

Topic of the lesson: PATHOPHYSIOLOGY OF BLOOD CIRCULATION SYSTEM. HEART FAILURE, MECHANISMS OF COMPENSATION. MYOCARDIAL INFARCTION

Aim: To learn etiology, variants of cardiac failure, mechanisms of development and consequences, to be able to carry out analysis of clinical and model situations associated with cardiovascular system disorders.

Main questions to the topic of the lesson:

1. The definition of “BLOOD CIRCULATION” disorders. Arts of cardiac failure.
2. Mechanisms of compensation: cardiac, extracardiac, their causes.
3. Acute cardiac failure, causes, consequences.
4. Myocardial hypertrophy, features of innervations, blood supply, structure and metabolism of hypertrophic heart.
5. Chronic failure, mechanisms of development.
6. Coronary destructions of myocardium. Coronary heart disease. Myocardial infarction, etiology, hazards.
7. Mechanisms of heart destruction by the coronary insufficiency.
8. Non-coronary heart destructions.
9. Syndrome of the reperfusion, causes, mechanisms of development, consequences.

Literature: 1. General and clinical pathophysiology/Gozhenko A.I. - Odessa National Medical University. - 2002. - p. 143-158
2. Pathophysiology/Gozhenko A.I., Gurkalova I.P. - Odessa National Medical University. - 2003. - p. 232-244

CONTROL QUESTIONS

№	Instructions to the execution of the task	Answers of the students with additions at the lessons
1.	What is insufficiency of blood circulation? What	

	are main causes of its development (a, b, c) What consequences have organs, tissues? a, b, c, d	
2.	What is a heart failure- Kinds of this failure a, b, c	
3.	Mark the causes that lead to volume overload of heart a, b, c, d Name the mechanism of compensation	
4.	Mark causes that lead to resistance overload of heart a, b, c Name mechanism of compensation	
5.	Mark main links of pathogenesis of heart hypertrophy Name stages of hypertrophy (according to Meerson)	
6.	Name features of heart hypertrophy that are main	

	in its development and decompensation- a, b, c, d, e, f, g	
7.	Name types of chronic heart insufficiency a, b, c; enumerate main hemodynamic signs of decompensation by chronic heart insufficiency a, b, c, d, e, f, g find clinical syndroms a, b, c, d, e, f, g	
8.	What is absolute and relative coronary insufficiency? Name the main pathogenetic factors of coronary heart disease and myocardial infarction. a, b, c, d, e	
9.	Mark the main mechanisms of heart destruction by coronary insufficiency a, b, c, d, e and clinic markers of this disease a, b, c, d	
10.	What is resorption- necrotic syndrome? Name signs of it a, b, c, d, e	

11.	What is syndrome of reperfusion? Name signs of it. Mark mechanism of its development a, b, c, d	
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TASK 1. Name non-coronary myocardial infarctions?

- a). _____
- b). _____
- c). _____
- d). _____

TASK 2. Name pathogenetic stages of cardiogenic shock?

- a). _____
- b). _____
- c). _____
- d). _____

TASK 3. Name main causes of acute heart insufficiency:

- a). _____
- b). _____
- c). _____
- d). _____
- e). _____
- f). _____

TASK 4. Mark main signs of right ventricular heart insufficiency:

- a). _____

- b) _____
- c) _____
- d) _____

TASK 5. Mark main signs of left ventricular heart insufficiency:

- a). _____
- b) _____

TASK 6. Name zones that we can find by infarction?

- a). _____
- b) _____
- c) _____

TASK 7-9. *Solve clinic-patophysiological tasks.*

Task 1. A 46 -year -old patient was hospitalized to the intensive care department of hospital. He complained of severe, pressing pains behind the breastbone that go on for 1,5 hour. From anamnesis: during the week he worked much, slept few, smoked more than usual, drank tea and coffee. Up to this time he believed that he was an absolutely healthy man. He went in for sports. On examination: general condition is very bad, paleness of skin, acrocyanosis. By lung auscultation: vesicular respiration, no crackles, respiratory rate is 28 for min., heart tones are muffled, unrhythmical. Arterial pressure: 100/70 millimeters of mercury. On ECG: periodic ciliary arrhythmia of atrium with pulse rate 360 in minute, right bundle-branch block, upsurge of ST segment in I, AVL, V1- V2 leads. On blood analyze: leucocytes: $9,2 \cdot 10^9$ g/l, other indices are in the limit of norm.

What forms of heart pathology has a patient? It must be argued.

What cause-effect relation is between the forms of pathology that you name?

What caused the pain between the breastbones?

What extra examinations would be lead for the confirmation of myocardial destruction?

Task 2. A Patient X., who suffers from arterial hypertension, came to clinic, he complains of periodic inspiratory short breath, especially by physical activity. Few days ago appeared the attack of inspiratory short breath with death anxiety. The ambulance was called, diagnose was “cardiac asthma”. On examination: arterial pressure: 155/120 millimeters of mercury, by roentgenoscopy- dilatation of left ventricle of heart.

What forms of heart activity pathology has a patient?

What caused its development?

Is it connected with ventricular overload? What? Overload with volume or pressure?

What is a trigger mechanism of contractile myocardial function by its overload?

Task 3. A 56- year- old patient stays in reanimation unit with a diagnosis “acute disseminate myocardial infarction” The second day after short period of temporary improvement developed short breath, appeared abundant small bubbling rale in lungs. What pathological changes of respiratory system and CVS can stipulate the clinical picture of patient’s condition on the second day?

What indexes of intracardiac and systemic haemodynamics can objectify the development of heart failure? Name this indexes and show the orientation of their changes

In situation of heart failure confirmation diagnosis specify its type (according to the speed of development and to injured part of heart. What origin of heart failure is it? a) overload type, b) myocardial type, c) mixed type

TASK 10. *Solve the tests of self control*

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| 1. A 20- year- old man complains of short breath, rapid fatigability. He thinks that he is sick from birth when it was detected that he has native aortic valve insufficiency. He is physically fit, paleness of skin, and | slight cyanosis of lips. Pulse 78 in minute, arterial pressure- 160/70 millimeters of mercury column. What is the mechanism of heart failure development?
A. injury of cardiomyocytes
B. myocardial ischemia | C. injury of conducting system of heart
D. overload with blood resistance
E. overload with blood volume |
| | | 2. A 20- year- old woman complains of general weakness, constant pain in |

heart zone, short breath by physical activity. On examination: paleness of skin, acrocyanosis, pulse 86 in minute, arterial pressure- 110/80 millimeters of mercury. First tone on cardiac apex is decayed, systolic murmur on aorta. On roentgenoscopy- aortic configuration of heart. It was diagnosed the stenosis of aortic valves. What caused the blood circulation disorder?

- A. Decrease of blood volume
- B. injury of myocard
- C. overload with blood volume
- D. overload with blood resistance
- E. myocardial ischemia

3. A 60 –year- old man suffers from chronic heart failure (left ventricular type). On examination: cyanosis, short breath, cough with phlegm, periodic attacks of asthmatic fit. What type of hypoxia has a man?

- A. circulatory stagnant hypoxia
- B. blood hypoxia
- C. respiratory hypoxia
- D. circulatory ischemic hypoxia
- E. tissue hypoxia

4. A patient with alcohol liver cirrhosis complains of general weakness and short breath, decrease of arterial pressure, ascites, and dilatation of superficial veins of abdomen, splenomegalia. What disorder of blood circulation has a patient?

- A. left ventricle insufficiency
- B. syndrome of portal hypertension
- C. right ventricle insufficiency
- D. collapse
- E. totally heart insufficiency

5. An animal with aortal valves insufficiency has hypertrophy of left ventricle of heart. In heart –local contracture. The accumulation of what matter in cardiomyocytes stipulates it?

- A. sodium
- B. potassium
- C. lactic acid
- D. carbonic acid
- E. calcium

For notes
