3rd year **Medical Faculty**
V semester

Lesson topic # 1

Introduction. Subject, tasks, and methods of pathophysiology. Historical stages of pathophysiology development. Modeling of pathological processes

1. Pathophysiology. Subject, purpose, tasks, and its place among other medical disciplines.
2. The importance of pathophysiology in medicine.
3. Historical stages of pathophysiology development.
4. Methods of pathophysiology.
5. Experimental modeling of diseases: its types, opportunities, and limitations.

task

A rat weighing 215 g undergoes median laparotomy. Find the abdominal aorta with aa extending from it at different levelsaa. renales. A metal rod with a diameter of 1 mm and a ligature between aa. renales extending from the abdominal aorta (above the point of departure of a. renalis sinistra) are applied to the abdominal aorta, then the metal rod is removed. As a result of this manipulation, blood circulation in the abdominal aorta and a. renalis sinistra decreases. Accordingly, the blood supply to the right kidney is normal, while the blood supply to the left kidney is reduced.

QUESTIONS:

1. How will blood pressure change after the experiment?
2. Indicate the reason for the change in blood pressure in the animal.
3. Specify the mechanism of changes in blood pressure in the animal.
4. For what purpose is this pathology modeled?

Lesson topic # 2

General nosology. Etiology and pathogenesis. Classification and characterization of etiological factors of diseases. Disease, definition, main components of the disease – pathological reaction, pathological process, pathological condition. Stages and outcomes of the disease. Influence of pathogenic environmental factors on the body.

1. General nosology as a branch of pathophysiology. Basic concepts of general nosology: pathological reaction, pathological process, pathological condition. Examples. The concept of a typical pathological process.
2. Norm, health, pre-illness. Examples.
3. Disease: definition of the concept, stage of the disease. Specific and non-specific manifestations of the disease. General and local manifestations of the disease, their interrelation. The concept of the syndrome.
4. Sanogenesis: definition of the concept, mechanisms.
5. Etiology: definition of the concept. The role of causes and conditions in the occurrence and development of diseases. Theoretical and practical significance of studying etiology.
6. Classification and characterization of etiological factors. Iatrogenic diseases, classification, examples.
7. Pathogenesis, definition of the concept. Causal relationships in pathogenesis: initial and leading links of pathogenesis, "vicious circles", their role and examples.
8. The importance of studying etiology and pathogenesis. The concept of etiotropic, pathogenetic, symptomatic, sanogenetic, and substitution therapy. Principles of disease prevention.
9. Terminal states. Dying as a stepwise process.
10. Pathophysiological foundations of resuscitation. Post-resuscitation disorders and post-resuscitation disease.

task

Patient B., 32 years old, went to the doctor for a job placement examination.

Objectively: body temperature 36.5°C, heart rate 72 / min, blood pressure 110/80 mm Hg. the skin is pink, warm, the pharynx is pink, the lungs are vesicular, the heart sounds are clear, rhythmic, the abdomen is soft, painless, the liver and spleen are not palpable.

Medical history: for the last 3 years, he has been living in the highlands.

General blood test: red blood cells $6{,}2 \cdot 10^{12}$/l; hemoglobin 185 g / l; color index **? (it is necessary to calculate the indicator**); hematocrit 50%; reticulocytes 0%; platelets $350 \cdot 10^{9}$/l; white blood cells $7{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 1%, basophils 1%, metamyelocytes 0%, rod neutrophils 1%, segmented neutrophils 55%, lymphocytes 35%, monocytes 7%, ESR 10 mm / h.

QUESTIONS:

1. What deviations were detected in the laboratory parameters of patient B.?
2. Specify the reason for these changes. Give a classification of the etiological factors of human diseases.
3. Specify the terms of these changes. Give a classification of conditions of human diseases.
4. Explain the mechanism of changes in laboratory parameters.

Lesson topic # 3

Reactivity of the body and its significance in pathology. Types of reactivity. Constitution of the body.

1. Reactivity of an organism: definition of the concept, types of reactivity. Examples.
2. Body reactivity: forms of reactivity. Examples.
3. Methods and significance of patient reactivity assessment.
4. External and internal environmental factors affecting reactivity. The importance of studying reactivity.
5. Body resistance: definition of the concept, non-specific and specific resistance factors, examples of their violations.
6. Constitution of an organism: definition of the concept, classification. The dependence of reactivity on the human constitution.

task

Man A., 40 years old, was found in the yard in serious condition and taken to the clinic by ambulance, which was called by neighbors in the house. According to them, the man leads an antisocial lifestyle, is often absent from home, wanders, and abuses alcohol. In the clinic, the patient complains of severe weakness and malaise, difficulty breathing, cough with a small amount of discharge, and fever.

Objectively: body temperature is 38.9°C, heart rate is 95 / min, skin is hyperemic, hot, pharynx is hyperemic, moist and crepitating wheezes are heard in the lungs on the right in the lower partsкрепитирующие, heart sounds are clear, rhythmic, the abdomen is soft, painless, liver and spleen are not palpable.

From anamnesis: ill on day 2.

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 $300 \cdot 10^{9}$/l; white blood cells $14{,}5 \cdot 10^{9}$/L. White blood cell formula: eosinophils 1%, basophils 1%, metamyelocytes 4%, rod neutrophils 8%, segmented neutrophils 54%, lymphocytes 27%, monocytes 5%, ESR 25 mm / h.

Sputum culture: a large number of Str. pneumoniae were sown.

Preliminary diagnosis: pneumonia.

questions

1. Specify the type of reactivity in patient A.
2. What other types of reactivity are distinguished?
3. Specify the form of reactivity in patient A.
4. What other forms of reactivity are distinguished?
5. Evaluate the patient's resistance and explain its nature.
6. Specify the cause of pneumonia.
7. Give a classification of the etiological factors of human diseases.

Lesson topic # 4

Pathophysiology cell damage. The role of external factors and genetic defects. Basic mechanisms of cell damage

1. Cell damage: definition of the concept, causes, and mechanisms of cell damage. Manifestations of cell damage.
2. Disorders of regulation of intracellular processes: etiology, pathogenesis, examples.
3. Etiology and mechanisms of cell energy supply disorders. Mitochondrial cytopathies, examples.
4. Mechanisms of cell membrane damage. The role of oxidative stress in cell membrane damage.
5. Mechanisms of short-and long-term compensation in response to cell damage. Examples.
6. Ischemia-reperfusion syndrome: etiology, pathogenesis, manifestations. Examples.
7. Types and mechanisms of cell death. Examples of increased and insufficient cell death in pathology.

task

Patient O., 56 years old, went to the doctor with complaints of severe thirst, dry mouth, general weakness, rapid fatigue, frequent urination, especially at night, and an increase in the amount of urine released.

From the anamnesis: the patient notes the appearance of these symptoms after a stressful situation. Decreased physical activity recently as a result of weight gain.

Objectively: body temperature 36.3°C, heart rate 75 / min, the patient is over-nourished, the skin is pink, warm, dry, the oral mucosa is pink, dry, the tongue is covered with a white coating, the lungs are vesicular, the heart sounds are clear, rhythmic, the abdomen is soft, painless, the liver and spleen are not palpable.

Данные Glucose tolerance test data: fasting plasma glucose 7.5 mmol/l, 2 hours after glucose loading - 13.0 mmol/l.

Biochemical blood test: glycosylated hemoglobin 7.8%.

Diuresis of 2800 ml / day.

General urinalysis: straw-yellow urine, specific gravity 1033, glucose 3.2 mmol/l.

A preliminary diagnosis was made: type 2 diabetes mellitus.

QUESTIONS:

1. Indicate the cause of this pathology in patient O.
2. Specify the mechanism of cell damage in patient O.
3. Explain the pathogenesis of the described clinical and laboratory manifestations.

Lesson topic # 5
General nosology (overview lesson)

1. Pathophysiology. Subject, purpose, tasks, and its place among other medical disciplines.
2. The importance of pathophysiology in medicine.
3. Historical stages of pathophysiology development.
4. Methods of pathophysiology.
5. Experimental modeling of diseases: its types, opportunities, and limitations.
6. General nosology as a branch of pathophysiology. Basic concepts of general nosology: pathological reaction, pathological process, pathological condition. Examples. The concept of a typical pathological process.
7. Norm, health, pre-illness. Examples.
8. Disease: definition of the concept, stage of the disease. Specific and non-specific manifestations of the disease. General and local manifestations of the disease, their interrelation. The concept of the syndrome.
9. Sanogenesis: definition of the concept, mechanisms.
10. Etiology: definition of the concept. The role of causes and conditions in the occurrence and development of diseases. Theoretical and practical significance of studying etiology.
11. Classification and characterization of etiological factors. Iatrogenic diseases, classification, examples.
12. Pathogenesis, definition of the concept. Causal relationships in pathogenesis: initial and leading links of pathogenesis, "vicious circles", their role and examples.
13. The importance of studying etiology and pathogenesis. The concept of etiotropic, pathogenetic, symptomatic, sanogenetic, and substitution therapy. Principles of disease prevention.
14. Terminal states. Dying as a stepwise process.
15. Pathophysiological foundations of resuscitation. Post-resuscitation disorders and post-resuscitation disease.
16. Reactivity of an organism: definition of the concept, types and forms of reactivity. Examples. Methods and significance of patient reactivity assessment.
17. External and internal environmental factors affecting reactivity. The importance of studying reactivity.
18. Body resistance: definition of the concept, non-specific and specific resistance factors, examples of their violations.
19. Cell damage: definition of the concept, causes, and mechanisms of cell damage. Manifestations of cell damage.
20. Disorders of regulation of intracellular processes: etiology, pathogenesis, examples.
21. Etiology and mechanisms of cell energy supply disorders. Mitochondrial cytopathies, examples.
22. Mechanisms of cell membrane damage. The role of oxidative stress in cell membrane damage.
23. Mechanisms of short-and long-term compensation in response to cell damage. Examples.
24. Ischemia-reperfusion syndrome: etiology, pathogenesis, manifestations. Examples.
25. Types and mechanisms of cell death. Examples of increased and insufficient cell death in pathology.

Lesson topic # 6

Acute inflammation. Etiology, main components of pathogenesis. Inflammatory mediators

1. Inflammation: definition of the concept, etiology, local and systemic signs of inflammation, their pathogenesis and interrelation. Biological significance of inflammation.
2. Primary and secondary alterations, changes in the blood vessels of the microcirculatory bed during inflammation, pathogenesis, manifestations.
3. Pathogenesis of edema in inflammation. The role of biologically active substances in the regulation of vascular wall permeability. Types of exudates, examples. Differences between exudate and transudate.
4. Mediators of inflammation, classification, their sources and role in the formation of inflammation.
5. Leukocyte reactions in inflammation: types, mechanisms, significance.
6. Phagocytosis in inflammation, stages. Oxygen-dependent and кислороднезависимые механизмы oxygen-independent killing mechanisms.
7. Stage of proliferation in inflammation: main stages, mechanisms and types of repair, regulation.

task

A 28-year-old man went to the doctor complaining of constant throbbing pain in the area of the nail phalanx of the right index finger. The pain continues for four days, it occurred after a microtrauma, which the man did not attach any importance to.

On examination: the skin of the nail phalanx from the palmar surface is hyperemic. The nail phalanx is enlarged, hot to the touch, painful on palpation. Movement in it is limited due to pain and swelling.

General blood test: red blood cells $3{,}7 \cdot 10^{12}$/l; hemoglobin 125 g / l; color index - **? (it is necessary to calculate the indicator**); hematocrit 42%; reticulocytes 0%; platelets $320 \cdot 10^{9}$/l; white blood cells $9{,}5 \cdot 10^{9}$/l; Leukocyte formula: eosinophils 2%; basophils 1%; neutrophils: metamyelocytes 1%; rod neutrophils 6%; segmented neutrophils 60%; lymphocytes 25%; monocytes 5%. ESR of 20 mm/h.

questions

1. What is the typical pathological process observed in the patient? Justify the answer. Specify the stage of a typical pathological process.
2. Indicate the possible etiological factor of a typical pathological process in this patient.
3. Specify the pathogenesis of a typical pathological process in the specified specific situation.
4. Explain the pathogenesis of symptoms in this patient. Give a classification of symptoms of a typical pathological process.
5. Outline the general principles of therapy and prevention of a typical pathological process**.**

Lesson topic # 7
"Chronic inflammation. Acute phase response."

1. Chronic inflammation: features of etiology.
2. Chronic inflammation: features of pathogenesis, examples of diseases.
3. Principles of anti-inflammatory therapy.
4. Acute phase response: definition of the concept, meaning, pathogenesis of manifestations.

task

In patient A. with a diagnosis of infiltrative pulmonary tuberculosis, foci of caseous necrosis surrounded by macrophages, lymphocytes, epithelioid cells, and Pirogov-Langerhans cells were found in the lung tissue, and Mycobacterium tuberculosis was detected.

In patient B. with a diagnosis of upper lobar pneumonia, exudate containing neutrophils, single red blood cells, and fibrin was found in the alveoli of the affected lung, and pneumococcus was detected.

QUESTIONS:

1. What is the typical pathological process developed in patient A. and patient B.? Justify the answer.

2. Indicate the etiology of a typical pathological process in each of the patients.

3. Indicate the stage of pathogenesis of a typical pathological process in each of the patients.

4. What other etiological factors can lead to the development of these typical pathological processes?

5. Outline the general principles of therapy and prevention of a typical pathological process**.**

Lesson topic # 8

"Pathophysiology of the immune system. Allergy. Classification of allergic reactions. Major allergic reactions".

1. Allergy: definition of the concept, classification according to Jell and Coombs, general characteristics of allergic reactions. General pathogenesis of allergic reactions.
2. Allergens: definition of the concept, classification. The concept of sensitization and desensitization. Principles of therapy.
3. Type I allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
4. Allergic reactions of type II: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
5. Type III allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
6. Type IV allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
7. Allergic reactions Vof type V: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
8. Autoimmune diseases: definition, etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
9. Primary and secondary immunodeficiency states: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.

TASK 1

A 20-year-old woman went to the doctor with complaints of itchy skin, redness and swelling of the eyelids, runny nose, sore throat, difficulty breathing.

From the medical history: all symptoms developed an hour after the next arrival at the forest lake.

General blood test: red blood cells $3{,}8 \cdot 10^{12}$/hemoglobin 127 g / l; color index - **? (it is necessary to calculate the indicator**); hematocrit 42%; reticulocytes 0%; platelets $350 \cdot 10^{9}$/l; white blood cells $9{,}8 \cdot 10^{9}$/l; Leukocyte formula: eosinophils 10%; basophils 6%; neutrophils: metamyelocytes 0%; rod neutrophils 2%; segmented neutrophils 61%; lymphocytes 18%; monocytes 3%. ESR is 22 mm/h.

Blood immunoassay: serum IgE of 650 IU / ml.

questions

1. What form of immune system pathology has the patient developed? What type of Jell and Coombs classification does this pathology of the immune system belong to? Justify the answer.
2. Indicate the etiology of the form of immune system pathology in the patient.
3. Indicate the pathogenesis of the form of pathology of the immune system in a specific situation.
4. Explain the pathogenesis of the described clinical and laboratory manifestations.
5. What other etiological factors can lead to the development of the indicated form of pathology of the immune system?
6. Outline the general principles of therapy and prevention of this form of immune system pathology.

TASK 2

A 25-year-old woman went to the doctor with complaints of severe weakness, dizziness, fever, pustular rashes on the skin, bleeding gums, frequent acute respiratory infections in the last 2 months.

From the anamnesis: 3 months ago I was treated with cytostatic drugs.

Objectively: the temperature is 37.6°C, the skin is pale, warm, with small ulcers in the area of the hands, buttocks, thighs. The respiratory rate is 15 per minute, vesicular respiration in the lungs, blood pressure 110/70 mm Hg, heart rate 86 per minute, heart sounds are clear, rhythmic, the abdomen is soft, painless, the liver and spleen are not palpable.

General blood test: red blood cells $2,5 \cdot 10^{12}$/hemoglobin 80 g / l; color index - **? (must be calculated)**; hematocrit 40%; reticulocytes 0%; platelets $100 \cdot 10^{9}$/l; white blood cells $2,5 \cdot 10^{9}$/L. White blood cell formula: eosinophils 2%; basophils 2 %; neutrophils: metamyelocytes 2%; rod neutrophils 10 %; segmented neutrophils 39 %; lymphocytes 34 %; monocytes 11 %. ESR is 22 mm/h.

questions

1. What form of immune system pathology does the patient develop? Justify the answer.
2. Specify the etiology of the form of pathology of the immune system in this situation.
3. Specify the pathogenesis of the form of immune system pathology in the specified specific situation.
4. Explain the pathogenesis of the described clinical and laboratory manifestations in this patient.
5. Outline the general principles of therapy and prevention of this form of immune system pathology.

Lesson topic # 9
"Fever. Hyperthermia. Hypothermia".

1. Fever: definition of the concept, etiology. Biological significance of fever. The difference between fever and overheating of the body.
2. Types of febrile reactions, their diagnostic significance. The concept of pyrotherapy.
3. Pathogenesis of fever. Thermoregulation at different stages of fever.
4. Changes in the metabolism, function of organs and systems in fever. Biological significance of fever.
5. Body overheating: definition of the concept, etiology, pathogenesis, manifestations.
6. Etiology and pathogenesis of overheating syndromes: heat exhaustion, heat stroke, sunstroke, malignant fever, heat injury due to overexertion (marching fever).
7. Hypothermia: definition of the concept, etiology, pathogenesis, manifestations. Therapeutic hypothermia.

task

Patient A. 24 years old went to the doctor with complaints of general malaise, fever, chills.

From the anamnesis: was for three days with parents suffering from acute respiratory viral infections.

Objectively: body temperature 38.3°C, heart rate 92 / min, blood pressure 120/80 mm Hg, skin pale, cold, dry, "goose bumps" symptom, pharynx hyperemic, vesicular respiration in the lungs, heart sounds clear, rhythmic, stomach soft, painless, liver and spleen are not palpable.

The patient was given a preliminary diagnosis: acute respiratory viral infection.

QUESTIONS:

1. What is the typical pathological process associated with changes in body temperature observed in patient A. Answer aboutbosnuite. Specify the stage.

2. Indicate the etiology of a typical pathological process in this patient. Specify the conditions for the development of a typical pathological process in this patient.

3. Indicate the pathogenesis of a typical pathological process in the specified specific situation.

4. Explain the pathogenesis of the patient's symptoms.

5. What other etiological factors can lead to the development of a typical pathological process?

6. Give a classification and indicate the general pathogenesis of a typical pathological process.

7.Outline the general principles of therapy and prevention of a typical pathological process**.**

Lesson topic # 10
"Hypoxia. Hyperoxia".

1. Hypoxia: definition of the concept, classification. Mechanisms of hypoxic necrobiosis.
2. Hypoxic hypoxia: types, etiology, pathogenesis, indicators of oxygen supply to the body.
3. Hemic hypoxia: types, etiology, pathogenesis, indicators of oxygen supply to the body.
4. Circulatory hypoxia: types, etiology, pathogenesis, indicators of oxygen supply to the body.
5. Histotoxic hypoxia: etiology, pathogenesis, indicators of oxygen supply to the body. Hyperoxia as a cause of hypoxia. Hyperoxygenation: therapeutic and pathological effects.
6. Urgent and long-term compensation mechanisms for hypoxia.

task

Patient A., 56 years old, was taken to the cardiology department of the hospital with a diagnosis of left ventricular myocardial infarction.

Objectively: body temperature 36.9 °C, skin pale, cold, moist, pharynx pink, vesicular respiration in the lungs, wet wheezing is heard, heart sounds are deaf, heart rate 89 / min, blood pressure 110/60 mm Hg, tachyarrhythmia, the abdomen is soft, painless, liver and spleen are not palpable.

QUESTIONS:

1. Does the patient have symptoms of hypoxia? If yes, then specify its version according to the classification. Justify the answer.
2. Indicate a possible etiological factor for the development of hypoxia in this patient.
3. Explain the pathogenesis of the observed symptoms in the patient.
4. What other etiological factors can lead to the development of hypoxia?
5. Specify the general pathogenesis of hypoxia.
6. Specify the mechanisms of hypoxia compensation.

Lesson topic # 11

"Typical pathological processes (overview lesson)".

1. Inflammation: definition of the concept, etiology, local and systemic signs of inflammation, their pathogenesis and interrelation. Biological significance of inflammation.
2. Primary and secondary alterations, changes in the blood vessels of the microcirculatory bed during inflammation, pathogenesis, manifestations.
3. Pathogenesis of edema in inflammation. The role of biologically active substances in the regulation of vascular wall permeability. Types of exudates, examples. Differences between exudate and transudate.
4. Mediators of inflammation, classification, their sources and role in the formation of inflammation.
5. Leukocyte reactions in inflammation: types, mechanisms, significance.
6. Phagocytosis in inflammation, stages. Oxygen-dependent and кислороднезависимые механизмы oxygen-independent killing mechanisms.
7. Stage of proliferation in inflammation: main stages, mechanisms and types of repair, regulation.
8. Chronic inflammation: features of etiology and pathogenesis, examples of diseases. Principles of anti-inflammatory therapy.
9. Allergy: definition of the concept, classification according to Jell and Coombs, general characteristics of allergic reactions. General pathogenesis of allergic reactions.
10. Allergens: definition of the concept, classification. The concept of sensitization and desensitization. Principles of therapy.
11. Type I allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
12. Allergic reactions of type II: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
13. Type III allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
14. Type IV allergic reactions: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
15. Allergic reactions Vof type V: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
16. Autoimmune diseases: definition, etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
17. Primary and secondary immunodeficiency states: etiology, pathogenesis, manifestations, principles of therapy and prevention, examples.
18. Fever: definition of the concept, etiology. Biological significance of fever. The difference between fever and overheating of the body.
19. Types of febrile reactions, their diagnostic significance. The concept of pyrotherapy.
20. Pathogenesis of fever. Thermoregulation at different stages of fever.
21. Changes in the metabolism, function of organs and systems in fever. Biological significance of fever.
22. Body overheating: definition of the concept, etiology, pathogenesis, manifestations.
23. Etiology and pathogenesis of overheating syndromes: heat exhaustion, heat stroke, sunstroke, malignant fever, heat injury due to overexertion (marching fever).
24. Hypothermia: definition of the concept, etiology, pathogenesis, manifestations. Therapeutic hypothermia.
25. Hypoxia: definition of the concept, classification. Mechanisms of hypoxic necrobiosis.
26. Hypoxic hypoxia: types, etiology, pathogenesis, indicators of oxygen supply to the body.
27. Hemic and circulatory hypoxia: types, etiology, pathogenesis, indicators of oxygen supply to the body.
28. Histotoxic hypoxia: etiology, pathogenesis, indicators of oxygen supply to the body. Hyperoxia as a cause of hypoxia. Hyperoxygenation: therapeutic and pathological effects.
29. Urgent and long-term compensation mechanisms for hypoxia.

Lesson topic # 12
"Pathophysiology of metabolism. ABB violations".

1. The concept of the acid-base state/balance (ABB): definition of the concept, role in the body, mechanisms of regulation.
2. The concept of acid-base state: main indicators, classification of ABB violations.
3. Gas acidosis, etiology, pathogenesis, compensation mechanisms, clinical and laboratory manifestations.
4. Non-gas acidosis, etiology, pathogenesis, compensation mechanisms, clinical and laboratory manifestations.
5. Gas alkalosis, etiology, pathogenesis, compensation mechanisms, clinical and laboratory manifestations.
6. Non-gas alkalosis, etiology, pathogenesis, compensation mechanisms, clinical and laboratory manifestations.

task

Patient A., 46 years old, was taken to the hospital in serious condition with a diagnosis of asthmatic status.

Objectively: body temperature 36.3°C, heart rate 85 / min, RESPIRATORY RATE 25 / min, blood pressure 150/90 mm Hg, skin cyanotic, cold, yawning pink, with percussion of the lungs-box sound, hard breathing, dry wheezing is heard, auxiliary muscles participate in the act of breathing, heart tones are clear, muffled the abdomen is soft, painless, the liver and spleen are not palpable.

General blood test: red blood cells $6{,}5 \cdot 10^{12}$/l; hemoglobin 185 g / l; color index ? (**calculate the indicator**); hematocrit 52%; reticulocytes 0%; platelets $350 \cdot 10^{9}$/l; white blood cells $8{,}0 \cdot 10^{9}$/L. White blood cell formula: eosinophils 10%, basophils 2%, metamyelocytes 0%, rod neutrophils 1%, segmented neutrophils 45%, lymphocytes 35%, monocytes 7%, ESR 2 mm / h.

Indicators of the acid-base state: pH 7.2;aO_2 70 мм рт.стPh270 mmHg; paCPH255 mmHg;55 мм рт.стstandard bicarbonate (SB) 32 mmol/ l; excess of buffer bases (BE) +2.6 mmol/l.

QUESTIONS:

1. What kind of ABB disorder did patient A. develop? Justify the answer.
2. Indicate the etiology of acid-base disorders in patient A. What other causes could cause these ABB disorders?
3. Explain the pathogenesis of symptoms and laboratory data in patient A.
4. Specify the mechanisms of compensation for the violation of ABB in A. What other compensatory mechanisms are possible for this violation of ABB?
5. What are the principles of treatment and prevention of this ABB disorder?

Lesson topic # 13
"Pathophysiology of metabolism.
Violations of water metabolism. Edema".

1. Water balance in the body, mechanisms of regulation of water metabolism. Classification of water balance disorders.
2. Hypohydration: definition, classification, etiology, pathogenesis, manifestations, compensation mechanisms.
3. Hyperhydration: definition, classification, etiology, pathogenesis, manifestations, compensation mechanisms.
4. Edema: definition of the concept, classification, mechanisms of development.
5. Pathogenesis of edema in heart failure.
6. Pathogenesis of edema in nephrotic syndrome.
7. Pathogenesis of inflammatory, hunger and hepatic edema.

task

Patient B., 21 years old, was admitted to the nephrology department of the hospital with a diagnosis of acute glomerulonephritis.

Objectively: body temperature 37.5°C, heart rate 82/min, RESPIRATORY RATE 13/min. Blood pressure 150/80 mm Hg. the skin is pink, warm, loose swelling of the face, which easily moves and leaves a hole when pressed with a finger.

The pharynx is pink, respiration is vesicular in the lungs, heart sounds are clear, rhythmic, the abdomen is soft, painless, a positive symptom of beating, the liver and spleen are not palpable.

General blood test: red blood cells $4{,}2 \cdot 10^{12}$/l; hemoglobin 125g/l; color index ? **(calculate the indicator)**; hematocrit 45%; 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 of 8 mm/h.

Blood chemistry: total protein 38 g/l, albumin 18 g/l.

General analysis of urine: red-brown urine, cloudy, specific gravity 1035, pH 5.9; glucose is absent, protein 3.5 g / l; sediment microscopy: single squamous epithelium in the field of vision, red blood cells 15-20 in the field of vision, white blood cells 2-5 in the field of vision, granular cylinders 8-19 in the field of vision.

QUESTIONS:

1. What is the typical pathological process in patient B.? Indicate the leading mechanism of this typical pathological process in patient B.?
2. What other mechanisms of this typical pathological process are distinguished?
3. Explain the pathogenesis of symptoms and laboratory data in this patient.
4. What are the pathogenetic principles of therapy and prevention of this typical pathological process in patient B.?

Lesson topic # 14
"Pathophysiology of metabolism.
Disorders of carbohydrate metabolism: hypo-and hyperglycemia. Diabetes mellitus".

1. Hyperglycemia: definitions, types, mechanisms of development, significance for the body. Hyperosmolar coma: etiology, pathogenesis, manifestations.
2. Hypoglycemia: definition of the concept, types, mechanisms of development, significance for the body. Hypoglycemic coma: etiology, pathogenesis, manifestations.
3. Diabetes mellitus: definition, classification, criteria. The mechanism of action of insulin. Contrinsular hormones.
4. Insulin-dependent diabetes mellitus: etiology, pathogenesis.
5. Non-insulin-dependent diabetes mellitus: etiology, pathogenesis.
6. Diabetes mellitus: pathogenesis of manifestations, principles of prevention and therapy.
7. Diabetic comas: ketoacidotic, lactic-acidemic. Etiology, pathogenesis, and manifestations.

task

Patient A., 18 years old, went to the doctor with complaints of severe general and muscle weakness, drowsiness, poor appetite, severe dry mouth, severe thirst (drinks up to 6 liters per day), frequent urination, weight loss by 7 kg in the last 2 weeks.

Medical history: according to the patient, these symptoms first began to be noted about 3 weeks ago, 2 weeks after the acute respiratory viral infection. The family history is not burdened.

Objectively: the mind is clear. The skin is warm and physiological in color. Weight-75 kg, height-188 cm**, calculate the body mass index**. Heart rate 75 / min, blood pressure 110/60 mm Hg, heart sounds clear, rhythmic, RESPIRATORY RATE 16 / min, vesicular respiration, no wheezing. The abdomen is soft, painless, and the liver is not palpable.

Laboratory data: fasting plasma glucose 23.8 mmol/ l HbA1c 16.3%.

Blood chemistry: creatinine 89 mmol/l, urea 5.2 mmol/l, total bilirubin 9.3 mmol/L; ALT 43 U/L, AsAT 27 U/L, cholesterol 5.3 mmol/L; total protein 64 g/l; sodium 142 mmol/L, potassium 4.1 mmol/l.

General analysisof urine: straw-yellow urine, transparent, specific density 1032, no protein, glucose 30 mmol/ l, ketone bodies 1.5 mmol/l, microscopy of urine sediment: single squamous epithelium in the field of vision, red blood cells are absent, white blood cells 2-4 in the field of vision, cylinders are absent.

QUESTIONS:

1. What syndrome did A develop A? Please indicate its classification, which variant of this syndrome has developed in this patient?
2. Name the cause of the syndrome in patient A., as well as other possible causes of this pathology.
3. Explain the pathogenesis of the described clinical and laboratory data.
4. What are the pathogenetic principles of treatment of this syndrome?

Lesson topic # 15
"Pathophysiology of tumor growth".

1. Tumor growth: definition of the concept. Tumor as a hyperbiotic process. Comparative characteristics of benign and malignant tumors. The role of physical factors in carcinogenesis.
2. Etiology of malignant tumors.
3. The role of epigenetic changes in the development of malignant neoplasms.
4. Initiation stage in carcinogenesis. The concept of proto-oncogenes, anti-oncogenes and their products.
5. Promotion stage in carcinogenesis. Tumor atypism and its types.
6. Stage of tumor progression: mechanisms and consequences. Mechanisms and pathways of metastasis.
7. Antiblastoma resistance of the body: immune and non-immune factors.

task

Patient A., 76 years old, went to the doctor with complaints of a painful cough, weakness, rapid fatigue, and decreased appetite.

Objectively: body temperature 36.3°C, heart rate 85 / min, blood pressure 140/80 mm Hg, skin cyanotic, cold, the patient is under-nourished, the throat is pink, breathing is hard in the lungs, dry wheezing is heard, heart sounds are clear, rhythmic, the abdomen is soft, painless, the liver and spleen are not palpable.

Medical history: smokes since the age of 30, about half a pack a day

On the X-ray of the lungs: in the lower lobe of the left lung, a darkening of 2 cm by 3 cm with indistinct uneven contours was found.

QUESTIONS:

1. What is the typical pathological process developed in patient A.?
2. What etiological factor caused the development of this typical pathological process in patient A.? What other etiological factors can lead to the development of this typical pathological process?
3. List the stages of this typical pathological process.
4. Explain the pathogenesis of the described clinical manifestations.
5. Explain the principles of therapy and prevention of this typical pathological process.

Lesson topic # 16

Pathophysiology of metabolism. Disorders of macro - and microelement metabolism. Pathophysiology of the endocrine system. Pathophysiology of the thyroid gland.

1. Violation of sodium metabolism: etiology, pathogenesis, and manifestations.
2. Violation of potassium metabolism: etiology, pathogenesis, manifestations.
3. Violation of calcium metabolism: etiology, pathogenesis, manifestations.
4. Violation of magnesium and phosphorus metabolism: etiology, pathogenesis, manifestations
5. Hyperthyroidism, etiology, pathogenesis, main clinical manifestations.
6. Hypothyroidism, etiology, pathogenesis, main clinical manifestations.

task

Experiment: a rat with a body weight of 210 g внутрибрюшинноis injected intraperitoneally with 10 ml of 4% sodium citrate solution. After 15-20 minutes, the rat develops clonic and tonic seizures. Convulsions are stopped by intraperitoneal administration of 4-5 ml of a 5% solution of calcium chloride.

QUESTIONS:

1. What type of pathological process is modeled in this experiment?

2. Specify the etiology of this typical pathological process. What other etiological factors can lead to the development of this typical pathological process?

3. Explain the pathogenesis of the observed changes in the laboratory animal.

4. Explain the principles of therapy and prevention of this typical pathological process.

Lesson topic # 17

General pathophysiology (test control).

Round table discussion on the results of independent work.

Test control on general pathophysiology.

Topics: independent work:

1. Dying as a stepwise process. Terminal states - preagonal state, agony, clinical death, biological death.
2. Pathophysiological foundations of resuscitation; post-resuscitation disease.
3. Socio-deontological aspects of resuscitation.
4. Classification of hereditary forms of pathology (gene, chromosomal diseases).
5. Causes of hereditary forms of pathology.
6. Pathogenesis of hereditary forms of pathology.
7. The role of heredity in the formation of reactivity and resistance.
8. Characteristics of the concept of damage as the basis of cell pathology. Communication of metabolic disorders, structure and function in the application to the cell.
9. General characteristics of dystrophies; their origin and significance. Violation (decrease, increase and perversion) of the function as a manifestation of damage.
10. Cell death; autolysis, necrobiosis, necrosis. Types of necrosis, their features. Natural (physiological cell death (apoptosis) and its death in pathology, characteristics of differences.
11. General pathology and pathogenesis of endocrinopathies. Violations of central regulatory mechanisms. Violation of transhypophysial regulation of the endocrine glands. Violation of parahypophyseal regulation. The role of the feedback mechanism.
12. Pathological processes in the endocrine glands; infectious processes and intoxications, tumor processes, genetically determined defects in hormone biosynthesis.
13. Peripheral mechanisms of impaired hormone production. Blockade of circulating hormones and hormone receptors.
14. General etiology and mechanisms of nervous system disorders. Traumatic brain injuries; the main manifestations of concussion.
15. Vascular lesions of the nervous system; causes and manifestations of hemorrhagic and ischemic stroke.
16. Infectious and infectious-allergic brain lesions; etiology, pathogenesis and main manifestations of meningitis, arachnoiditis and encephalitis.
17. Pathophysiological principles of drug therapy for disorders of the nervous system
18. Pain as an integrative response of the body to damaging effects. Receptor, conductor and central links of the pain apparatus. Biological significance of pain as a signal of danger and damage.
19. Endogenous mechanisms of pain suppression, the role of the antinociceptive system.
20. Pathophysiological bases of anesthesia, reflexology.
21. Substance abuse. Etiology, mechanisms of formation, clinical manifestations at different stages of development, outcomes.
22. Alcoholism. Etiology, mechanisms of formation, clinical manifestations at different stages of development, outcomes.
23. Drug addiction and drug addiction. Etiology, mechanisms of formation, clinical manifestations at different stages of development, ex