

MINISTRY OF HEALTH OF UKRAINE
ODESA NATIONAL MEDICAL UNIVERSITY

Faculty Medicine

Department of Surgery with Postgraduate Education

APPROVED BY

Vice Rector for Scientific and Pedagogical Work



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‘ _____ ’ _____ **2025**

**METHODOLOGICAL RECOMMENDATION
FOR PRACTICAL CLASSES OF THE ACADEMIC DISCIPLINE**

Faculty, course _____ **Medical 6th year** _____

Academic discipline Surgery
(name of the discipline)

PRACTICAL CLASSES

Practical class № 25

Topic: “Problems of thrombosis and embolism. Vein diseases.”

Approved:

At the meeting of the Department of Surgery with Postgraduate Education of Odesa National Medical University

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PRACTICAL CLASSES

Practical class № 25

Topic of the practical class: ‘Problems of thrombosis and embolism. Vein diseases. ‘- 6 hours

1. Relevance of the topic.

1. The significance of the topic is due to the gradual increase in the number of patients with multifocal atherosclerosis, one of the complications of which is thromboembolic events. Given that in the case of thrombosis and embolism of the peripheral bloodstream, the main factor of a positive outcome for patients is the time factor from the moment of vessel occlusion to the provision of specialised medical care, it becomes clear that doctors of all specialties need to know the clinical picture and diagnosis of these diseases. Correct orientation in the readings of early diagnosis of thrombosis and embolism and timely referral of patients to angiosurgical departments will help to achieve better treatment outcomes and prevent severe disabling (and sometimes fatal) outcomes, which are determined by the prevalence of the disease. According to the International Society of Phlebology, various forms of this pathology can be detected in more than half of the population of developed countries. Such a high incidence of the disease allows us to safely call varicose veins a ‘disease of civilisation’. Moreover, if earlier the disease was attributed to the problem of the older age group, nowadays 10-15% of schoolchildren aged 12-13 show signs of venous reflux.

Such a high prevalence and the fact that all age groups are affected by the disease dictate the need for continuous improvement of methods of specialised care for patients with venous diseases. This situation has led to the fact that a significant proportion of patients do not receive adequate care. The only way out of this situation is to ensure that doctors at all levels of healthcare are widely familiarised with the principles and capabilities of modern medical technologies.

2. Objectives:

Educational objectives:

- to acquaint the student with the frequency of thromboembolic cases in the world and Ukraine, the causes of the disease, the pathogenesis of development and the classification of the pathological process.
- higher education students should know the anatomy of blood vessels, their morphological structure, pathophysiological changes in case of disorders of the coagulation system.
- to provide higher education students with the opportunity to master the technique of determining the pulse at typical points, the technique of performing functional clinical tests.
- to provide higher education students with the ability to assess the clinical manifestations of the disease, laboratory parameters, experimentally induced ischaemia of peripheral anatomical structures.
- To acquaint the student with the anatomical structure of the human venous system, to create an understanding of the mechanisms of regional haemodynamics, to explain the role of the valvular apparatus of the veins in counteracting reflux. - Level I.

- The applicant for higher education should know the pathophysiological mechanisms of chronic venous insufficiency and its negative role in microcirculatory disorders, learn the types of trophic disorders that arise as a result of diseases of the venous system. - Level II.

- To provide higher education students with the opportunity to master the technique of performing functional clinical tests that identify qualitative and quantitative defects in the valvular apparatus of the veins. - Level III.

- To provide higher education students with the ability to investigate theoretically and clinically the degree and variants of chronic venous hypertension in both superficial and deep veins of the extremities (using hardware research methods). - Level IV.

Educational objectives:

- to form professionally trained doctors to diagnose acute circulatory disorders in patients.

- to explain to higher education students the legal aspects of early diagnosis of vascular obstruction, responsibility (including judicial) for untimely or erroneous diagnosis of thromboembolism (in case of irreversible changes in patients' disability).

3. Interdisciplinary integrations.

Disciplinary	To know	To be able to.
1. Anatomy	The exact typical location of the main vessels.	Clearly indicate the projection points of superficially located arteries to determine their pulsation. Locate the projection of branching vessels.
2. Biochemistry	Mechanisms of the blood coagulation system, coagulation factors, their indicators and norms.	Interpret the deviations of all indicators of the coagulation system and their significance in the occurrence of thromboembolism.
3. Histology	The histological structure of a thrombus in different phases of its occurrence. Differences in the histological structure of thrombus and embolus.	Determine the time since the onset of thromboembolism. Determine histologically the thrombus from the embolus.
4. General surgery	Topography of the main arteries, methods of examination of patients with acute vascular obstruction.	Identify areas of possible vascular obstruction, assess the degree of peripheral tissue ischaemia.

4. Content of the class.

Thrombosis and embolism occur as a result of changes in the blood coagulation system or as a consequence of systemic diseases (general atherosclerosis, diabetes mellitus, arrhythmias, etc.). In the event of acute thrombosis and embolism, oxygen deprivation develops, which disrupts all types of metabolism.

The clinical picture of thrombosis and embolism depends on the level of occlusion and the degree of ischaemia. The disease begins acutely and is manifested *by the 'acute ischaemic syndrome'*.

1. Ischaemic pain with numbness, coldness and paresthesia of the limb.
2. Change in skin colour - initially pallor, and later - 'marbling'.
3. Absence of arterial pulsation at all levels below the occlusion.
4. Reduction of skin temperature in the distal parts.
5. Disorders of sensitivity (superficial and deep).
6. Violation of active movements in the limb.
7. Ischaemic muscle contracture.

The diagnostic programme should be extremely fast and include ultrasound examination of the vessels and angiography.

Treatment should be complex and should be started as early as possible.

1. Only complete elimination of the occlusion ensures both preservation of the limb and restoration of its function.
2. In patients with embolism and relatively good vascular condition, embolectomy with a balloon catheter is the method of choice.
3. Acute occlusion that has developed on the background of chronic arterial insufficiency can be reliably and radically eliminated only by radical surgery.
4. An absolute contraindication to the operation is the patient's agonistic state.
5. Relative contraindications to the operation are severe concomitant diseases with a mild degree of ischaemia without progression.
6. In case of total ischemic contracture of the limb, reconstructive surgery is contraindicated, and emergency primary amputation is performed.
7. Conservative therapy is used in patients with AN as an independent method of treatment (thrombolytic therapy, direct-acting anticoagulants, disaggregants, angiolytics), and in combination with surgical intervention.

Varicose veins are a pathology of the superficial vessels of the system of large or small saphenous veins caused by their ectasia and valvular insufficiency. There are ascending (acquired) and descending (hereditary) forms. Etiology - natural or acquired valve insufficiency; weakness of the venous wall.

Varicose disease has three stages:

1. The compensation stage: the lower limb has very tortuous, varicose veins, no other complaints. At this stage, patients rarely visit a doctor.
2. Subcompensation stage: in addition to varicose veins, there is pasty or small short-term swelling in the lateral malleolus, lower third of the lower leg; fatigue and a feeling of swelling in the lower leg muscles; cramps in the calf muscles at night.
3. 2. decompensation stage: the above complaints are accompanied by itchy skin, eczema-like dermatitis in the lower third of the lower leg.

Strangulated forms are characterised by trophic ulcers, hyperpigmentation of the skin, and tissue induration.

Complications of varicose veins include thrombophlebitis and thrombosis of superficial and deep veins; erysipelas; haemorrhage and bleeding.

Diagnosis: to establish the diagnosis, a thorough history is taken and functional tests are performed

- Troyanov-Trendelenburg test (to determine the capacity of superficial and communicating vein valves);
- Pratt-II test, two-band test (to determine the location of perforated veins);
- Three-tourniquet Sheinis test (to determine the insufficiency of communicating veins);
- Delbe-Perthes march test (to determine the patency of deep veins).

To make a final diagnosis, ultrasound methods (Doppler, duplex scanning), radioisotope or X-ray contrast (ascending, descending and pelvic) phlebography are used.

Treatment for varicose veins can be conservative and surgical.

Conservative treatment is carried out at the initial stage of the disease or complements surgical treatment; its possibilities are limited:

- Elastic leg bandaging;
- Avoidance of heavy physical activity;
- Venotonic drugs (detralex, phlebodil, escuzan, troxevazine, etc.);
- Sclerosing therapy (limited by frequent complications and relapses).

Surgical treatment: indications for surgery are cosmetic, defects, trophic changes, insufficiency of vein valves, and saphenous vein thrombophlebitis. Before surgery, the patency and condition of the deep vein valves should be assessed.

The types of surgical interventions for varicose veins are as follows:

- by Troyanov-Trendelenburg (transection and ligation of the great saphenous vein at the point of its confluence with the femoral vein);
- by Babcock (removal of saphenous veins with a special probe);
- by Narath (removal of saphenous veins from separate incisions);
- by Klapp-Sokolov (numerous saphenous ligatures);
- suprafascial (according to Cockett) and subfascial (according to Linton) ligation of failed communicating veins;
- venectomy using endoscopic technique;

Prevention: early movements after surgery, elastic bandaging; use of low-molecular-weight heparins and venotonics.

5. Lesson plan and organizational structure

No.	Main stages of the lesson	Educational objectives	Learning tools	Methodologic al support materials	Terms
1.	Preparatory	Assess the initial level of knowledge, skills, and goal setting.	Survey of higher education applicants and setting learning goals.	Questions, tests on the topic	10%
2.	Basic	Patient management, functional tests, evaluation of additional methods. Mastery of treatment methods, surgical interventions	Development of clinical examination skills. Tests, tasks, role-playing games.	Algorithms for examination and treatment orientation map, training films	65%
3.	Final stage	Monitoring the level of learning of the class material. Assessment of the mastery of professional skills. Providing homework	Tasks, tests, learning tasks	Graphological structure, orientation maps, educational literature.	25%

6. Materials on methodological support of the lesson

6.1. Control materials for the preparatory stage of the lesson.

1. Causes of embolism and thrombosis, pathogenetic mechanisms of circulatory disorders in vascular occlusion.
2. Limits of circulatory disorders at different levels of embolism.
3. Clinical picture of thrombosis and embolism.
4. Methods of objective examination of patients with circulatory disorders.
5. Technique of arteriography and interpretation of the data obtained.
6. Conservative treatment of thrombosis and embolism.
7. Indications for surgical treatment of vascular occlusions.
8. Methods of surgical treatment of emboli.
9. Complications and mortality during surgery.
10. Prevention of thromboembolism.
11. Management of patients in the postoperative period.

6.2. Materials for the methodological support of the main stage of the class: professional algorithm of acute circulatory disorders, orientation maps of skills and abilities.

6.3. Control materials for the final stage of the lesson

Control tasks:

1. 5 hours after the onset of the disease, sharp pain in the right lower leg appeared, pulse only on the femoral artery, no pulse below. What are the diagnosis and treatment tactics?

Answer: Embolism of the femoral artery in the gunter's canal. Embolectomy.

2. A patient with a history of myocardial infarction developed severe pain in the right leg on the third day after cholecystectomy. There is no pulse on the right femoral artery. There were signs of limb ischaemia, 'marble' skin pattern. What is your diagnosis and action plan?

Answer: Embolism of the right iliac artery. Embolectomy.

3. During laparotomy, circulatory disorders in the small intestine were detected, and there was no pulsation of the superior mesenteric artery. The patient has been ill for 6 hours. What is the diagnosis and tactics?

Answer: Embolism of the superior mesenteric artery. Attempt for embolectomy, with ineffectiveness - resection of the intestine.

4. On the third day after the onset of intense pain in the left leg, the patient developed gangrene of the lower leg and foot. There is no pulsation of the femoral artery. What is the diagnosis and tactics?

Answer: Thromboembolism of the iliac artery. Amputation at the level of the thigh.

5. A patient with mitral heart disease suddenly developed sharp pain in the right arm. There is no pulse on the cubital artery. What is the diagnosis and tactics?

Answer: Brachial artery embolism. Embolectomy, conservative therapy.

6. Embolectomy was performed a day after the onset of the disease. After the restoration of blood circulation, the patient developed severe shock. What is the diagnosis?

Answer: Tourniquet type shock (intoxication by non-necrobiotic agents).

7. An elderly patient on the second day after gastric resection suddenly developed acute cardiovascular failure, shock, cyanosis of the upper half of the body. What is your diagnosis and tactics?

Answer: Thromboembolism of the pulmonary artery. Regional thrombolytic injection, anti-shock measures.

Test control

What is the most common cause of venous thrombosis?

- A. Blood clotting disorders.
- B. Arterial hypertension.
- C. Elevated cholesterol levels.
- D. Dehydration.

What is the most common complication of deep venous thrombosis?

- A. Pulmonary embolism.
- B. Varicose veins.

- C. Thrombophlebitis.
- D. Phlebitis.

Which diagnostic method is the 'gold standard' for detecting deep venous thrombosis?

- A. Ultrasound examination of the veins.
- B. Radiography.
- C. Computed tomography (CT).
- D. Magnetic resonance imaging (MRI).

What is the main treatment for acute venous thrombosis?

- A. Anticoagulant therapy.
- B. Prescription of antibiotics.
- C. Anti-inflammatory therapy.
- D. Surgical intervention.

Which of the following risk factors contributes most to the development of thrombosis?

- A. Prolonged immobility.
- B. Improper nutrition.
- C. Frequent physical activity.
- D. Alcohol abuse.

What complication can occur after the pulmonary embolism?

- A. Pulmonary infarction.
- B. Pericarditis.
- C. Pleurisy.
- D. Pneumonia.

Which venous disease is accompanied by thrombosis and inflammation of the vessel wall?

- A. Thrombophlebitis.
- B. Varicose veins.
- C. Arteritis.
- D. Phlebitis.

What is the main drug for the prevention of thromboembolism?

- A. Heparin.
- B. Paracetamol.
- C. Acetylsalicylic acid (Aspirin).
- D. Ibuprofen.

What can be the main cause of pulmonary embolism?

- A. Deep vein thrombosis of the lower extremities.
- B. Heart failure.
- C. Myocardial infarction.
- D. Hypertension.

What disease can lead to thrombosis of superficial veins?

- A. Varicose veins disease.

- B. Arterial hypertension.
- C. Chronic bronchitis.
- D. Diabetes mellitus.

Literature:

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