MODULE CONTROL TEST NO. 2
ON "CLINICAL PATHOPHYSIOLOGY"

Procedure and evaluation procedure

The control work consists in the presentation of answers to questions to the proposed situational tasks (clinical case) taken from real clinical practice. The maximum number of points for each correctly solved problem is 10 points, in total, the student is offered 2 problems to solve. Thus, 20 points is the total score for the entire control.

When solving a clinical case, the student needs to identify the leading clinical and laboratory syndromes and verify the main diagnosis. Besides, to determine the presence of accompanying illnesses, to explain the pathogenesis of the development of each symptom or condition. It is also necessary to determine whether the patient needs additional examination and the appointment of pathogenetic therapy.

As a result, the teacher assesses the effectiveness and correctness of the application of methods for solving clinical cases, the ability to analytical and synthetic clinical mindset.

Exemplary clinical cases for the module control test

Clinical case №1

Patient B., 39 years old, was admitted to an internal disease department with complaints of persistent headaches, impaired vision, fatigability, pains in the heart, nausea, continuous thirst, skin itching, face edema in the morning. The patient is known to have frequent tonsillitis. He has been having these symptoms for more than a year. Examination findings: The patient is pale, the skin is dry. BP is 190/100 mm Hg, breathing rate – 25/min. Blood test: Hb – 90 g/l; erythrocytes – 3.2 x 1012 /l; leukocytes – 6.2 x 10^9/l, plasma osmolality is > 290 mOsm/l; blood pH – 7.3. Diurnal diuresis is 4 liters, nocturia. GFR - 40 ml/min; blood urea – 17 mmol/l, creatinine – 500 mcmol/l. Urine test: protein 1.92 g/l (molecular mass >70, 000); dysmorphic erythrocytes – 50 per high power field (HPF), RBC's casts – 2 – 4 per high power field (HPF). Selectivity index (ratio of IgG and transferrin) is > 0.1.

Answer the questions below.

1. Make a preliminary conclusion about the patient's renal pathology and determine the stage of the disease. 2. Explain the etiology and pathogenesis of this disease. 3. Explain the pathogenesis of the main renal syndromes. 4. Explain the pathogenesis of extrarenal symptoms: BP, osmolarity and pH, anemia. 5. List the principles of pathogenetic therapy for this patient.

Clinical case №2

Patient D., a 12-year-old girl, was admitted to hospital with complaints of headache, chills, temperature rise to 39 – 40˚C, pains in the loin and abdomen, frequent and painful urination. Examination findings: the tongue is dry and coated; BP – 100/60 mm Hg; kidney area is painful on palpation. In the blood: Hb – 120 g/l; neutrophil leukocytosis with the left shift, BUN (blood urea nitrogen) – 6 mmol/l, ESR – 35 mm/h. In the urine: protein < 1 g/l (albumins and β- microglobulins); erythrocytes – 3-5 per high power field (HPF) (of irregular form < 15%); leukocytes – 50 per high power field (HPF). Diurnal diuresis is 2 – 2.5 liters, hyposthenuria. GFR – 100 ml/min.

Answer the questions below.

1. What renal disease are these clinical features and laboratory findings typical of? 2. Assess the function of the renal glomeruli and tubules in this patient. 3. Explain the etiology and pathogenesis of this disease and the mechanism of the symptoms. 4. What changes in the blood one can observe? 5. List the principles of therapy of the disease.

Clinical case №3

A 75-year-old man with terminal small-cell carcinoma of the lung presents to the emergency department with altered mental status. The patient's wife, who cares for him at home, states that he is quite weak at baseline, requiring assistance with all activities of daily living. Over the past few days, he has become progressively more lethargic. She has been careful to adequately hydrate him, waking him every 2 hours to give him water to drink. His appetite has been poor, but he willingly ingests the water, consuming 2–3 quarts per day. He is taking morphine for pain and dyspnea.

On examination, the patient is a cachectic man. He is lethargic but arousable. He is oriented to person only. Vital signs reveal a temperature of 38 °C, blood pressure of 110/60 mm Hg, heart rate of 88 bpm, respiratory rate of 18/min, and oxygen saturation of 96% on 3 L of oxygen. On head–neck examination, pupils are 3 mm and reactive, scleras are anicteric, and conjunctivas are pink. Mucous membranes are moist. The neck is supple. There are decreased breath sounds in the left lower posterior lung field and rales in the upper half. The cardiac examination shows a regular heartbeat without murmur, gallop, or rub. The abdomen is benign without masses. The extremities are without edema, cyanosis, or clubbing. The neurologic examination shows only bilateral positive Babinski reflexes and asterixis. Laboratory studies reveal a serum sodium level of 118 mEq/L.

Answer the questions below.

1. What is the likely diagnosis? 2. What is the pathophysiologic mechanism? 3. What is the cause of this patient's lethargy, confusion, and asterixis? 4. Asses the level of sodium in the serum. 5. List the principles of therapy of the condition.

Clinical case №4

A 25-year-old woman presents with a complaint of rapid weight loss despite a voracious appetite, diarrhea. Physical examination reveals body temperature 37.2ºC, tachycardia (pulse rate 110 bpm at rest), BP 155/90 mm.Hg, fine moist skin, a symmetrically enlarged thyroid, mild bilateral quadriceps muscle weakness, and fine tremor. Exophthalmos and eye propulsion.

Answer the questions below.

1. What other features of the history should be elicited? 2. What other physical findings should be sought? 3. Serum TSH and free thyroxine level are ordered. What results should be anticipated? 4. What are the possible causes of this patient's condition?

E. What is the most common cause of this patient's condition, and what is the pathogenesis of this disorder? 5. What is the pathogenesis of this patient's tachycardia, weight loss, skin changes, goiter, high body temperature, exophthalmos and muscle weakness?

Clinical case №5

A 35-year-old woman has hypertension of recent onset. The review of systems reveals several months of weight gain and menstrual irregularity. On examination, she is obese, with a plethoric appearance. The blood pressure is 165/98 mm Hg. There are prominent purplish striae over the abdomen and multiple bruises over both lower legs.

Answer the questions below.

1. What other features of the history and physical examination should be sought? 2. What is the underlying pathogenesis of this patient's hypertension, weight gain, and skin striae? 3.Why is she predispose to peptic ulcer and fractures? 4. List four main causes, and discuss the relationships among the hypothalamus, pituitary, and adrenal in each. Which is the most likely cause in this patient? 5. How can the diagnosis be established in this patient?

Clinical case №6

A 44-year-old man is concerned about abnormal liver tests drawn for his pre-employment physical 6 months ago. His serum aminotransferase levels were two times normal at that time and remain unchanged after repeat testing. On further questioning, he denies regular alcohol use but states that he used to inject heroin. Currently, he reports some fatigue but says he feels well otherwise. His primary

care physician orders serologic testing, which reveals HBsAg-positive, anti-HBs-negative, and anti-HBc-positive IgG. Anti-HDV and anti-HCV test results are both negative.
Answer the questions below.
1. Based on these antigen and antibody test results, what is the patient's diagnosis? 2. What percentage of patients with acute hepatitis B remain chronically infected with HBV? Of those patients, how many develop chronic active disease? 3.What are the significant complications of chronic active infection? 4. What is the significance of hepatitis D superinfection? 5. What evidence exists supporting immune-mediated damage in chronic active hepatitis?

Clinical case №8
A 35-year-old man presents to the emergency department with complaints of chest pain. The pain is described as 8 on a scale ranging from 1 to 10, retrosternal, and sharp in nature. It radiates to the back, is worse with taking a deep breath, and is improved by leaning forward. On review of systems, he has noted a "flu-like illness" over the past several days, including fever, rhinorrhea, and cough. He has no medical history and is taking no medications. He denies tobacco, alcohol, or drug use. On physical examination, he appears in moderate distress from pain, with a blood pressure of 125/85 mm Hg, heart rate 105 bpm, respiratory rate 18/min, and oxygen saturation of 98% on room air. He is currently afebrile. His head-and-neck examination is notable for clear mucus in the nasal passages and a mildly erythematous oropharynx. The neck is supple, with shotty anterior cervical lymphadenopathy. The chest is clear to auscultation. Jugular veins are not distended. Cardiac examination is tachycardic with a three-component high-pitched squeaking sound. Abdominal and extremity examinations are normal.
Answer the questions below.
1. What is the likely diagnosis? 2. What are the most common causes of this disease, and which is most likely in this patient? 3. What is the pathophysiologic mechanism for his chest pain? 4. What is the sound heard on cardiac examination? What is its cause? 5. What are two possible complications of this disease? What might you look for on physical examination to make certain these complications are not present?

Clinical case №9
A 59-year-old man is brought to the emergency department by ambulance after experiencing a syncopal episode. He states that he was running in the park when he suddenly lost consciousness. He denies any symptoms preceding the event, and he had no deficits or symptoms upon arousing. On review of systems, he does say that he has had substernal chest pressure associated with exercise for the past several weeks. Each episode was relieved with rest. He denies shortness of breath, dyspnea on exertion, orthopnea, and paroxysmal nocturnal dyspnea. His medical history is notable for multiple episodes of pharyngitis as a child. He is otherwise well. He has no significant family history. He was born in Mexico and moved to the United States at age 10 years. He does not smoke, drink alcohol, or use illicit drugs. On examination, his blood pressure is 110/90 mm Hg, heart rate 95 bpm, respiratory rate 15/min, and oxygen saturation 98%. Neck examination reveals both pulsus parvus and pulsus tardus. Cardiac examination reveals a laterally displaced and sustained apical impulse. He has a grade 3/6 midsystolic murmur, loudest at the base of the heart, radiating to the neck, and a grade 1/6 high-pitched, blowing, early diastolic murmur along the left sternal border. An S4 is audible. Lungs are clear to auscultation. Abdominal examination is benign. He has no lower extremity edema. Aortic stenosis is suspected.
Answer the questions below.
1. What are the most common causes of aortic stenosis? Which is most likely in this patient? Why?
2. How does aortic stenosis cause syncope? 3. What is the pathophysiologic mechanism by which aortic stenosis causes angina pectoris? 4. How does aortic stenosis result in the physical findings described? 5. Based on the way this patient presented, what is his life expectancy if left untreated?

Clinical case №10

A 45-year-old woman presents complaining of fatigue, 30 pounds of weight gain despite dieting, constipation, and menorrhagia. On physical examination, the thyroid is not palpable; the skin is cool, dry, and rough; the heart sounds are quiet; and the pulse rate is 50 bpm. The rectal and pelvic examinations show no abnormalities, and the stool is negative for occult blood.
Answer the questions below.
1. What other features of the history should be elicited? What other findings should be sought on physical examination? 2. What is the pathogenesis of this patient's symptoms? 3. What laboratory tests should be ordered, and what results should be anticipated? 4. What are the possible causes of this patient's condition? Which is most likely? 5. What other conditions may be associated with this disorder?

Evaluation criteria

Written work is evaluated on a 10-point scale, according to the following criteria:
9-10 points are given if the student:

- speculates the conceptual apparatus and terminology at a high level;
- demonstrates the depth and complete mastery of the content of the educational material, in which it is easy to navigate;
- can systematically and logically state the answer.

7-8 points are given if the student:

- has a good understanding of the educational material, but with minor inaccuracies in the definition of concepts;
- speculates systematically and logically.

5-6 points are given if the student:

- the main concepts are mastered partially;
- understands the basics of educational material, but the answer is poorly structured and contains inaccuracies in the definition of concepts;
- after leading questions is able to formulate logical conclusions and statements.

3-4 points are given if the student:

- the main concepts are mastered fragmentarily;
- understands superficial concepts from the basics of educational material, the answer contains errors;
- conclusions and statements do not trace a causal relationship, the student sets out individual facts that he cannot link into a system.

1-2 points are given if the student:

- is extremely superficially familiar with the material, the conceptual apparatus is not mastered;
- makes gross mistakes that cannot be corrected even with the help of a teacher;
- logic and cause-and-effect relationships are not observed in the answer.

0 points are given if the student:

- did not hand over the written work or did not hand it in on time.

Questions to prepare
for successful solution of clinical cases

1. Clinical pathophysiology of atherosclerosis.
2. Clinical and morphological forms of atherosclerosis.
3. Complications and causes of death in atherosclerosis.
4. Prevention and treatment of atherosclerosis from the standpoint of clinical pathophysiology.
5. Arterial hypertension: definition, diagnostic criteria, epidemiology, classification, assessment of cardiovascular risks.
6. Arterial hypertension: target organs, diagnosed cardiovascular and renal diseases, risk assessment.
7. Primary hypertension: etiology, pathogenesis, clinical pathophysiology of clinical manifestations.
8. Clinical pathophysiology of symptomatic hypertension: obstructive sleep apnea syndrome.
9. Clinical pathophysiology of symptomatic hypertension: renal hypertension.
10. Clinical pathophysiology of symptomatic hypertension: endocrine causes.
11. Clinical pathophysiology of symptomatic hypertension: pregnancy, aortic coarctation, alcohol abuse, pharmaceutical and narcotic drugs.
12. Remodeling of blood vessels and heart in arterial hypertension. The role of hypertension in the development of heart failure, coronary heart disease, cerebrovascular accidents.
13. Clinical pathophysiology of chronic coronary heart disease: etiology, pathogenesis, clinical forms.
14. Clinical pathophysiology of acute forms of coronary heart disease: etiology, pathogenesis, clinical forms. Acute coronary syndrome.
15. Remodeling of the heart in all forms of coronary heart disease.
16. Acute disorders of cerebral blood circulation.
17. Intracranial hemorrhage: causes, pathogenesis, pathogenesis of clinical manifestations.
18. Ischemic stroke causes, pathogenesis, pathogenesis of clinical manifestations.
19. Clinical pathophysiology of pulmonary embolism: etiology, pathogenesis, pathogenesis of clinical manifestations.
20. Clinical pathophysiology of pulmonary hypertension: etiology, pathogenesis, pathogenesis of clinical manifestations.
21. Clinical pathophysiology of certain forms of rhythm and conduction disorders: atrial fibrillation, ventricular fibrillation, long and short QT interval syndrome.
22. Primary and secondary polycythemia: causes, pathogenesis of clinical manifestations.
23. Anemia: classification, characteristics of pathogenetic forms, clinical manifestations.
24. Posthemorrhagic anemia. Clinical pathophysiology.
25. Iron deficiency anemia. Anemia of chronic disease. Clinical pathophysiology.
26. B12-/folic deficiency anemia. Clinical pathophysiology.
27. Congenital and acquired hemolytic anemias. Clinical pathophysiology.
28. Hypo- and aplastic anemias: clinical pathophysiology.
29. Leukocytosis and leukopenia, their types and characteristics, clinical and hematological manifestations.
30. Acute leukemia: epidemiology, causes, forms, clinical and hematological manifestations.
31. Chronic leukemia: epidemiology, causes, forms, clinical and hematological manifestations.
32. Lymphomas: epidemiology, causes, forms, clinical and histological manifestations.
33. Multiple myeloma: epidemiology, causes, types, pathogenesis of clinical and laboratory manifestations.
34. Hemolytic-uremic and atypical hemolytic-uremic syndrome: causes, pathogenesis, pathogenesis of clinical manifestations.
35. DIC syndrome: etiology, pathogenesis, pathogenesis of clinical manifestations.
36. Primary and secondary coagulopathy: etiology, pathogenesis, pathogenesis of clinical manifestations.
37. Primary thrombocytopathy: etiology, pathogenesis, pathogenesis of clinical manifestations.

38. Acute lung injury. Acute respiratory distress syndrome: etiology, pathogenesis, pathogenesis of clinical manifestations.
39. Obstructive and restrictive lung diseases: general principles of pathogenesis, difference in clinical, instrumental and laboratory manifestations.
40. COPD: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
41. Bronchial asthma epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
42. Idiopathic pulmonary fibrosis: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
43. Sarcoidosis: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
44. Cystic fibrosis epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
45. Malignant neoplasms of the lung. Clinical pathophysiology.
46. Clinical pathophysiology in artificial lung ventilation: basic modes, changes in blood gas composition, pH.
47. Clinical pathophysiology of changes in blood gas composition, pH and electrolytes.
48. Sepsis: modern definition, etiology, pathogenesis, pathogenesis of clinical manifestations.
49. The role of systemic inflammation in the development of somatic pathology: modern views.
50. Prediabetes: epidemiology, etiology, pathogenesis, clinical and laboratory forms.
51. Type 1 diabetes mellitus: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
52. Diabetic comas: etiology, pathogenesis, pathogenesis of clinical manifestations.
53. Chronic complications of diabetes mellitus: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
54. Autoimmune thyroiditis: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
55. Graves' disease: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
56. Hyperprolactinemia: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
57. Hypopituitarism: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
58. Hypercortisolism: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
59. Adrenal insufficiency: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
60. Primary and secondary female hypogonadism: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
61. Primary and secondary male hypogonadism: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
62. Congenital dysfunction of the adrenal cortex: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
63. Polycystic ovary syndrome: epidemiology, etiology, pathogenesis, pathogenesis of clinical manifestations.
64. Clinical pathophysiology of esophageal diseases: GERD, Barrett's esophagus, achalasia, eosinophilic esophagitis, esophageal cancer.
65. Helicobacter associated diseases: etiology, pathogenesis, pathogenesis of clinical manifestations.
66. Precancerous diseases of the stomach, stomach cancer.
67. Crohn's disease: etiology, pathogenesis, pathogenesis of clinical manifestations.
68. Nonspecific ulcerative colitis: etiology, pathogenesis, pathogenesis of clinical manifestations.
69. Clostridium difficile-associated disease.
70. Polyps and colon cancer. Clinical pathophysiology.
71. Acute pancreatitis: etiology, pathogenesis, pathogenesis of clinical manifestations, pathogenesis of complications
72. Chronic pancreatitis: etiology, pathogenesis, pathogenesis of clinical manifestations, pathogenesis of complications.
73. Metabolically associated fatty liver disease: etiology, pathogenesis, progression, role in the development of hepatocellular carcinoma.

74. Cirrhosis of the liver: etiology, pathogenesis, pathogenesis of clinical manifestations.
75. Clinical pathophysiology of intestinal obstruction.
76. Clinical pathophysiology of viral hepatitis.
77. Clinical pathophysiology of toxic and drug-induced hepatitis.
78. Clinical pathophysiology of autoimmune hepatitis.
79. Hepatic encephalopathy, hepatic coma: etiology, pathogenesis, pathogenesis of clinical manifestations.
80. Polycystic kidney disease: etiology, pathogenesis, pathogenesis of clinical manifestations.
81. Clinical pathophysiology of inflammatory glomerulopathies.
82. Clinical pathophysiology of non-inflammatory glomerulopathies.
83. Clinical pathophysiology of tubulopathies.
84. Tubulointerstitial nephritis. Clinical pathophysiology.
85. Clinical pathophysiology of urinary tract infection.
86. Pyelonephritis: etiology, pathogenesis, pathogenesis of clinical manifestations.
87. Nephrolithiasis: etiology, pathogenesis.
88. Acute kidney injury and acute kidney disease: etiology, classification, pathogenesis, pathogenesis of clinical manifestations, pathogenesis of complications.
89. Chronic kidney disease: etiology, pathogenesis, pathogenesis of clinical manifestations and complications.
90. Terminal renal failure: pathogenesis, pathogenesis of clinical manifestations.