3rd year Medical Faculty
VI semester

Practical lesson # 1
Pathophysiology of the blood system. White blood disorders. Leukocytosis. Leukopenia. White blood cell dysfunction. Hemoblastosis.

1. Leukocytosis: definition, types, etiology, pathogenesis.
2. Diagnostic significance of changes in the leukocyte formula.
3. Leukopenia: definition, types, etiology, pathogenesis, manifestations. Agranulocytosis.
4. Leukocyte dysfunctions: types, etiology, pathogenesis, and manifestations.
5. Acute leukemias: definition, classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
6. Chronic leukemias: definition, classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
7. Leukemoid reactions: types, etiology, pathogenesis, differences from leukemias.

Task 1
Patient A., 34 years old, is being treated in a hospital with pneumonia.
Objectively: body temperature 37.8° C, heart rate 95/min, respiratory rate 19/min, blood pressure 100/75 mmHg, skin is hyperemic, hot, dry, pharynx is hyperemic, in the lungs on the right in the lower parts, wet and crepitating wheezes are heard, heart sounds are clear, rhythmic, the stomach is soft, painless, liver and the spleen is not palpable.
From anamnesis: ill for the second day
General blood test: red blood cells $4{,}3 \cdot 10^{12}$/l; hemoglobin 135 g / l; color index **? (it is necessary to calculate the indicator)**; hematocrit 43%; reticulocytes 0%; platelets $280 \cdot 10^{9}$/l; white blood cells $15{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 1%, basophils 1%, metamyelocytes 5%, rod neutrophils 7%, segmented neutrophils 64%, lymphocytes 17%, monocytes 5%, ESR 22 mm/h.
QUESTIONS:
1. Indicate the patient's blood system syndrome.
2. Specify the etiology of the syndrome in this patient. What other etiological factors can lead to the development of this syndrome?
3. Explain the pathogenesis of clinical symptoms and laboratory data in patient A.

Practical lesson # 2

Pathophysiology of the blood system. Anemia. Red blood cells.

1. Anemia: definition, classification, clinical and hematological manifestations.
2. Erythrocytosis, general characteristics.
3. Acute post-hemorrhagic anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
4. Iron metabolism in the body and its disorders.
5. Iron deficiency anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
6. Hypoplastic anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
7. Bitamine B_{12}-deficient and folate-deficient anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
8. Acquired (exoerythrocytic) hemolytic anemia: etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
9. Congenital (endoerythrocytic) hemolytic anemia: classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.

task

Patient A., 24 years old, was admitted to the surgical department of the hospital with a diagnosis of open wound of the lower third of the left forearm.

Objectively: body temperature 36.3°C, heart rate 85 / min, blood pressure 100/60 mm Hg, respiratory rate 22 / min, skin pale, warm, open wound in the lower third of the left forearm, bleeding profusely, pharynx pink, vesicular respiration in the lungs, heart sounds clear, rhythmic, stomach soft, painless, the liver and spleen are not palpable.

The patient underwent surgical treatment of the wound with suturing of damaged vessels. Total blood loss was about 500 ml.

General blood test: red blood cells $4{,}5 \cdot 10^{12}$/l; hemoglobin 135 g / l; color index **? (it is necessary to calculate the indicator)**; hematocrit 40%; reticulocytes 0%; platelets $350 \cdot 10^{9}$/l; white blood cells $8{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 1%, basophils 1%, metamyelocytes 0%, rod neutrophils 1%, segmented neutrophils 55%, lymphocytes 35%, monocytes 7%, ESR 12 mm / h.

The serum iron content is 15.7 mmol/l.

QUESTIONS:

1. Specify the patient's syndrome. Give a classification and substantiate the specified syndrome. Specify the stage of this state.

2. Indicate the etiology of the syndrome in this patient. What other etiological factors can lead to the development of this syndrome?

3. Explain the pathogenesis of clinical symptoms and laboratory data in patient A.

4. Specify the principles of treatment and prevention of this syndrome.

Practical lesson # 3

Pathophysiology of hemostasis. Hemorrhagic syndrome.

1. 1. Hemostasis and antihemostasis: vascular, cellular, plasma components, their role in ensuring the rheological properties of blood in normal and pathological conditions
2. Types of bleeding.
3. Clinical and laboratory methods of hemostatic system research.
4. Vasopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
5. Thrombocytopenia: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
6. Thrombocytopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
7. Coagulopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.

task

Patient V., 75 years old, went to the doctor with complaints of weakness, rapid fatigue, the appearance of a small-point rash on the upper and lower extremities, and bleeding gums.

Objectively: body temperature 36.8°C, heart rate 75 / min, respiratory rate 13 / min, blood pressure 120/80 mm Hg, skin pale, pharynx pale pink, mouth corners jammed, gums loose, bleed when pressed with a spatula, lungs breathing vesicular, heart sounds muffled, stomach soft, painless the liver and spleen are not palpable. On the lower and upper extremities, a symmetrical, small-point rash is determined, bright red in color.

Medical history: during the last year, she reduced her consumption of fruits and vegetables.

General blood test: red blood cells $3{,}9 \cdot 10^{12}$/l; hemoglobin 115 g / l; color index **? (must be calculated)**; hematocrit 40%; reticulocytes 0%; platelets $220 \cdot 10^{9}$/l; white blood cells $5{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 0%, basophils 1%, metamyelocytes 0%, rod neutrophils 1%, segmented neutrophils 57%, lymphocytes 37%, monocytes 4%, ESR 10 mm / h.

Blood chemistry: total bilirubin 19.1 mmol/ l, direct bilirubin 3.6 mmol/L, ALT 24 IU / L, AsAT 19 IU/ L, alkaline phosphatase 90 IU/L, total protein 68 g/l, albumin 37 g/l, urea 2.5 mmol/l, cholesterol 5.5 mmol/ll,

Coagulogram: bleeding time 6.5 min (according to Duka); Rumpel-Leede-Konchalovsky cuff test positive, ADP-induced platelet aggregation normal, blood clotting time 7 min (according to Mas Magro), thrombin time 12 s, prothrombin time 15 s, APPT 32 s, fibrinogen 4.0 g/l, antihrombin 80%, protein C and S are normal.

QUESTIONS:

1. Specify the patient's syndrome. Justify the specified syndrome and its variant in accordance with the classification.
2. Specify the etiology of the indicated variant of the syndrome. What other etiological factors can lead to the development of this type of syndrome?
3. Explain the pathogenesis of the described clinical and laboratory changes in this patient.
4. List the principles of therapy and prevention of the indicated syndrome.

Practical lesson # 4
Pathophysiology of hemostasis. Thrombophilic syndrome. DIC-syndrome.

1. Thrombophilic syndrome: definition, classification. Эetiology, pathogenesis, manifestations, principles of laboratory diagnostics.
2. Outcomes and complications of thrombosis.
3. DIC-syndrome: definition of the concept, etiology, pathogenesis, manifestations, laboratory screening.

task

Patient A., 68 years old, was admitted to the intensive care unit with a diagnosis of cardiogenic shock on the background of transmural myocardial infarction. In the department, the patient's condition worsened, the patient is adynamic, and acrocyanosis has developed.

Objectively: the general condition is severe, the patient does not answer questions, apathetic, body temperature 37.5°C, heart rate 100 / min, blood pressure 100/60 mm Hg, respiratory rate up to 25 / min, auxiliary muscles participate in the act of breathing, skin is pale, cold, wet, pharynx is pale, tongue is dry, overlaid white coating, wet wheezing sounds are heard in the lower parts of the lungs, heart tones are rhythmic, muffled, heart borders are within normal limits, the abdomen is soft, painful in the lower parts, the liver and spleen are not palpable.

Total blood count: red blood cells 3.1* 10^{12}/l; hemoglobin 98 g/l; color index ? (it is necessary to calculate); hematocrit 33%; reticulocytes 0%; platelets 180*10^{9}/l; leukocytes 9,5•10^{9}/l. White blood cell formula: eosinophils 1%, basophils 1%, metamyelocytes 2%, rod neutrophils 5%, segmented neutrophils 51%, lymphocytes 35%, monocytes 5%, ESR 22 mm / h.

General urinalysis: urine volume was 300 ml per day; urine color was dark yellow, cloudy, specific density 1034, protein 4.4 g / l, glucose was absent, urine sediment microscopy: large amounts of renal epithelium, red blood cells: single in the field of vision, white blood cells: 2-4 in the field of vision, granular cylinders: 3-4 in the field of view.

Blood chemistry: total bilirubin 18.8 mmol/ l, direct bilirubin 4.5 mmol/L, ALT 90 IU/ L, AsAT 320 IU/ L, alkaline phosphatase 80 U/L, total protein 55 g/l, albumin 31 g/L, urea 10.5 mmol/l, cholesterol 5.9 mmol/ll, troponin 2.5 ng/ ml.

Coagulogram: bleeding time 4.5 min (according to Duque); blood clotting time 3 min (according to Mas Magro), thrombin time 11 s, prothrombin time 9 s, APPT 20 s, fibrinogen 4.5 g / l, antithrombin 90%, C and S proteins normal, soluble fibrin-monomer complexes were detected , activated forms of platelets.

QUESTIONS:

1.What is the leading syndrome of the blood system that can be identified in the patient? Justify the specified syndrome and its stage in accordance with the classification.

2.Indicate the etiology of the indicated syndrome in this patient.

3.What other etiological factors can lead to the development of this syndrome?

4.Explain the pathogenesis of the described clinical and laboratory changes in this patient.

5.List the principles of therapy and prevention of the indicated syndrome.

Practical lesson # 5
Overview session. Pathophysiology of the blood system

1. Leukocytosis: definition, types, etiology, pathogenesis.
2. Diagnostic significance of changes in the leukocyte formula.
3. Leukopenia: definition, types, etiology, pathogenesis, manifestations. Agranulocytosis.
4. Leukocyte dysfunctions: types, etiology, pathogenesis, and manifestations.
5. Acute leukemias: definition, classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
6. Chronic leukemias: definition, classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
7. Leukemoid reactions: types, etiology, pathogenesis, differences from leukemias.
8. Anemia: definition, classification, clinical and hematological manifestations.
9. Erythrocytosis, general characteristics.
10. Acute posthemorrhagic anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
11. Iron metabolism in the body and its disorders.
12. Iron deficiency anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
13. Hypoplastic anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
14. Bitamine B_{12}-deficient and folate-deficient anemia: etiology, pathogenesis, features of clinical manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
15. Acquired (exoerythrocytic) hemolytic anemia: etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
16. Congenital (endoerythrocytic) hemolytic anemia: classification, etiology, pathogenesis, manifestations, characteristics of hematopoiesis and principles of laboratory diagnostics.
17. 1. Hemostasis and antihemostasis: vascular, cellular, plasma components, their role in ensuring the rheological properties of blood in normal and pathological conditions.
18. Types of bleeding.
19. Clinical and laboratory methods of hemostatic system research.
20. Vasopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
21. Thrombocytopenia: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
22. Thrombocytopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
23. Coagulopathies: definition, classification, etiology, pathogenesis, manifestations, principles of laboratory diagnostics.
24. Thrombophilic syndrome: definition, classification. эetiology, pathogenesis, manifestations, principles of laboratory diagnostics.
25. Outcomes and complications of thrombosis.
26. DIC-syndrome: definition of the concept, etiology, pathogenesis, manifestations, laboratory screening.

Practical lesson # 6
Pathophysiology of the cardiovascular system. Heart defects.

1. Heart defects: definition, classification, compensation mechanisms.
2. Congenital heart defects: definition, classification, etiology, and pathogenesis of hemodynamic disorders.
3. Acquired heart defects: definition, classification, etiology, pathogenesis of hemodynamic disorders in mitral valvedisease.
4. Acquired heart defects: definition, classification, etiology, pathogenesis of hemodynamic disorders in aortic valveA malformation.
5. Acquired heart defects: definition, classification, etiology, pathogenesis of hemodynamic disorders ine tricuspid valve malformations.
6. Acquired heart defects: definition, classification, etiology, pathogenesis of hemodynamic disorders ine pulmonary valve disease.

task

A 20-year-old man went to the doctor complaining of general weakness, persistent headaches, dizziness, tinnitus and frequent nosebleeds. During a short walk, there is pain in the legs, lameness, shortness of breath.

Objectively: the body temperature is 36.7 °C, the skin is pale, the facial skin is hyperemic, the patient is athletic, the shoulder girdle is well developed, the lower limbs are poorly developed, pale, cold. BP 20 per minute, vesicular respiration, heart rate 90 beats per minute, pulse tense in the upper extremities, not detected in the lower extremities, heart sounds are muffled, noises are heard, blood pressure in the upper extremities is 206/104 mm Hg, in the lower extremities is not detected. The abdomen is soft, painless, the liver and spleen are not palpable.

Echocardiography shows a pronounced thickening of the left ventricular wall and expansion of the left atrial cavity.

QUESTIONS:

1. Make a reasonable conclusion about the form of pathology of the cardiovascular system in this patient.
2. Indicate the etiology of this form of pathology in the patient, as well as other possible factors for the occurrence of this form of pathology.
3. Explain the pathogenesis of the described clinical and instrumental manifestations.
4. Explain the principles of therapy for this form of pathology.

Practical lesson # 7

Pathophysiology of atherosclerosis. Coronary heart disease

1. Atherosclerosis: definition of the concept, etiology.
2. Risk factors and laboratory signs.
3. Atherosclerosis: pathogenesis, stages.
4. Clinical consequences of atherosclerosis.
5. Ischemic heart disease, definition, causes, classification.
6. Pathogenesis of ischemic myocardial damage.
7. Main forms of coronary heart disease, pathogenesis, clinical manifestations.

task

A 58-year-old man went to the doctor with complaints of sharp compressive pains behind the sternum, which spread to the left shoulder and occur when walking short distances or climbing 2-3 floors. Smokes from the age of 20 for 10 cigarettes a day, work is associated with constant psycho-emotional stress.

Objectively: body temperature is 36.3°C, skin is pale, BP is 17 per minute, breathing is hard, heart rate is 90 beats per minute, pulse is rhythmic, heart sounds are muffled, blood pressure is 150/98 mm Hg. The abdomen is soft, painless, the liver and spleen are not palpable.

Biochemical blood test: total cholesterol 11.5 mmol/ l, high-density lipoprotein cholesterol 0.3 mmol/l.

Echocardiography revealed a thickening of the left ventricular myocardial wall.

ECG at rest shows signs of left ventricular hypertrophy, while Holter ECG monitoring shows signs of myocardial ischemia in the anterior - septal region of the left ventricle during moderate exercise.

QUESTIONS:

1. Make a reasonable conclusion about the form of pathology of the cardiovascular system in this patient.
2. Indicate the etiology of this form of pathology in the patient, as well as other possible factors for the occurrence of this form of pathology.
3. Explain the pathogenesis of the described clinical and laboratory-instrumental manifestations.
4. Explain the principles of therapy for this form of pathology.

Practical lesson # 8

Pathophysiology of the cardiovascular system. Arterial hypertension: hypertension, symptomatic hypertension.

1. Local and systemic mechanisms of blood pressure regulation.
2. Arterial hypertension: definition of the concept, etiology, classification.
3. Features of blood circulation in the small circle.
4. Small circulatory hypertension: etiology, mechanisms of development and compensation, consequences.
5. Primary arterial hypertension (hypertension): definition, etiology, pathogenesis.
6. Secondary (symptomatic) arterial hypertension: definition, types, causes and main mechanisms of their development.

task

A 48-year-old man went to the doctor with complaints of dizziness, severe headache, tinnitus, flickering flies in front of his eyes, frequent nosebleeds. It is known that for the last 18 years he smokes 10 cigarettes a day, prefers salty food, and abuses alcohol.

From the family history: the mother had hypertension and died of a myocardial infarction at the age of 60.

Objectively: the body temperature is 36.8°C, the skin is pale, the face is hyperemic, the respiratory rate is 20 per minute, the respiration is vesicular. The heart rate is 64 beats per minute, the pulse is rhythmic, tense, the borders of the heart are extended to the left, the heart sounds are increased, blood pressure on the brachial artery is 168/96 mm Hg, the abdomen is soft, painless, the liver and spleen are not palpable.

Echocardiography records left ventricular myocardial hypertrophy.

Ophthalmoscopy revealed increased tortuosity of the fundus vessels.

QUESTIONS:

1. Make a reasonable conclusion about the form of pathology of the cardiovascular system in this patient. Specify the stage.
2. Indicate the etiology of this form of pathology in the patient, as well as other possible factors for the occurrence of this form of pathology.
3. Explain the pathogenesis of the described clinical and instrumental manifestations.
4. Explain the principles of therapy for this form of pathology.

Practical lesson # 9

Pathophysiology of the cardiovascular system. Heart failure

1. Heart failure: definition, classification, etiology, compensation mechanisms.
2. Chronic heart failure: pathogenesis, manifestations, mechanisms of compensation and decompensation.
3. Pathological myocardial hypertrophy, pathogenesis. The concept of ремоделированииheart remodeling in chronic heart failure.
4. Acute heart failure: types, etiology, pathogenesis, manifestations.

Pathophysiology of shock.

1. Shock: definition, classification, general pathogenesis, manifestations.
2. General pathogenesis of shock: changes in central hemodynamics.
3. General pathogenesis of shock: changes in microcirculation, metabolism and cell damage during shock.
4. Features of pathogenesis of traumatic shock, burn shock, cardiogenic shock.
5. Features of etiology and pathogenesis of septic shock and anaphylactic shock Principles of shock therapy and prevention.

TASK 1

A 62-year-old patient went to the ambulance with complaints of severe weakness, attacks of suffocation, acute pressing pain in the heart that lasted for an hour and was not stopped by nitroglycerin.

From the anamnesis: a year ago, she suffered from infectious myocarditis.

Objectively: the body temperature is 36.8°C, the skin is pale, with a bluish tinge, cold sticky sweat, acrocyanosisакроцианоз. RESPIRATORY RATE 33 per minute, hard breathing, small-bubble wheezing sounds are heard in the lower parts of the lungs, heart rate is 100 beats per minute, pulse is tense, blood pressure is 100/80 mm Hg, heart sounds are weakened. The abdomen is soft, painless, the liver and spleen are not palpable.

The electrocardiogram shows an increase in the ST segment in leads I, II and aVL, and a pathological Q wave in leads I and aVL.

QUESTIONS:

1. What is the leading syndrome of the cardiovascular system that can be identified in this patient? Justify the specified syndrome.
2. Indicate the etiology of this syndrome in the patient, as well as other possible factors for the occurrence of this syndrome.
3. Explain the pathogenesis of the described clinical and instrumental manifestations.
4. Explain the principles of treatment for this syndrome.

TASK 2

A 38-year-old patient was taken to the clinic in serious condition. It was found under the rubble of a building 2 hours after the collapse of a panel house in an explosion. The right lower limb was squeezed by a panel plate for a long time.

Objectively: the body temperature is 36.0°C, the patient's condition is severe, consciousness is confused, the patient is slowed down, multiple bone fractures, abrasions and bruises. The skin is pale, cold sticky sweat, acrocyanosis. The pupils are narrow and the reaction to light is weak. The skin of the compressed limb is dark purple, with areas of hemorrhage, a clearly defined demarcation line, many blisters filled with cloudy hemorrhagic contents, the frequency of respiratory movements is 30 per minute, vesicular breathing. The heart rate is 110 beats per minute, the pulse is weak, the heart sounds are weakened, the blood pressure is 58/32 mm Hg. The abdomen is soft, painful in the flank areas on both sides, the liver and spleen are not palpable.

After installing the urinary catheter, 100 ml of dirty - brown urine was released, followed by anuria.

Blood chemistry: urea 8.6 mmol/L, creatinine 160 mmol/L, potassium 6.9 mmol/L, myoglobin more than 1000 mcg/ml, creatine phosphokinase 5500 U/l.

Indicators of the acid-base state of the blood: pH = 7.15, $RASO2_2$ = 24.5 mm Hg, AB = 5.0 mmol/L, SB = 8.6 mmol/L, BE = -22.5 mmol/L, lactate 12.6 mmol/l.

QUESTIONS:

1. What is the typical pathological process developed in this patient? Justify the answer. Name the option according to its classification.
2. Indicate the etiology of this typical pathological process in the patient, as well as other possible factors for the occurrence of this typical pathological process.
3. Explain the pathogenesis of the described clinical and laboratory-instrumental manifestations.
4. Explain the principles of therapy for this typical pathological process.

Practical lesson # 10

Pathophysiology of the external respiratory system: respiratory failure

1. Breathing as a process. Methods for evaluating ventilation,pulmonary perfusion, and gas diffusion.
2. Respiratory failure: definition of the concept, classification.
3. Ventilation form of respiratory failure: types, etiology, pathogenesis, manifestations.
4. The concept of chronic obstructive pulmonary disease.
5. Diffusive form of respiratory failure: etiology, pathogenesis, manifestations.
6. Adult respiratory distress syndrome.
7. Ventilation form of respiratory failure: violation of central respiratory regulation, etiology, pathogenesis, manifestations.
8. Perfusion form of respiratory failure: etiology, pathogenesis.
9. Pulmonary hypertension: mechanism of development and compensation, consequences.
10. Dyspnea: definition, pathogenesis.
11. Pathological types of breathing.
12. Pulmonary edema: types, causes, and mechanisms of development.

task

Man E., 32 years old, went to the doctor with complaints of fever up to 39 ° C, painful wet cough with sputum, general weakness.

From the anamnesis: there are no bad habits, the day before I was exposed to hypothermia as a result of a forced long stay in a cold room, in the evening I felt unwell, chills.

Objectively: body temperature is 39.3°C, skin is hyperemic, hot, dry, tongue is dry. RESPIRATORY RATE 21 per minute, hard breathing, wet fine-bubbled wheezes are heard on the right, percussion: blunting of sound on the right in the lower parts of the lung. The heart rate is 85 beats per minute, the pulse is rhythmic, tense, heart tones are muted, blood pressure is 110/70 mm Hg, the abdomen is soft, painless, the liver and spleen are not palpable.

General blood test: red blood cells $4{,}5 \cdot 10^{12}$/l, hemoglobin 120 g / l, color index ? **(it is necessary to calculate the indicator)**, hematocrit 42%, reticulocytes 0%, platelets $330 \cdot 10^{9}$/l, white blood cells $13{,}1 \cdot 10^{9}$/L. White blood cell formula: eosinophils 0%, basophils 1%, neutrophils: metamyelocytes 2%, rod neutrophils 9%, segmented neutrophils 61%; lymphocytes 23%, monocytes 4%. ESR of 40 mm/h.

Spirometry: VEL = 2500 ml, FVC = 2500 ml, FEV_1= 1500 ml, Tiffno index ? **(you need to calculate the indicator).**

Sputum culture: Streptococcus pneumoniae was sown in large numbers pneumoniae.

QUESTIONS:

1. .....Make a reasonable conclusion about the form of pathology of the external respiratory system in this patient.
2. .....Indicate the etiology of this form of pathology in the patient, as well as other possible factors for the occurrence of this form of pathology.
3. .....Explain the pathogenesis of the described clinical and laboratory-instrumental manifestations.
4. .....Explain the principles of therapy for this form of pathology of the external respiratory system.

Practical lesson # 11

Pathophysiology of the gastrointestinal tract: disorders of the functions of the stomach, small and large intestines. Peptic ulcer of the stomach and duodenum.

1. Violation of motor, evacuation and secretory functions of the stomach: etiology, mechanisms of development, manifestations and consequences.
2. Peptic ulcer of the stomach and duodenum: definition of the concept, etiology.
3. The role of dysregulation of gastric secretion.
4. Peptic ulcer of the stomach and duodenum: pathogenesis, complications.
5. Consequences of gastrointestinal surgery. Dumping syndrome, shortened bowel syndrome, consequences of vagotomy: etiology, pathogenesis of manifestations.
6. Синдром Maldigestion and malabsorption syndrome: definition of concepts, etiology, pathogenesis.
7. Intestinal enzymopathies.

task

Patient A., 41 years old, was admitted to the clinic with complaints of nausea, belching of air and food, heartburn, constipation,epigastric pain that occurs after eating.

Objectively: body temperature 36.3°C, heart rate 86 / min, RESPIRATORY RATE 16 / min, blood pressure 115/80 mm Hg, skin pale, warm, visible mucous membranes clean, vesicular respiration in the lungs, heart sounds clear, rhythmic, abdomen soft, painful in the epigastric region, liver and spleen are not palpable.

From the medical history: the patient recently eats irregularly, mainly in dry water, prefers spicy food, smokes about 1 pack per day.

General blood test: red blood cells $3,8 \cdot 10^{12}$/l; hemoglobin 95 g / l; color index - **? (must be calculated)**; hematocrit 39%; reticulocytes 0%; platelets $275 \cdot 10^{9}$/l; white blood cells $5,0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 0%, basophils 0%, metamyelocytes 0%, rod neutrophils 1%, segmented neutrophils 56%, lymphocytes 38%, monocytes 5%, ESR 10 mm / h.

In the blood smear: anisocytosis, poikilocytosis, microcytosis.

Blood chemistry: total bilirubin 21.7 mmol/ l, direct bilirubin 5.4 mmol/L, ALT 43 IU / L, AsAT 41 IU/ L, alkaline phosphatase 110 U/L, total protein 58 g/l, albumin 32 g/L, urea 2.6 mmol/L, cholesterol 4.9 mmol/ll, the serum iron content is 9.7 mmol/l.

Examination of feces for hidden blood: the reaction is positive.

Endoscopic examination: on the small curvature of the stomach, a mucosal defect measuring 0.9 cm by 1.2 cm was found, reaching the submucosal layer.

QUESTIONS:

1. What is the leading gastrointestinal syndrome that can be identified in this patient? Justify the specified syndrome.
2. Indicate the etiology of this syndrome in the patient, as well as other possible factors for the occurrence of this syndrome.
3. Explain the pathogenesis of the described clinical and laboratory-instrumental manifestations.
4. Explain the principles of treatment for this syndrome.

Practical lesson # 12

Pathophysiology of the liver: the main syndromes in liver pathology.

1. Hepatic-cellular insufficiency: definition, etiology, pathogenesis, manifestations.
2. Hepatic encephalopathy: definition, etiology and pathogenesis.
3. The role of alcohol and environmental factors in the occurrence and progression of liver diseases.
4. Jaundice syndrome: definition, classification, manifestations and consequences.
5. Hemolytic jaundice: etiology, pathogenesis, diagnostic criteria.
6. Mecanicjaundice: etiology, pathogenesis, diagnostic criteria.
7. Parenchymal and enzymopathic jaundice: etiology, pathogenesis, diagnostic criteria.
8. Portal hypertension: definition of the concept, etiology, classification, pathogenesis of the main symptoms.
9. Cirrhosis of the liver: definition of the concept, etiology, classification, pathogenesis of the main symptoms.

task

Patient A., 19 years old, was admitted to the clinic with complaints of weakness, rapid fatigue, nausea, vomiting, decreased appetite, discoloration of the skin and urine, and itching of the skin.

Medical history: has been using intravenous drugs for 3 years.

Objectively: body temperature 37.4°C, heart rate 82 / min, saffron-tinged skin, warm, icteric mucousmembranes, vesicular respiration in the lungs, clear, rhythmic heart tones, soft, painless abdomen, liver protrudes 3 cm from under the edge of the costal arch, the edge of the liver is dense, painful, the spleen is not palpable.

General blood test: red blood cells $4{,}1 \cdot 10^{12}$/l; hemoglobin 128 g / l; color index**? (must be calculated);** hematocrit 39%; reticulocytes 0%; platelets $175 \cdot 10^{9}$/l; white blood cells $10{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 1%, basophils 0%, metamyelocytes 1%, rod neutrophils 1%, segmented neutrophils 53%, lymphocytes 39%, monocytes 5%, ESR 37 mm / h.

Blood chemistry: total bilirubin 70 mmol/ l, direct bilirubin 36 mmol/L, ALT 175 IU/ L, AsAT 50 IU/L, albumin 31 g/L, urea 1.75 mmol/L, cholesterol 3.98 mmol/L, alkaline phosphatase 95 IU/ L, prothrombin index 50%.

The HBsAg test is positive.

General urinalysis: brick-colored urine, direct bilirubin detected.

QUESTIONS:

1. What is the leading syndrome of the hepatobiliary system that can be identified in this patient? Justify the specified syndrome.
2. Indicate the etiology of this syndrome in the patient, as well as other possible factors for the occurrence of this syndrome.
3. Explain the pathogenesis of the described clinical and laboratory manifestations.
4. Explain the principles of treatment for this syndrome.

Practical lesson # 13
Pathophysiology of the kidneys: nephritic and nephrotic syndromes, acute renal failure, CRF.

1. Disorders of glomerular filtration, tubular reabsorption, secretion: etiology, pathogenesis of manifestations.
2. Acute renal failure: definition, etiology, pathogenesis, stages, clinical and laboratory criteria, manifestations.
3. Nephrotic syndrome: definition, etiology, pathogenesis, clinical and laboratory manifestations.
4. Nephritic syndrome: definition, etiology, pathogenesis, clinical and laboratory manifestations.
5. Chronic renal failure: definition, etiology, pathogenesis, stages, manifestations.
6. The concept of dialysis and kidney transplantation.

task

Patient M., 60 years old, was taken to the clinic with complaints of headaches, nausea, vomiting, itching of the skin, and general weakness.

From the anamnesis: 10 years ago, a diagnosis of urolithiasis was made with a decrease in GFR to 35 ml / min/1.73 m2.

Objectively: the condition is severe, the body temperature is 37.0°C, the skin is pale, dry, with traces of scratching. Consciousness is confused, ориентированапartially oriented, and there are no paresis or meningeal symptoms. Oral mucosa with ulceration, ammonia smell from the mouth. RESPIRATORY RATE 22 / min, hard breathing, like Kussmaul. Heart rate is 90 / min, pulse is tense, heart sounds are increased, blood pressure is 188/112 mm Hg. The abdomen is soft, painless, the liver and spleen are not palpable.

Ultrasound of the kidneys: multiple small concretions in the calico-pelvic system.

Blood chemistry: urea 86 mmol/l, uric acid 350 mmol/L, creatinine 1460 mmol/l..

Diuresis of 100 ml per day, GFR less than 5 ml / min1, 73m2.

General analysis of urine: straw-colored urine, cloudy, specific density 1002, protein 0.8 g / l; glucose was not detected; microscopy of urine sediment: single squamous epithelium in the field of vision, red blood cells 10-25 in the field of vision, white blood cells 70-100 in the field of vision, granular cylinders 0-1 in the field of vision, oxalate crystals.

QUESTIONS:

1. Make a reasonable conclusion about the pathology of the kidneys in the patient.
2. Name the cause of this pathology in the patient, as well as other possible causes of the development of this pathology.
3. Explain the pathogenesis of the described clinical and laboratory manifestations.

Practical lesson # 14

Private pathophysiology (test control).
Round table discussion on the results of independent work.

Topics of independent work

1. Violation of the main exchange. General characteristics, factors that determine the main exchange rate.
2. Basal metabolic disorders in metabolic disorders, endocrine system functions.
3. Basal metabolic disorders in fever, infectious process.
4. Basic metabolic disorders understress and shock.
5. Disorders of fat metabolism. Insufficient and excessive intake of fat in the body.
6. Alimentary, transport, retention hyperlipidemia.
7. General obesity, its types and mechanisms.
8. Atherosclerosis: general characteristics of the disease, etiology.
9. Atherosclerosis: developmental stages, pathogenesis. Clinical manifestations and consequences.
10. Principles of therapy of fat metabolism disorders.
11. Violation of protein metabolism. Positive and negative nitrogen balance.
12. Violation of the assimilation of food proteins, amino acid metabolism.
13. Hyperazotemia, disorders of the protein composition of the blood: hypop-, hypo- and dysproteinemia.
14. Protein-trophic insufficiency (kwashiorkor, alimentary insanity): epidemiology, clinical and biochemical manifestations.
15. Principles of correction of protein metabolism disorders.
16. Stress as a general adaptation syndrome. Stages, mechanisms of development and manifestations of stress: metabolic, functional and structural.
17. Principles of correction of disorders of vital activity under stress.