MINISTRY OF HEALTH OF UKRAINE
ODESA NATIONAL MEDICAL UNIVERSITY

Faculty of Medicine No. 1

Department of simulation medical technologies

CONFIRMED by
Vice-rector for scientific and pedagogical work

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September 1, 2023

METHODICAL RECOMENDATION FOR PRACTICE

«SIMULATION MEDICINE»

Faculty, course: International, 6 year

Educational Discipline: Simulation medicine

Approved:

The methodical recommendation was approved at the meeting of the department of simulation medical technologies

Protocol No. 1 of 28.08.2023

Head of the department _____ Oleksandr ROGACHEVSKYI

(signature)

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PRACTICAL TRAINING

Practical classes No. 11 — 14

Topic: Practical skills in surgery. Simulation training .

Purpose: To form, master and practice the practical skills of performing surgical manipulations .

To learn the ability to independently use knowledge and skills when performing surgical manipulations .

C to form a clear idea of the sequence of actions in the algorithm of performing surgical manipulations .

To form the competence of professional communication in the team when performing surgical manipulations .

Basic concepts: primary surgical treatment of wounds, pleurocentesis, laparocentesis, cricothyroidotomy, pericardiocentesis.

Equipment: BOSS, Ultrasound Pleurocentesis Model, Ultrasound Laparocentesis Model, TraumaMan, latex gloves, medical masks, medical trays, medical masks, latex gloves, forceps, Hegar needle holder , suture material, cutting needles, pins, syringe and needle, grooved probe, probe button, anatomical tweezers, abdominal scalpel, sharp scalpel, Cooper's scissors, straight sharp surgical scissors, Kocher's hemostatic clamps, Billroth's hemostatic clamps, "Mosquito" type clamp, Farabef hooks, three-pronged hooks, decompression needles, anesthetic solutions, antiseptic solutions, puncture needles, trocar, ultrasound.

Plan:

1. Organizational activities (greetings, verification of those present, announcement of the topic, purpose of the lesson, motivation of higher education seekers to study the topic).
1. Control of the reference level of knowledge (frontal survey) :

requirements for students' theoretical readiness to perform practical classes (concepts , indications, contraindications, technique , algorithm and complications of surgical manipulations);

questions (clinical situations) to check basic knowledge on the subject of the lesson:

For the following conditions of patients (Convulsions, Anaphylaxis, Diabetic coma, BA attack) know:

1. Differential diagnosis.
2. Examination.
3. Making a preliminary diagnosis.
4. Providing emergency care according to protocols.
5. Adherence to the algorithm of actions.

1. Formation of professional skills and abilities:

- mastering skills:

1. Quick recognition of an emergency in a patient.
2. Be able to quickly give and receive commands to medical personnel depending on the critical situation (teamwork).
3. To be able to quickly carry out a differential diagnosis of an emergency.
4. Examination (physical methods, measurement of blood pressure, blood pressure, heart rate, SpO2, thermometry, capnometry-graphy, glucometry, peak flowmetry, plan laboratory and instrumental studies).
5. Determination of the treatment scheme based on theoretical knowledge of protocols obtained at previous departments.
6. Assistance (introduction of IV injections and a catheter, oxygen supply, use of a functional bed, ECG recording and interpretation).
7. Communication skills with staff and relatives in an emergency patient situation.

- task content:
  For each topic nosology:
  1. Briefing.
  2. Conducting a clinical simulation scenario.
  3. Debriefing.

- recommendations (instructions) for performing tasks:
  1. It is mandatory to have theoretical knowledge on the topic obtained while attending classes at previous departments.
  2. Acquaintance with the methodical recommendations of the department before the class.
  3. Completion of the elective course of the department of simulation medical technologies "Professional communication skills in extreme situations".

- requirements for work results and control materials for the final stage of the lesson:
  Passing a clinical scenario with a positive result for a simulated patient.

Causes and signs of wounds, classification

A wound it is customary to call any mechanical damage accompanied by a violation of the integrity of covering tissues - skin and covering membranes. In the general sense, a wound is an open mechanical injury.

A gunshot wound **is** damage to tissues and organs with a violation of the integrity of their covering (skin, mucous or serous membrane), which is caused by a firearm and is characterized by a zone of primary necrosis and changes that lead to the formation of foci of secondary necrosis in the surrounding tissues, as well as inevitable primary microbial contamination , which significantly increases the risk of infection in the wound.

Modern gunshot wounds are very diverse in appearance and complexity of morphological structure. At the same time, these wounds have general features that are characteristic only of gunshot wounds.

Classification of wounds:

depending on the type of projectile :

a) spherical; b) fragmentary; c) not timesheets; d) secondary projectiles; e) mines and explosives.

according to the nature of the wound channel:

a) blind; b) through; c) tangents; d) ricochet.

according to the volume of the lesion:

a) isolated; b) combined; c) combined.

by the number of shells:

a) single; b) multiple.

by penetration into body cavities:

a) penetrating; b) non-penetrating.

by nature of damage:

a) only soft tissues; b) internal organs; c) blood vessels; d) nerves; e) bones; f) nerve plexuses.

with aggravating consequences:

a) massive bleeding; b) acute regional tissue ischemia; c) damage to vital organs, anatomical structures; d) damage to bones and joints; e) traumatic shock.

according to the clinical course of the wound process:

a) complicated; b) uncomplicated.

According to the appearance, gunshot wounds are divided into point, torn and torn-crushed. Currently, the classification of phases of the wound process according to M.I. Cousins The first phase is the inflammatory phase (1-5 days). It distinguishes the period of vascular changes and the period of cleaning the wound from necrotic tissues. The second phase is the regeneration phase (6-

14 days). The third phase is the phase of formation and reorganization of the scar and epithelization (from the 15th day)

There are three classic types of wound healing. Types of wound healing:

4. Healing by primary tension;
5. Healing by secondary tension;
6. Healing under the scab.

Clinical signs of the wound:

1. Pain that depends on the localization of the wound, damage to the nerve trunks, the nature of the traumatic agent, the neuropsychological state of the patient's body;
2. Bleeding - which is determined by the nature and diameter of the damaged vessels, the nature of the traumatic factor. the state of hemodynamics and the coagulation system of the body;
3. Gaping of the wound due to the reduction of elastic fibers of the skin (Langer's lines);

A gunshot wound has a complex morphological structure. In it, it is customary to distinguish three zones: *the first* is the zone of the wound channel, which is a tissue defect formed as a result of the direct impact of the projectile; *the second* is the zone of contusion or primary traumatic necrosis. These are the walls of the wound channel in the form of an uneven layer of tissue, deadened as a result of the side impact of the projectile *; the third* is a zone of shock (molecular shock), or a zone of secondary necrosis.

The last two zones arise as a result of the lateral impact of the projectile in the process of forming a temporary pulsating cavity. As a rule, necrosis outside the wound channel occurs on the third or fourth day.

Burn wounds always have microbial contamination. The composition of microbes depends on many reasons: the nature and localization of the wound. the presence of foreign bodies in the wounds, the degree of contamination of the skin and clothing. A distinction is made between primary and secondary microbial contamination. *Primary* microbial contamination occurs at the time of wounding as a result of the introduction into the wound along with the projectile and foreign bodies (pieces of clothing, equipment, soil) of a wide variety of microbes from the environment. *Secondary* microbial contamination can occur with late care, if the wound remains open for a long time and is additionally contaminated with dust, as a result of inept care or violation of the rules of asepsis and antiseptics during dressings and operations.

Causes and symptoms of penetrating and non-penetrating wounds skull, chest, abdomen.

Penetrating wounds are wounds that penetrate into body cavities (abdominal cavity, chest cavity, etc.), which are accompanied by a violation of the integrity of the parietal peritoneum and the parietal sheet of the sternum pleura, as well as into other cavities.

Non-penetrating wounds are wounds where the peritoneum, parietal pleura and other cavities of the human body are not damaged.

They can be classified as:

1. Non-penetrating:

a) with damage to the organs of the abdomen, pelvis, chest, skull;
b) with retroperitoneal damage to the intestines, kidneys, ureters and bladder;
c) with damage to the heart and lungs;

2. Penetrating:

a) actually penetrating:

- without damage to abdominal organs, chest;
- with damage to hollow organs;
- with damage to parenchymal organs;
- with combined damage to cavity and parenchymal organs;

b) thoraco - abdominal;
c) which are accompanied by injury to the spine and spinal cord;

Trauma to the abdomen and organs of the abdominal cavity is a relatively small group in war. During the Second World War, the frequency of injuries ranged from 1.9 to 5%, in the structure of sanitary losses of modern wars, the rate of penetrating gunshot wounds to the abdomen increased to 5-9%. The mortality rate for penetrating gunshot wounds to the abdomen during World War II reached 63%.

Features of gunshot damage

- internal organs can be damaged not only by the direct impact of the projectile, but also by the force of impact from the side;
- it is not always possible to accurately determine the limits of viability of tissues of damaged organs due to the presence of a zone of repeated necrosis (molecular shock);
- multiple ruptures and destruction of hollow organs under the action of hydrodynamic impact are possible, especially in cases where these organs are filled with liquid (bladder, stomach);
- the number of injuries, the complexity of the trajectory of the wound channel, associated with the use of projectiles with a shifted center of gravity, cause the difficulty of intraoperative diagnosis of gunshot injuries to the internal organs of the abdomen;
- large areas of primary tissue necrosis and collapse of regional blood flow and microcirculation in the wound area, which causes a large number of purulent-septic complications in the wounded. 2/3 of the wounded have damage to 2 or more abdominal organs.

Symptoms of non-penetrating wounds depend on the nature and extent of damage. Symptoms of peritoneum irritation are possible with wounds that penetrate the peritoneum and are accompanied by the formation of a hematoma in the periperitoneal tissue. which often makes one suspect damage to internal organs.

It should be remembered that with non-penetrating injuries as a result of a side impact with a wounding projectile, the internal organs of the abdominal cavity may be damaged. Non-penetrating wounds of retroperitoneal organs (kidney, pancreas) are accompanied by shock and blood loss.

Progressive expansion of the wound with a careful examination of the direction of the wound canal is one of the techniques that allow establishing the nature of the injury. If a wound is found in the peritoneum, proceed to laparotomy and revision of the abdominal organs.

The absolute symptoms of a penetrating wound include the loss of the omentum or intestinal loops into the wound or the appearance of intestinal contents in the wound, bilious urine.

Symptoms:

1. Abdominal pain;
2. Vomit;
3. Thirst, dry mouth, dry tongue.
4. Change in the nature of external breathing (becomes more frequent);
5. Acceleration of the pulse.
6. tension of the abdominal wall.
7. Soreness during palpation.
8. Shttkin-Blumberg symptom.

Head and eye injuries: signs, provision of first aid in combat (in the shelter and evacuation sector) and non-combat conditions

Traumatic injuries to the skull and brain, during the anti-terrorist operation in the east of Ukraine, account for 38.5% of all injuries and occupy one of the first places in terms of lethality and disability among military personnel. Correct provision of first aid for head injuries will prevent the occurrence of complications, significantly speed up the rehabilitation of such injured persons and reduce disability.

Head injury - any damage to the head area.

Causes of head injuries.

traffic accidents; falling from a height; fire damage; explosive damage.

Classification of head injuries

1. Open injuries:

- bruises, bruises, wounds, subcutaneous hemorrhages;
- bone fractures;
- fractures of the cerebral part of the skull;
- fractures of the bones of the facial part of the skull.

Open injuries are more common in combat settings than civilian injuries.

2. Closed injuries:

- skull base fracture;
- Concussion;
- intracranial hemorrhage.

Closed injuries are common in military operations. Blast injuries are often self-contained.

3. Scalped.

Scalp injuries can be closed (contusion) or open (puncture, laceration, or laceration). Any scalp wound can be associated with a skull fracture and/or brain injury.

Open scalped wounds are accompanied by massive bleeding, which can even lead to lethal blood loss, but if timely help is provided, they usually heal.

In addition, head injuries are divided into:

1. Blunt (closed).
2. Permeable:

- due to the impact of bone fragments;
- as a result of a gunshot wound;
- sliding (relative to the skull).

3. Primary explosive (excessive pressure with damage to the central nervous system).

According to the mechanism of head injuries, they are divided into:

1. Primary injury is a function of the energy imparted to the brain by the injurious agent.
2. Secondary damage is a consequence of brain damage and systemic physiological changes due to a traumatic event.

Reinforcement of personal protective equipment (eg, helmets, seat belts) is the most important prevention.

Clinical signs

visible damage in the head area (presence of wounds, bleeding, bruises); headache; loss or disturbance of consciousness; memory impairment; dizziness; nausea, vomiting; impaired speech, breathing; visual impairment; asymmetry of the pupils of the eyes; absence or weak reaction of the pupils to light;

weakness of various muscle groups; clear discharge from the nose and ears.

In the case of facial injuries, the following signs are observed:

1. *Blunt trauma* : bruises; bone fractures; facial nerve damage.
2. *Penetrating trauma* : massive bleeding; violation of the patency of the respiratory tract; damage to the facial nerve.

One of the severe head injuries is a skull base fracture and intracranial hemorrhage.

Signs of a skull base fracture: loss of consciousness; nosebleed; discharge of cerebrospinal fluid from the ears; hemorrhage in the eye area (symptom of glasses); hearing loss; facial asymmetry.

Clinical signs of intracranial hemorrhage: headache; nausea, vomiting; drowsiness; dizziness; confusion or lack of consciousness; delayed speech or loss of speech; pupil size difference; weakness in the limbs on one side of the body. In severe cases, convulsions and coma are possible.

Provision of first aid for head injuries.

First of all, it is necessary to start assessing the condition of the victim according to the algorithm of SAVS. If foreign bodies are found obstructing the airways, they should be carefully removed. If the victim is unconscious or the state of consciousness is not stable, it is necessary to ensure breathing with the help of a naso- or oropharyngeal tube. After that, protect the cervical spine using a Schantz collar, SAM splint or improvised means (clothing, blanket, knees or hands of a helper). Fix the head

in a neutral position. In the presence of external bleeding, stop it by finger pressure or applying a pressure bandage. If there are wounds, apply bandages.

Next, it is necessary to ensure vascular access (place an intravenous catheter) and, in case of signs of hypovolemic shock, start infusing 0.9% saline solution (with head injuries, a decrease in blood pressure and an acceleration of the pulse are not characteristic).

The victim should be wrapped in a medical cape/thermal cover and evacuated, taking into account the severity of the head injury, to a medical facility for medical assistance.

Evacuation. Victims with a head injury, in which there are signs of impaired consciousness, should be evacuated in a supine position with the head end elevated by 30°. During evacuation, it is necessary to ensure constant supervision of the victim. At the same time, monitor the state of consciousness, breathing, blood pressure, pulse. In case of severe head injuries, evacuation is carried out to a specialized medical institution, where he will be provided with the help of a neurosurgeon.

Puncture and drainage of the pleural cavity

Definition.

Pleural puncture is a puncture of the pleural cavity, which is carried out for diagnostic and therapeutic purposes, for the aspiration of pleural contents with subsequent determination of its nature and quantity and expansion of the lungs.

Indication:

1. Therapeutic pleurocentesis:
    1.1. Exudative pleurisy (thickness of the fluid layer in the pleural cavity on an X-ray when lying on the side is more than 10 mm).
    1.2. Pneumothorax.
    1.3. Administration of drugs into the pleural cavity.
    1.4. Acute respiratory failure.
2. Diagnostic pleurocentesis:
    2.1. Diagnosis of the etiology of pleural effusion.
    2.2. Diagnosis of the main disease (pancreatitis, subdiaphragmatic abscess).

Contraindication:

1. Violation of the hemostasis system.
2. Inflammatory and purulent diseases of the skin at the place of manipulation.
3. Adhesion processes in the pleural cavity.
4. Bullous transformation of the lungs.
5. Condition after surgical intervention (thoracotomy, esophagectomy, heart surgery).

Location and position of the patient. Pleural puncture is performed in the procedure room, in the case of a serious patient - in the ward. To remove air from the pleural cavity, a puncture is performed in the II intercostal space along the mid-clavicular line or in the V-VI intercostal spaces along the mid-axillary line. In the first case, the patient sits facing the doctor, in the second case, he also sits, but turned to the doctor on the appropriate side with his hand behind his head. If the patient cannot sit, the puncture is performed in a lying position on the healthy side with the hand held behind the head.

To remove exudate from the pleural cavity, a puncture is performed in the VIII-IX intercostal spaces along the posterior axillary or scapular lines. At the same time, the patient sits on a chair facing his back, tilting his head slightly and placing his hands on his chest. Pleural puncture is performed in compliance with the rules of asepsis.

Necessary equipment: sterile trays, needle for pleural puncture, syringes with a capacity of 5-20 ml with needles, Jean syringe, gauze balls, tampons and napkins, diapers, bandages, rubber gloves, mask, clamp, forceps, antiseptic solution, 0.5% solution of novocaine (2% solution of lidocaine), cordiamine in ampoules, disinfectant solution, sticky patch or cleol, sterile and non-sterile test tubes with stoppers, tripod, phonendoscope, tonometer.

Conducting technique.

1. Conduct psychological preparation of the patient for manipulation, obtain consent for its implementation.
2. Offer the patient to empty the bowels and bladder.
3. Measure the patient's blood pressure and pulse.
4. Conduct an intradermal test for sensitivity to anesthetics.
5. Sit the patient on a chair facing the back, placing his hands on the back of the chair and lowering his head on them (to widen the intercostal spaces, the patient raises his hand on the side of the puncture and puts it behind his head).
6. Wash your hands, treat them with alcohol, put on a sterile mask and rubber gloves.
7. Take a sterile gauze ball with a clamp, moisten it with an antiseptic solution and treat the puncture site.
8. Cover the puncture area with a sterile diaper with a hole inside.
9. Fill the syringe with 5-20 ml of 0.5% novocaine solution (2% lidocaine), attach the needle.
10. Carry out infiltration anesthesia of the skin, subcutaneous fat, and intercostal muscles.
11. After anesthesia, the needle is removed from the chest and in this place, a puncture of the pleural cavity is performed with a special needle and a syringe with a capacity of 20 ml, which contains 1 ml (1000 units) of heparin solution to prevent pleural fluid from settling.
12. With the finger of the left hand, determine the upper edge of the lower rib and slightly pull the skin down in the place of the intended puncture.
13. Strictly perpendicular to the skin of the chest, a pleural puncture is quickly performed with a small effort.
14. When the pleura is punctured, a feeling of failure is created, and when the piston is pulled up, pleural fluid enters the syringe. This indicates that the needle has reached the pleural cavity. Pleural fluid does not enter the syringe if the needle is inserted above (into the lung) or below the pleural cavity (into the abdominal cavity) or if there is no pleural fluid in it.
15. After aspirating the liquid into the syringe, the needle is removed and a sterile gauze swab moistened with an antiseptic solution is applied to the puncture site, and a sterile gauze napkin is placed on top of it, which is attached to the chest wall with an adhesive plaster or Cleol. The pleural fluid is sent to the laboratory immediately to prevent the destruction of enzymes and cellular elements.

Methodology of therapeutic pleurocentesis .

The patient is in such a position as during diagnostic pleurocentesis. To remove air from the pleural cavity, a puncture is performed in the II intercostal space along the mid-clavicular line; to remove free fluid - more often - in VI-VII intercostal spaces along the posterior axillary line. Disinfection of the puncture site, covering with sterile napkins and layer-by-layer anesthesia are performed in the same way as during diagnostic pleurocentesis.

Puncture of the pleural cavity is performed with a sterile needle with a blunt end, a rubber tube is put on and fixed to the cannula. The rubber tube is covered with a clamp to prevent air from entering the pleural cavity (there is negative pressure in the pleural cavity). After the needle enters the pleural cavity, a Janet syringe or a fluid pumping system (Bobrova apparatus, tube system, clamp, suction) is attached to the rubber tube.

Complication.

1. A sharp decrease in blood pressure, collapse, which is associated with a reaction to pain, the appearance of blood, with the procedure, etc. The patient becomes pale, lethargic, the skin is covered with cold sweat, there may be chills.

Tactics: the procedure is stopped, the patient is placed in bed, the tender end of which is raised, and 2 ml of cordiamine is administered intravenously.

2. The appearance of a vasovagal reflex, which develops as a result of irritation of the leaves of the pleura when it is punctured. It is characterized by a liquid pulse of weak filling, a decrease in blood pressure.

Tactics: the procedure is stopped, the patient is put to bed, and 1 ml of 0.1% atropine sulfate solution is administered intravenously.

3. Pneumothorax develops as a result of incorrect manipulation, when the pleural cavity communicates with the atmosphere. If the visceral pleura is damaged by a needle, air enters the pleural cavity from the alveoli of the lungs.

Prevention: clear implementation of the manipulation technique.

Tactics: repeated puncture with aspiration.

4. Infection of the pleural cavity occurs when asepsis and antisepsis are violated.

Prevention: compliance with the rules of asepsis and antiseptics.

Tactics: rational antibiotic therapy.

5. Hemothorax develops as a result of damage to the intercostal artery.

Prevention: clear implementation of the manipulation technique.

Tactics: urgent hospitalization in the surgical department.

6. Penetration of the needle into the abdominal cavity and damage to the liver, intestines and spleen.

Prevention: clear implementation of the manipulation technique.

Tactics: urgent hospitalization in the surgical department.

7. Infection of the soft tissues of the chest occurs when the rules of asepsis and antiseptics are violated.

Prevention. To minimize the occurrence of possible complications during pleurocentesis, it is necessary to follow all the proper rules for performing this procedure.

Tactics: rational antibiotic therapy.

8. Swelling of the lungs, which can occur in case of simultaneous evacuation of a large amount of liquid (more than 1.5 l) and rapid expansion of the lung.

Prevention: gradual evacuation of fluid from the pleural cavity. With the simultaneous evacuation of a large amount of liquid, the procedure is carried out at a rate of no more than 1 liter per 30 minutes. and no more than 1.5 liters at a time.

Tactics: immediate hospitalization.

9. Allergic reactions manifested by itching and rashes on the skin, Quincke's edema, anaphylactic shock.

Prevention: Before the first injection of any drug, it is necessary to collect an allergic history and directly perform a test for the individual sensitivity of the body to the drug. In the case of a negative reaction, make the first injection of 0.01 ml of the prescribed dose into the limb and observe the patient for 20 minutes.

Tactics: according to the Order of the Ministry of Health of Ukraine dated 12/30/2015 No. 916 "Unified clinical protocol of emergency, primary, secondary (specialized) and tertiary (highly specialized) medical care for drug allergy, including anaphylaxis."

Pericardiocentesis

Definition.

Pericardiocentesis is a puncture of the pericardial cavity , which is performed for diagnostic or therapeutic purposes.

Indication:

1. Tamponade of the heart.
2. Determination of the etiology of pericardial effusion (purulent, exudative, transudative).
3. Hemopericardium.
4. Treatment of pericarditis.
5. Pneumopericardium.

Contraindication:

1. Violations of the blood coagulation system and platelet-vascular hemostasis.
2. Layering of the aorta.
3. Anticoagulant therapy.
4. Traumatic hemopericardium, post-infarction ruptures of the myocardium (in this case, surgical intervention is performed).
5. Small or osmotic pericardial effusion.

6. Condition after coronary artery bypass surgery due to the danger of damage to grafts.

Location and position of the patient. Puncture of the pericardial cavity is performed in the supine position with the head end of the bed raised by 30° to ensure accumulation of pericardial effusion in the anteroinferior sinus of the pericardium. The most widespread and safe are the Larray point - on the left between the cartilage of the VII rib and the xiphoid process and the Marfan point - at the top of the xiphoid process. Other points are also used to perform the puncture - directly to the left of the sternum in the IV intercostal space (Pirogov - Karavaev point), in the V intercostal space (Delorme - Magnon point), in the VI intercostal space (Voynych - Syanozhensky point), to the right of the sternum in the IV intercostal space (Shaposhnikov's point). Pericardiocentesis is performed in compliance with the rules of asepsis.

Necessary equipment: gauze balls, syringe 5-20 ml, sterile mask and rubber gloves, cap, catheter 22G and 24G, puncture needles 10-15 cm long and 21-23G in diameter (Spinocan) , anesthetic solution, antiseptic solution, sterile test tubes, sterile diapers, sterile dressing material, connecting tube, sterile cotton swabs, sterile tweezers, scalpel, adhesive plaster.

Performance technique:

1. Conduct psychological preparation of the patient for manipulation, obtain consent for its implementation.
2. Conduct an intradermal test for sensitivity to anesthetics.
3. Measure the patient's blood pressure and pulse.
4. Give the patient a semi-sitting position (30-40°).
5. Wash your hands, treat them with an antiseptic solution, put on a sterile mask and rubber gloves.
6. Treat the skin of the chest and the upper part of the abdomen with a sterile gauze ball soaked in an antiseptic solution and limit the puncture site (the area of the xiphoid process) with a sterile material.
7. Fill the syringe with an anesthetic solution and perform infiltration anesthesia, being sure to pull the piston toward you before injecting the anesthetic (analgesia should be performed at the point between the xiphoid process and the left costal arch).
8. After infiltration anesthesia, take a syringe with a long needle containing anesthetic solution and insert the needle at an angle of 30° to the skin in the direction of the left mid-clavicular line (to the left shoulder joint). Administer the anesthetic solution along the course of the needle.
9. Pushing the needle forward, constantly pull the piston towards you. After passing through the diaphragm, there is a sensation of a needle passing through dense tissue, after which the needle enters the pericardial cavity.
10. Pull the plunger of the syringe towards you; if nothing enters the syringe, 1 — 2 ml of anesthetic solution is introduced and aspiration is performed. Normally, a small amount of light yellow serous fluid enters the syringe from the pericardial cavity. When receiving blood, it is necessary to conduct a Revilois-Gregoir test (determination of ongoing or stopped bleeding).
11. Collect the liquid obtained during the puncture in sterile test tubes.
12. Apply an aseptic bandage.
13. Inquire about the patient's well-being and transport him to the ward on a gurney.
14. Disinfect used tools.

Complication:

1. Damage to the myocardium or damage to the coronary artery.

Tactics: monitoring of vital functions, immediate hospitalization in the surgical department, if necessary, emergency open thoracotomy.

Prevention: clear implementation of the manipulation technique, advance the needle until liquid or air is obtained.

2. Air embolism.

Tactics: try to remove air by aspiration, consult a thoracic surgeon.

Prevention: clear implementation of the manipulation technique .

3. Pneumo- or hemothorax: usually occurs when anatomical landmarks are neglected and when a puncture is performed blindly.

Tactics: performing a pleural puncture on the affected side.

Prevention: clear implementation of the manipulation technique.

4. Violation of heart rhythm.

Tactics: in case of unstable hemodynamics, it is necessary to remove the needle from the pericardial cavity. It is possible to carry out antiarrhythmic pharmacotherapy or electroimpulse therapy.

Prevention: clear implementation of the manipulation technique.

5. Allergic reactions manifested by itching and rashes on the skin, Quincke's edema, anaphylactic shock.

Prevention: Before the first injection of any drug, it is necessary to collect an allergic history and directly perform a test for the individual sensitivity of the body to the drug. In the case of a negative reaction, make the first injection of 0.01 ml of the prescribed dose into the limb and observe the patient for 20 minutes.

Tactics: according to the Order of the Ministry of Health of Ukraine dated 12/30/2015 No. 916 "Unified clinical protocol of emergency, primary, secondary (specialized) and tertiary (highly specialized) medical care for drug allergy, including anaphylaxis."

6. Infection.

Tactics: rational antibiotic therapy.

Prevention: compliance with the rules of asepsis and antiseptics.

Cricothyroidotomy

Definition.

Cricothyroidotomy is surgical restoration of airway patency by perforating (median dissection) of the larynx between the cricoid and thyroid cartilages) of the cricothyroid membrane.

It is used in adults and children over eight years old. Puncture conicotomy is used in children under eight years of age (due to the high risk of damage to the cartilages of the larynx. Damaged cartilages lag behind in development, which leads to narrowing of the respiratory tract. When using a needle, the integrity of only the conical ligament is violated).

Indication:

1. Inability to perform tracheal intubation in case of:

- massive bleeding;
- laryngospasm;
- swelling of the soft tissues of the larynx and connective tissue (anaphylaxis, diphtheria croup, false croup, etc.);
- severe facial injury;
- volumetric formation;
- the presence of ulcerative and necrotic lesions of the larynx;
- bilateral vocal cord paralysis;
- a foreign body of the upper respiratory tract;
- violation of the patency of the respiratory tract due to swelling of the oropharynx;
- some congenital malformations of the facial skull;
- tightly clenched jaws during convulsions.

2. Trauma of the cervical spine with a high risk of its destabilization.

3. Chemical burns of the upper respiratory tract.

Contraindication:

1. The possibility of safely performing orotracheal or nasotracheal intubation.

2. Section (dissection) of the trachea.

3. Dissection of the larynx with retraction of the distal end of the trachea into the mediastinum.

4. Fracture or the presence of pathological changes in the cartilage of the larynx.

5. Detachment of the larynx from the trachea.

6. Age younger than eight years.

7. Violations of the blood coagulation system and platelet-vascular hemostasis.

8. Inability to determine landmarks (presence of anatomical barriers: large hematoma, enlarged thyroid gland or pronounced subcutaneous emphysema, which make it impossible to palpate anatomical landmarks — thyroid and cricoid cartilage).

9. Basic anatomical abnormality (tumor).

10. Acute diseases of the larynx due to infection or trauma.

Location and position of the patient. Conicotomy is performed with the patient lying on his back, a roller is placed under the shoulder blades, and the head is thrown back. By palpation, they find a conical connection located between the thyroid and piriform cartilages.

Necessary equipment: a set for conicotomy, a wide needle (from a catheter), syringes with a capacity of 5-20 ml with needles, gauze balls, tampons and napkins, diapers, bandages, rubber gloves, a mask, a scalpel, an antiseptic solution, a disinfectant solution, an adhesive plaster.

Technique for adults and children over 8 years old.

1. Make sure of the expediency of conicotomy.

2. Provide the patient with an appropriate body position.

3. Palpate to determine the localization of the arc of the cricoid cartilage and the lower edge of the thyroid.

4. Treat the front surface of the neck with an antiseptic solution (if possible).

5. Delimit the place of manipulation with napkins.

6. Fix the thyroid cartilage with the fingers of the left hand (for shulga - the right hand).

7. Place a scalpel with a narrow blade vertically along the middle line of the neck immediately under the lower edge of the thyroid cartilage with the cutting side up (to avoid damage to the back wall of the larynx, tightly wind cotton wool on the base of the scalpel, leaving 1.5-2 cm of its blades open) and in one movement stab into the larynx to a depth of 1.5 cm, but no more than 2 cm, dissecting all layers of the front wall of the larynx. The incision can be started from the arc of the cricoid cartilage.

8. Without pulling out the scalpel, the incision is continued a few millimeters up to the upper edge of the cricoid cartilage.

9. After removing the scalpel, first insert the blunt side of the scalpel into the incision and turn it 90º (or any blunt atraumatic object) in order to widen the opening.

10. Insert a conicotomy tube (or any half tube) into the created hole and fix it with an adhesive plaster or a bandage.

11. In the absence of independent breathing, carry out ventilation through a tube or hole.

WARNING!

It must be taken into account that below the arc of the cricoid cartilage there is a thyroid gland, the injury of which is accompanied by severe bleeding.

Technique of puncture cricothyroidotomy (mainly for children under 8 years old):

1. Make sure of the expediency of conicotomy.

2. Provide the patient with an appropriate body position.

3. Palpate to determine the localization of the arc of the cricoid cartilage and the lower edge of the thyroid.

4. Treat the front surface of the neck with an antiseptic solution (if possible).

5. Delimit the place of manipulation with napkins.

6. Fix the thyroid cartilage with the fingers of the left hand (for shulga - the right hand).

7. With the right hand, insert the needle through the skin and conical ligament into the lumen of the trachea.

8. Fix the needle with an adhesive plaster or bandage. If a catheter with a needle is used, remove the needle.

9. To increase the respiratory flow, you can insert several needles in sequence.

Complication:

1. Bleeding, usually superficial and stops on its own.
Prevention: clear implementation of manipulation stages.
Tactics: stop bleeding by finger pressure, applying a clamp or ligature.
2. Subcutaneous emphysema occurs if air penetrates into the tissues due to a mismatch in the diameter of the tube to the opening in the trachea, tight suturing of the tissues or application of a tight bandage that gets wet and becomes impassable for air inhaled past the tube.
Prevention: clear implementation of manipulation stages. Exclusion of dense sewing of fabrics, application of a dense bandage.
Tactics: subcutaneous emphysema resolves on its own within a week and does not require special treatment.
3. Pneumothorax occurs when the lung tissue and the visceral layer of the pleura are ruptured as a result of increased pressure in the lungs due to valvular closure of the bronchial lumen.
Prevention: clear implementation of manipulation stages.
Tactics: puncture and drainage of the pleural cavity; hospitalization.
4. Pneumopericardium is associated with the passage of air along the fold of the pleura, large vessels with subsequent breakthrough into the pericardial space.
Prevention: clear implementation of manipulation stages.
Tactics: puncture of the pericardial cavity for air aspiration.
5. Damage to the wall of the esophagus occurs as a result of damage to the back wall of the trachea.
Prevention: clear implementation of manipulation stages.
Tactics: consultation of a thoracic surgeon.
6. Infection (mediastinitis).
Prevention: clear execution of manipulation stages; compliance with the rules of asepsis and antiseptics.
Tactics: hospitalization and rational antibiotic therapy.

4. Summary:

After completing the class on the topic " Practical skills in surgery. Simulation training ", students should:

To have formed and practiced practical skills of performing surgical manipulations .

To learn the ability to independently use knowledge and skills when performing surgical manipulations .

Have a well- formed and clear idea of the sequence of actions in the algorithm of performing surgical manipulations .

To have the formed competence of professional communication in the team when performing surgical manipulations .

5. List of recommended literature:

Main:

1. Surgery: textbook / O.Yu. Usenko, G.V. Bilous, G.Y. Putintseva. - 5th edition. - K.: VSV "Medicine", 2021. - 416 p.

2. Surgical diseases (textbook) — P.D. Fomin, Ya.S. Bereznytskyi, Ya.S. Bereznytskyi, O.A. Viltsanyuk, M.D. Zheliba et al., - K.: Medical University "Medicine", 2017

Additional:

1. Emergency situations in surgery (study guide) — L.M. Kovalchuk, K.M. Bobak, A.I. Bobak, V.V. Kyretiv et al., 2017

Electronic information resources:

1. https://www.c-tecc.org/our-work/guidance - Committee on Tactical Emergency Relief
2. https://zakon.rada.gov.ua/laws/show/z0356-22#n42 - Order of the Ministry of Health of Ukraine No. 441 dated 09.03.2022 "On approval of procedures for providing pre-medical assistance to persons in emergency situations"
3. https://gmka.org/uk/category/dlya-medykiv/nevidkladna-hirugiya/ - Global Alliance for Medical Knowledge
4. https://zsz.pp.ua/nozhove-poranennya-v-zhivit-infikovana-rana-peredno-cherevno-stinki-kod-za-mkx-10/ – Knife wound to the stomach: infected wound of the front abdominal wall, code according to MKX -10