**elaborated by Cobeț valeriu**

**Secondary arterial hypertension (SAH)**

Patient N., 41 years old, is diagnosed with Cushing's syndrome associated with secondary arterial hypertension (SAH).

She complains of periodic headaches, low tolerance to physical exertion.

Functional, instrumental and laboratory assessments:

♦Systolic blood pressure =170 mm Hg. Diastolic blood pressure =100 mm Hg.

♦Heart rate =64 beats/min.

♦The size of the left adrenal gland is enlarged on radiography.

♦Hypercortisolemia. Reduced ACTH level. Hypernatremia. Hypokalemia. Hyperglycemia. Dyslipidemia.

**Questions:**

1. What is the pathogenetic contribution of cortisol excess in connection with Ang II, regarding SAH?

2. What is the pathogenetic contribution of cortisol excess in connection with the sympathetic system, regarding SAH?

3. What is the pathogenetic contribution of cortisol excess in connection with mineralocorticoid activity, regarding SAH?

4. What is the pathogenetic contribution of cortisol excess in connection with nitric oxide (NO), regarding SAH?

5. What is the pathogenetic contribution of cortisol excess in connection with hyperglycemia, regarding SAH?

6. What is the pathogenetic contribution of cortisol excess in connection with insulin resistance and the associated metabolic syndrome, regarding SAH?

7. What is the pathogenetic contribution of cortisol excess in connection with autocosanoids (local hormones), regarding SAH?

**Essential (primary) arterial hypertension (PAH)**

Patient N., 57 years old, has been suffering from essential or primary arterial hypertension (PAH) for 9 years.

He complains of periodic headaches, low tolerance to physical exertion, sleep disorders.

Functional, instrumental and laboratory assessments:

♦Systolic blood pressure =170 mm Hg. Diastolic blood pressure =100 mm Hg. Heart rate =60 b/min.

♦Thickness of the intima-media complex of the common carotid artery =1.2 mm (norm<0.9 mm).

♦Reduced level of nitric oxide (NO). Hyperhomocysteinemia =21 μmol/L (norm<10 μmol/L).

♦Triglycerides =180 mg/dL (norm<150 mg/dL). Total cholesterol =6.8 mM/L (norm<5.4 mg/dL). Increased oxy-LDL levels.

♦Microalbuminuria =190 mg/24 hours (normal <30 mg/24 hours).

♦Vit.D (25.OH-D) level =30 nM/L (normal =50-70 nM/L).

♦C-reactive protein =4 mg/L (normal <1.0 mg/L). Elevated IL-1b, IL-6 and TNF-α.

**Questions:**

1. What are the general etiological factors that lead to endothelial injury and dysfunction in patients with PAH?

2. What are the factors that lead to NO deficiency in patients with PAH that are dispensable from endothelial injury and the mechanism of their action?

3. The deficiency of which factors of endothelial origin have a pathogenetic role in vasoconstriction and the evolution of PAH?

4. What are the 3 components of the renin-angiotensin-aldosterone system with a pathogenetic role in the development of PAH and the imminent mechanisms?

5. Microalbuminuria is an early marker of renal dysfunction in patients with PAH (the kidney is a target organ). What are the mechanisms?

6. What are the mechanisms of pathogenetic contribution of hyperhomocysteinemia in the evolution of PAH?

7. What are the mechanisms of pathogenetic contribution of vit.D deficiency in the evolution of PAH?

**Diastolic Heart Failure**

Patient N., 66, 11 years old, hypertensive, complains of low tolerance to physical exertion, manifested by the appearance of dyspnea (the feeling of lack of air).

The estimated echocardiographic indices are:

♦Ejection fraction (EF) =59% (norm, EF>50%).

♦Systolic volume =51 ml (norm >70 ml).

♦Minute volume =3.1 L (norm =4-6 L).

♦Heart rate =60 b/min.

♦End-diastolic volume =100 ml (norm >120 ml).

♦End-systolic volume =41 ml (norm >55 ml).

♦End-diastolic diameter of the LV =40 mm (norm >43 ml).

**Questions:**

1. What type of heart failure is present, and which functional indices have diagnostic value?

2. What type of myocardial remodeling is present, its genesis and pathogenetic contribution to the impairment of diastole?

3. What are the mechanisms of reduced oxygen supply of cardiomyocytes in a concentrically hypertrophied myocardium?

4. What are the mechanisms of impaired diastolic relaxation in the hypertensive heart?

5. Which remodeling patterns, apart from concentric hypertrophy, lead to impaired diastolic relaxation?

6. Explain the causes and nature of the alteration of the heterometric and homeometric response in diastolic heart failure?

7. What are the factors that activate fibroblasts and increase extracellular matrix growing in diastolic heart failure?

**Systolic Heart Failure**

Patient N., 67, 11 years old, complains of anginal pain and low tolerance to physical exertion. Edema of the legs periodically occurs.

Coronary angiography estimates stenosis of up to 80% of the left descending artery (LAD).

Estimated echocardiographic indices are:

♦Ejection fraction (EF) =39% (normal, EF>50%).

♦Heart rate =80 b/min

♦Systolic volume =48 ml (normal >70 ml).

♦Minute volume =3.6 L (normal =4-6 L).

♦End-systolic volume, end-diastolic volume and end-diastolic pressure of the left ventricle are elevated.

♦Circulating level of natriuretic peptide B (PNB) is elevated.

**Questions:**

1. What type of heart failure is present, and which functional and biochemical indices have diagnostic value?

2. What are the causes of systolic heart failure in this patient?

3. What are the mechanisms of pulmonary arterial pressure elevation in systolic heart failure?

4. What are the causes of edema in systolic heart failure?

5. What are the consequences of calcium accumulation in cardiomyocytes caused by the energy deficiency attested in systolic heart failure?

6. What are the mechanisms of urgent activation of contractile function in systolic heart failure?

7. What are the early compensatory and decompensatory functional changes of systolic heart failure?