time of applying the tourniquet must be indicated in the accompanying sheet. Stopping external bleeding is the first priority of first aid. Arterial bleeding is a particular danger. Arteries are blood vessels that carry blood from the heart to the organs.

The most dangerous injuries are large arteries – femoral, brachial, carotid; in these cases, death can occur in a matter of minutes.

For example, Bleeding from the femoral artery can lead to the death of the victim within 1-2 minutes. Therefore, it is necessary to know and be able to apply the techniques of finger pressing of the arteries and the technique of applying an arterial tourniquet.

The figure shows the scheme of pressing the main arteries to temporarily stop bleeding. Pressing the artery with a finger or palm is carried out before applying an arterial tourniquet. It is very important that the tourniquet is applied only to the shoulder or hip

#### Signs of arterial bleeding:

Blood spills out of the wound in a pulsating stream.

The color of the blood is bright scarlet.

The pulsation of the blood coincides with the pulse rate.

The rules for pressing the artery during bleeding are as follows:

Press the artery above the wound (closer to the heart)

Press the artery with enough force to stop the bleeding.

Do not release the pressure before applying the tourniquet

For superficial arteries, it is enough to press it with your finger, for large arteries (femoral), use your palm or fist.

Application of a tourniquet in case of injury of large arteries:

Wrap the limb area with a towel (gauze) to the place of bleeding (more centrally).

Lift the injured limb.

Slightly stretch the tourniquet and make 2-3 turns around the limb.

Secure the ends of the harness with a hook and chain.

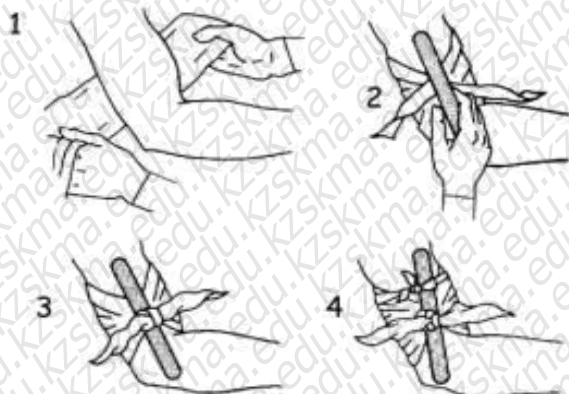
Tie the ends of the homemade harness (thick rope, cloth, belt).

Leave a note indicating the time of applying the tourniquet.

The tourniquet can be on the limb for no more than 2 hours!

Apply a sterile bandage to the wound.

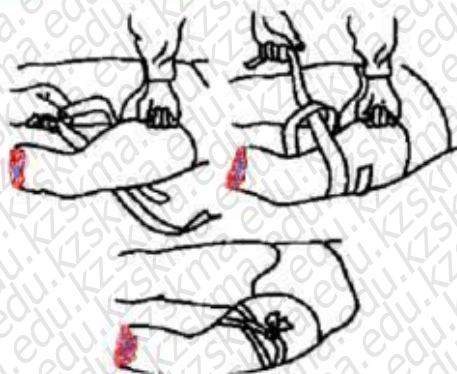
### Артериальное кровотечение.



For example, the figure shows the application of a harness made of auxiliary material.

1. wrap the overlying part of the limb with a layer of gauze.
2. Using a thick cloth (kerchief) and a stick, apply an improvised twist.
- 3.


### Артериальное кровотечение.



### Rotating the stick

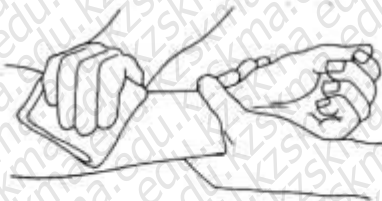
You can use a standard rubber harness. The technique of applying it is not difficult. For example, during amputation of the lower limb, without stopping squeezing the femoral vein with a fist, we hold a rubber turnstile under the thigh, make a loop, tighten it until the bleeding stops and tie a knot. If the tourniquet is applied correctly, the bleeding from the wound stops, the pulse on the radial artery or the back artery of the foot disappears, the distal parts of the limb turn pale. A note is placed under the tourniquet indicating the time of applying the tourniquet.



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### Артериальное кровотечение.

#### Давящая повязка для остановки кровотечения



Bleeding from small arteries on the forearm, on the hand, on the foot can be stopped by squeezing the vessels in the wound without applying a tourniquet. We put a clean napkin on the wound and, fully pressing it, hold it for 4-5 minutes. After that, we apply a pressure bandage. The tourniquet is used only in cases of extensive multiple wounds and fractures of the hand or foot. Wounds of the finger arteries are stopped by a tight pressure bandage. How is external arterial bleeding stopped in the area of the scalp, head, neck and trunk?


Arterial bleeding in the scalp (temporal artery), neck (carotid artery) and trunk (subclavian and iliac arteries) is stopped by tight tamponade of the wound. With tweezers or a clamp, the wound is tightly tamponed with napkins, on top of which you can put an unrolled bandage from a sterile package and wrap it as tightly as possible. If the artery is visible in the wound, then hemostatic clamps can be applied.

#### Venous bleeding

Signs of venous bleeding. If the blood is dark red and comes from the wound with a slow or weakly pulsating jet in time with breathing, your patient has venous bleeding. Bleeding from large veins (femoral, subclavian, jugular) is a danger to the patient's life as a result of rapid blood loss and the possibility of air embolism. Except in cases of traumatic damage to the veins, venous bleeding is possible with rupture of blood vessels in the nasal mucosa or varicose veins of the lower extremities. Nosebleeds caused by taking aspirin, increased blood pressure, may not stop for a long time and require hospitalization of the patient. First aid for any venous bleeding involves applying a pressure bandage, cold and elevated position.

Help with venous bleeding. Applying a pressure bandage and exposure to cold. A pressure bandage is applied below the wound, as venous blood rises from the peripheral vessels to the heart. Such a pressure bandage consists of several sterile gauze napkins or an unwound bandage, on which a tourniquet or elastic bandage is applied. The correctness of the application of a venous tourniquet is indicated by the stop of bleeding, but the preservation of pulsation below the place of pressing. On top of the bandage in the projection to the source of bleeding, it is good to put an ice bubble or a hot water bottle filled with cold water. Do not forget that after 30-40 minutes the cold must be removed for 10 minutes to restore the general blood flow in this area.

If bleeding occurs from a limb, it should be given an elevated position. In case of nosebleed, the wing of the nose is pressed against its septum, it is good to pre-insert a ball of cotton wool soaked with 3% hydrogen peroxide into the nasal passage. Cold is applied to the area of the bridge of the nose or the back of the head for 3-4 minutes with breaks of 3-4 minutes until the bleeding stops. It is not necessary to throw back the head, because the blood will flow down the back wall of the pharynx.

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Signs of capillary bleeding. The slow outflow of blood from the entire surface of the wound is an indicator of capillary bleeding. For all the apparent harmlessness of such a wound, stopping such bleeding is very difficult if the patient suffers from poor blood clotting (hemophilia).

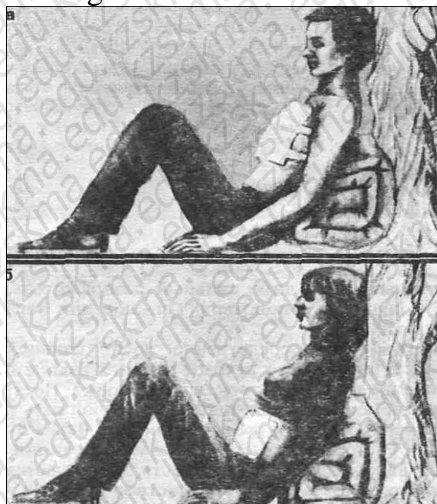


Help with capillary bleeding. Applying a pressure bandage. If there is a hemostatic sponge in your first aid kit, it should be applied to the wound, then make a pressure bandage. If there is no such sponge, then several layers of gauze napkins are applied to the wound, which are fixed with a pressure bandage. In any case, if the wound is on a limb, it should be given an elevated position and provide peace and cold (an ice bubble).

Parenchymal bleeding (internal), internal bleeding is the cause of emergency hospitalization. If internal bleeding is suspected, it is necessary to call an ambulance as soon as possible and provide first aid before her arrival. Possible internal bleeding can be determined by the following signs


- pallor of the skin
- fatigue, drowsiness, weakness
- cough with blood clots or scarlet foamy sputum with pulmonary bleeding
- vomiting of "coffee grounds" or dark tar-like stools with gastric bleeding
- cold sweat
- decreased blood pressure and increased heart rate

The algorithm of first aid should be something like this



- the patient must observe complete rest.
- ensure fresh air access as much as possible



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- if, with the help of localization of pain or other symptoms, it is possible to assume the place of bleeding, then it is necessary to attach an ice bubble to the affected area. At home, ice, frozen meat and other frozen foods put in a plastic bag and wrapped with a towel will do.
- if possible- administration of hemostatic drugs (calcium chloride, vikasol, epsilon-aminocaproic acid, hemoglobin)

The cause of pulmonary bleeding may be trauma or lung disease (tuberculosis, abscess, tumor lesion, etc.) and heart disease (mitral heart disease). It is characterized by coughing up foamed blood, blood-stained sputum, shortness of breath, shortness of breath. With severe bleeding, blood coughs up clots, there are signs of acute blood loss: pronounced pallor, dizziness, decreased blood pressure. The victim is given a semi-sitting position, a roller is placed under the back for support, the chest is released (the collar, the trouser belt are unbuttoned, a cold compress is applied to the chest, fresh air is provided). The patient is forbidden to speak, move, cough. They will urgently arrange for sending to a medical institution.

Intra-thoracic bleeding is a consequence of injury to the chest and damage to internal organs: the heart, large vessels, lungs. Bleeding into the pleural cavity can be massive, as a rule, it does not stop spontaneously. The increasing accumulation of blood in the pleural cavity limits the expansion of the lung, which contributes to the development of respiratory failure. Ruptures of the lung are accompanied by symptoms of pulmonary bleeding, the ingress of large amounts of blood into the respiratory tract leads to asphyxia, manifested by increased breathing, bluish color of the skin and mucous membranes. The rapid increase in threatening symptoms requires rapid transportation of the victim to a medical institution for surgical care. The patient is given a semi-sitting position with bent lower limbs, an ice bubble is applied to the chest, the shirt collar and trouser belt are unbuttoned, restraining breathing movements, and free fresh air is provided. Peptic ulcer, stomach cancer, other diseases or injuries are complicated by bleeding into the lumen of the gastrointestinal tract.

Symptoms of such bleeding are coffee grounds-colored vomiting, tar-like feces, common signs of acute anemia: pallor, tachycardia, decreased blood pressure, weakness, loss of consciousness. The patient is provided with complete rest and a horizontal position. An ice bubble is placed on the epigastric region, small pieces of ice can be swallowed. Transportation to the hospital is carried out on a stretcher in the prone position.

Intra—abdominal bleeding occurs as a result of abdominal trauma with damage to internal organs - this is the most common cause of intra-abdominal bleeding. In women, intra-abdominal bleeding often accompanies a disturbed tubal pregnancy. Intra-abdominal bleeding is characterized by large blood loss (up to 2-3 liters), the inability to stop spontaneously, the threat of peritonitis. They proceed heavily, with the phenomena of acute anemia, collapse. The only way to save the victim is an immediate operation aimed at finally stopping the bleeding. The patient is forbidden to drink and eat, transported in a lying position with a cold compress or an ice bubble on his stomach and accompanied by a person providing assistance. During the delivery of the victim with bleeding to a medical institution, the accompanying person monitors the patient's condition, the presence of consciousness, appearance, periodically registers the pulse, if possible, blood pressure. The life of the victim ultimately depends on the timeliness and correctness of the provision of pre-medical care for any type of bleeding. The outcome of bleeding is largely due to therapeutic measures carried out at the hospital stage, which are aimed at normalizing pathophysiological abnormalities caused by blood loss.

#### 4. Illustrative material:

## Кровотечение.

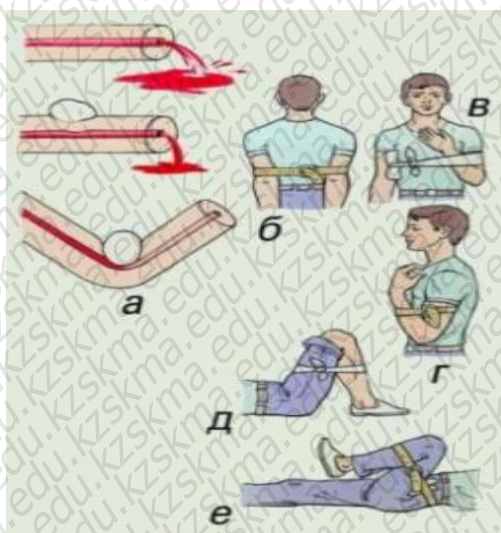
Места прижатия  
артерий для  
временной  
остановки  
артериального  
кровотечения.



## Артериальное кровотечение.

Прижимайте артерию выше раны (ближе к сердцу)

Прижимайте поверхностную артерию пальцем  
крупную (бедренную) ладонью или кулаком



### 5. Literature:

- Durmanov, K. D. General surgery: Textbook/ . - Kagandy: AKNUR, 2017. - 608 page. S
- Gostischev V.K. General surgery: textbook and CD.— 4th ed. – М., 2016. – 832 p.;

### 6. Control questions (feedback)





1. The concept of bleeding
2. What is a hematoma and hemorrhage
3. Classification of bleeding
4. Common symptoms of bleeding
5. Local symptoms of bleeding
6. Hemothorax; concept, clinic, treatment
7. Hemoperitoneum: concept, clinic, treatment
8. Hemopericardium: Hemokrainium: concept, clinic, treatment
9. The dangers and outcomes of bleeding. Temporary stop of bleeding
10. Applying a pressure bandage. Finger pressure. Applying a tourniquet
11. The final stop of bleeding. Mechanical, thermal, biological, chemical methods of stopping bleeding.
12. Acute and chronic anemia
13. Compensatory reactions of the body during bleeding
14. Normal indicators of the general blood test

### Lecture No. 3

#### 1. Subject: General issues of anesthesiology.

2. Purpose: To consolidate and expand students' knowledge on general issues of anesthesiology. To teach to identify indications and contraindications to various types of anesthesia, to individually select the type of anesthesia and anesthetic drug. Properly conduct premedication. To teach to recognize the degree of anesthesia and timely provide the patient with intensive care for various complications.

#### 3. Lecture theses:

General issues of anesthesiology.

Anesthesiology is the science of anesthesia and methods of protecting the patient's body from the extreme effects of surgical trauma.. October 16, 1846 is considered the official date of birth of modern anesthesiology – American William Thomas Morton used ether anesthesia when removing a tumor of the submandibular region. In 1844, Wales used nitrous oxide. In 1844 – amputation of the hip by means of sulfur ether by Chistovich. In 1847 – J. Jung Simpson applied chloroform anesthesia, which is currently not used, due to the high toxicity of the drug. In Russia, anesthesia was used by Inozemtsev on February 7, 1847. For the first time intravenous anesthesia was applied – hedonal, which was synthesized. Since 1942, curare-like substances have been synthesized, endotracheal anesthesia with a ventilator appeared.


Local anesthesia.

Anesthesiology is the science of anesthesia and methods of protecting the patient's body from the extreme effects of surgical trauma. Local anesthesia is the anesthesia of certain areas of the body against the background of preserved consciousness. About 50% of operations are performed under local anesthesia.

Indications:

It does not require special long-term preoperative preparation. With contraindications to general anesthesia. The patient does not need constant postoperative supervision. Outpatient operations. Elderly and senile persons, emaciated, suffering from respiratory and cardiovascular insufficiency.

Contraindications:

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Intolerance to anesthetic, due to hypersensitivity. age less than 10 years. The presence of mental disorders in the patient, increased nervous excitability. The presence of inflammatory or scarring changes in the tissues. Ongoing internal bleeding.

Methods of local anesthesia:

Infiltration anesthesia according to Vishnevsky. The method is based on the features of the structure of fascial formations. Tight novocaine infiltrates move along the cases and merge with each other, hydraulic tissue preparation is carried out. 0.25% ratsvor of novocaine with the addition of adrenaline is used (3 drops of ratsvor per 100 ml of novocaine solution). Regional anesthesia – conduction, intravascular, intraosseous, spinal, epidural, etc.

Conduction anesthesia, there are the following types: anesthesia of nerve trunks, anesthesia of nerve plexuses, anesthesia of nerve nodes, spinal and epidural anesthesia. The anesthetic is administered peri - or endoneurally.

Conduction anesthesia of the finger according to Oberst – Lukashevich. A rubber tourniquet is applied to the base of the finger, distally, on the back surface of the main phalanx, the skin and subcutaneous tissue are anesthetized, the needle is pushed to the bone and 2-3 ml of 1-2% novocaine solution is injected, the other side is anesthetized in the same way.

Intercostal anesthesia – for rib fractures. Retreating a few cm from the fracture to the spine. The needle is inserted perpendicular to the broken rib, until it stops, then, pulling the needle by 2-3 mm, it is pushed to the lower edge of the rib, sliding along its surface and 3-5 ml of 1-2% novocaine solution is injected.

Novocaine blockades. Circular blockage of the shoulder. On the anterior surface of the middle third of the shoulder with the elbow joint bent, the skin, the fascia of the shoulder, the biceps of the shoulder are pierced with a needle. They reach the humerus, pulling the needle, inject 50-60 ml of 0.25% novocaine solution, the fir of the straightened limb is injected with 50-60 ml of 0.25% novocaine solution.

Circular block of the forearm. In the middle third of the forearm, in the same way. 60-80 ml of 0.25% novocaine solution is injected.


Circular blockade of the hip. Insertion of a needle in the middle third of the thigh along the front surface. They pass to the bone, and slightly pulling back, 150 – 180 ml of 0.25% novocaine solution is injected.

Retromammary blockade. During operations on the mammary gland. At 3-4 points at the lower and upper poles from the outer surface of the breast. 50 ml of 0.25% novocaine solution is injected through each needle injection.

Cervical vagosympathetic blockade. For the prevention of pleuropulmonary shock, in case of chest injury. The patient lies on his back with a roller under his neck, the head is turned in the opposite direction, the arm on the side of the blockade is strongly pulled down. At the posterior edge of the sternoclavicular-mastoid muscle at a level above the intersection with the external jugular vein. They push the anterior and thoracic-clavicular-mastoid muscle, pierce the skin with a needle, push the needle up and inside, focusing on the anterior surface of the spine. 40-50 ml of 0.25% novocaine solution is injected. A sign of properly performed anesthesia is the appearance of a Gorner's symptom (pupil dilation) on the side of the blockade performed.

Paranephral blockade. The patient lies on his healthy side with a roller under the lower back. The leg located on top is stretched out, bent at the knee joint from below. The injection point, the angle formed by the XII rib and the long back muscle along the bisector by 1 – 1.5 cm downwards. The needle is injected perpendicular to the surface of the body and is promoted, with a sense of failure, the needle has entered the paranephral space. The piston is pulled back on itself, make sure there is no blood, 60-80 ml of 0.25% novocaine solution is injected.



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**Intraosseous anesthesia.** The limb is isolated from the general blood flow by applying a cuff, an elastic bandage. The anesthetic is injected on the upper limb into the condyles of the shoulder, the ulnar process, the bones of the hand; on the lower limb – into the condyles of the thigh, ankle, heel bone.

**Spinal anesthesia.** Introduction of an anesthetic into the subarachnoid space. The patient is seated across the table, the knees should be raised. Puncture is performed between the spinous processes L III and L IV or L II and L III. The landmark is the process L IV, located on the line of intersection of the connecting posterior spine of the iliac bones. the needle is inserted between the spinous processes with a slight downward slope of 5 –10°. when the ligaments are punctured, there is a feeling of failure, and when the duramater is punctured, rotational movements. The appearance of cerebral fluid is the correct anesthesia. Enter 1 ml of 5% novocaine or 0.5 – 0.8 ml of 1% sovcaïne solution.

**General anesthesia.**

General anesthesia or anesthesia is a condition characterized by a temporary shutdown of consciousness, pain sensitivity, reflexes and relaxation of skeletal muscles caused by the effects of narcotic substances on the central nervous system.

Stages of ether anesthesia, there are 4 stages: I – analgesia, II – arousal, III – surgical stage, IV – awakening.

Stage of analgesia (I) – the patient is conscious, but inhibited. There is no superficial pain sensitivity.

Stage of arousal (II) – inhibition of the centers of the cerebral cortex, consciousness is absent pronounced motor and speech arousal. The pupil is wide and does not react to light, cough often appears, vomiting may occur. Lasts 7-15 minutes.

Surgical stage (III) – depending on the depth of anesthesia, there are 4 levels of stage III anesthesia.

Level 1 – the patient is calm, breathing is even, the pupil is narrowed, the reaction to light is preserved. Muscle tone is preserved.

Level 2 – the movement of the eyeballs stops. Pupils dilate, breathing is calm, even. Decrease in muscle tone – perform abdominal operations.

Level 3 – deep anesthesia. Pupils are dilated, I react only to a strong stimulus. Complete relaxation of skeletal muscles. Shallow breathing, sinking of the tongue root, blood pressure is reduced. It is dangerous for the patient's life.

Level 4 – maximum pupil dilation, the cornea is dull, dry. Pulse is ready, frequent, paralysis of intercostal muscles. Respiratory and circulatory arrest may occur.

Stage of awakening (IV) – occurs with the cessation of the anesthetic substance. To suppress the function of the vagus nerve, premedication is performed, 40 minutes before surgery – 1 ml of 1-2% Solution a promedol, or 1 ml of pentozocin and 2 ml of fentanyl.

**Intravenous anesthesia.**

Advantages – quick introduction to anesthesia. Short-term anesthesia.

Derivatives of barbituric acid – thiopental – sodium, hexenal. The duration of anesthesia is maintained by fractional administration of 100-200 mg of the drug, the total dose of the drug should not exceed 1000 mg.

Viadril is used at a dose of 15 mg / kg, the total dose is 1000 mg on average. It is more often used together with nitrous oxide. Viadrilis used for introductory anesthesia, for endoscopic examinations.

Propanidide – 10 ml of 5% solution. IV, quickly 500 mg in 30 s., duration of anesthesia snsa 5-6 min. Causes hypotension, is used for introductory anesthesia, for small operations.

Sodium oxybutyrate – in / in, slowly. The dose is 100 – 150 mg / kg. Causes superficial anesthesia, is used for introductory anesthesia. Ketamine – i / v, I / m, a dose of 2-5 mg / kg. Contraindicated in patients with hypertension. It is used in the form of mononarcosis and introductory anesthesia.

Diprivan is a short-acting intravenous anesthesia. Ampoules of 20 ml of 1% Solution. The duration of anesthesia is 5-7 minutes. It is used for introductory anesthesia.

Inhalation anesthesia.

Ether for anesthesia – oxidized under the influence of light, explosive. A strong narcotic substance, causes deep anesthesia. Reduces the functional ability of the liver.

#### 4. Illustrative material:








##### 5. Literature:

- Durmanov, K. D. General surgery: Textbook/ . - Kagandy: AKNUR, 2017. - 608 page . S
- Gostichev V.K. General surgery: textbook and CD.— 4th ed. – M., 2016. – 832 p.;

##### 6. Control questions (feedback)

1. Who and in what year first discovered anesthesia?
2. What types of anesthesia do you know?
3. What advantages and disadvantages of the local type of anesthesia do you know?
4. What indications and contraindications to anesthesia do you know?
5. How and when is premedication performed?



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## Lecture No. 5

### 1. Subject: Closed and open mechanical damages.

2. Purpose: Development and strengthening of knowledge in general traumatology. To teach to distinguish between different injuries by clinical manifestations. Training in the correct diagnosis and trial diagnosis of various types of injuries. Training in first aid for various open and closed injuries and their complications, the use of modern complex methods of treatment. First aid training for various injuries, the application of a transport bandage, dressing, carrying. Familiarization with the peculiarities of caring for patients with various injuries.

### 3. Lecture theses:

Traumatology — the science of injuries Trauma is the impact on the body of an external factor that causes anatomical and functional disorders in tissues and organs, which are accompanied by a local and general reaction. Traumatism is a set of injuries affecting, under certain circumstances, the same groups of the population. Injuries are divided into industrial and non-industrial. This division has important social and legal significance. In case of an industrial injury, the company fully pays the costs of treating the victim, from the first day a disability certificate is issued to the victim with 100% payment, if necessary, a special pension and compensation. In Russia, a work injury is considered to be an injury received at the workplace during the performance of official duties, as well as on the way to work and home. In case of non-work injury, a disability certificate is issued from the sixth day and it is paid in accordance with the rules adopted in the industry: work experience, position, etc. Depending on the type of activity in which the injury was sustained, agricultural, industrial, transport, street, sports, school, military, household and intentional injuries are distinguished. In recent years, there has been a tendency for injuries to take second place in the overall mortality structure. Traumatism ranks 3rd among the causes of disability. In Russia, about half of the cases are domestic injuries, transport — about 40%, production — 5-6%.

### Organization of trauma care.

The provision of trauma care consists of the following links: first aid, outpatient inpatient treatment, rehabilitation. The provision of first aid is carried out by a doctor, secondary medical personnel or other people in the order of self- and mutual assistance. In this case, the role of sanitary and educational work among the population is important. Everyone should have the skills to provide medical care, especially representatives of the police, fire service, military personnel, drivers of vehicles. When providing first aid at the scene, it is necessary to carry out transport immobilization, anesthesia, apply a bandage, stop bleeding and perform basic cardiopulmonary resuscitation. To provide qualified medical care, the victim is taken to a medical institution. When transporting the victim, it is necessary to properly lay him down and quickly deliver him to the emergency room or trauma department.


Outpatient treatment of a traumatological patient is performed in specialized trauma centers. X-ray examination, primary surgical treatment of wounds, the application of conventional and plaster dressings, as well as comprehensive treatment and follow-up of victims after discharge from the hospital are carried out here.

Inpatient treatment of traumatological patients is carried out in specialized departments of city and district hospitals, in clinics at the departments of Traumatology and Orthopedics of medical universities, in the Research Institute of Traumatology and Orthopedics. Rehabilitation of the victim plays an important role.

Rehabilitation is carried out in trauma hospitals, trauma centers, polyclinics at the place of residence of patients, special rehabilitation centers and sanatoriums, where the restoration of lost functions is carried out.

### Classification of damages.



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Damages are divided into single and multiple, closed and open. Injuries of the musculoskeletal system, combined with damage to internal organs, are called combined trauma. With a combination of various injuries (fractures, burns, concussion, etc.), they speak of a combined injury. Closed soft tissue injuries include: bruising, stretching, tissue rupture, concussion, prolonged compression syndrome. Dislocations and fractures of bones can be closed and open.

**Bruise.** A bruise is a closed mechanical damage to soft tissues and organs without a visible violation of their anatomical integrity. Bruises can be an independent injury or accompany other more severe injuries. The cause of the injury may be a fall from a small height or a slight impact. Bruises can be superficial and internal organs. The main clinical manifestations of bruising are pain, swelling of soft tissues, hematoma and dysfunction of the damaged organ. The pain occurs immediately at the moment of injury, then subsides a little. The swelling usually remains limited and painful. The size of the hematoma depends on the depth of the injury. Violation of the function of the damaged organ with a bruise usually does not occur immediately, but as the swelling and hematoma increase. The patient complains about the restriction of active movements associated with pain syndrome. Passive movements are usually preserved. When providing first aid, it is necessary to apply a pressure bandage and cold. Treatment is carried out on an outpatient basis. On the first day, to reduce the swelling of soft tissues and hematoma, cold is applied or the place of injury is treated with chloroethyl. An immobilization soft bandage is applied to the joint area. To reduce the hematoma, a pressure bandage can be applied. To reduce edema, an elevated position of the limb and troxevasin ointment are used. After 4 reduction of edema and hematoma (2-3 days), thermal procedures are applied: dry heat, ultraviolet radiation, UHF therapy.

**Stretching.** Stretching is called tissue damage with partial tears while maintaining anatomical integrity. Stretching usually occurs with sudden or sudden movement. Ligaments and tendons are more often damaged, but muscles, fascia, nerves can also be damaged. The clinical picture of stretching resembles a bruise, but all the symptoms are most pronounced. When providing first aid, it is necessary to apply an immobilization bandage and cold. Treatment is carried out on an outpatient basis: rest for the limb, cold with subsequent thermal procedures.

#### Gap

A rupture is a closed damage to tissues or an organ with a violation of their anatomical integrity. Strong stretching of the tissues can cause them to rupture. Ligaments, tendons, muscles, fascia, nerves are usually damaged. **Ligament rupture.** Ligament rupture can be either an independent injury, or in combination with a dislocation or fracture of bones. The ligaments of the ankle and knee joints are most often damaged. At the same time, there is severe pain, swelling of soft tissues, hem arthrosis and restriction of joint function. Hem arthrosis (the presence of blood in the joint) is determined by the symptom of balloting in the joint or by radiography (expansion of the joint gap). When providing first aid, it is necessary to apply a transport tire and cold, to carry out anesthesia. Treatment consists in applying a plaster splint for 2-3 weeks, followed by a gradual restoration of the load on the joint with the help of physical therapy, physiotherapy is also necessary. In case of hem arthrosis, joint punctures are performed. Sometimes, when ligaments are torn, surgical treatment is performed.

**Muscle rupture.** The rupture of the muscle can be with a rapid strong contraction or a strong blow to the contracted muscle. When damaged, severe pain appears, an increasing hematoma, swelling of soft tissues, loss of muscle function, a defect (gap) in the muscle is palpated. When providing medical care, it is necessary to apply a pressure bandage, cold, immobilization splint, anesthetize in one of the ways. Treatment is carried out in the traumatology department of the hospital. In case of incomplete rupture, observation, cold at the site of damage, the application of a plaster splint for 2 weeks. From 3-4 days physiotherapy procedures are shown, after removing the plaster splint — physical therapy. In case of a complete rupture of the muscles, surgical treatment (stitching of the muscles), the



application of a plaster cast for 2-3 weeks. After removing the plaster — physiotherapy and physical therapy.

Tendon rupture. The most common is the rupture of the tendons of the extensors of the fingers of the hand, the Achilles tendon, the long head of the biceps muscle of the shoulder. When a tendon is torn, pain appears, swelling of soft tissues, loss of function of the corresponding muscle (flexor or extensor) while maintaining passive movements. With first aid, immobilization with a tire is carried out, anesthesia is applied, cold is applied. Treatment of tendon ruptures is operative: suturing the tendon and applying a plaster cast for 2-3 weeks, followed by physiotherapy treatment.

Rupture of fascia. When the fascia ruptures, pain, swelling of soft tissues, palpable muscle hernia appear. 6 When providing first aid, it is necessary to apply a pressure bandage, cold, immobilization splint. Treatment of fascia rupture is only operative: suturing of the fascia, observance of rest and physiotherapy.



## 5. Literature:

- Durmanov, K. D. General surgery: Textbook/ . - Kagandy: AKNUR, 2017. – 608 page. S
- Gostischev V.K. General Surgery: textbook and CD.– 4th ed. – M., 2016. – 832 p.;

## 6. Control questions (feedback)

1. What types of injuries do you know?
2. what special signs of various injuries do you know?
3. What types of immobilization do you know?
4. What complex measures are advisable to perform with double injuries?
5. What is the danger of timely medical care for various injuries?