

# CLINICAL PHARMACOLOGY OF ANTIHYPERTENSIVE AND ANTIHYPOTENSIVE MEDICINES

## **A. Actuality**

Arterial Hypertension is a high frequency disorder in the general population which affects about one third of all adults in economically developed countries. Most patients suffer from essential hypertension and in only 5% of cases hypertension is secondary. If it is untreated this condition causes complications of the target organs: heart, brain, kidney, etc., with serious, disabling consequences for patients.

Hypertensive emergencies are associated with significant increases in morbidity and mortality, and because of this the problem of antihypertensive therapy has been and remains very current. Acute hypotension accompanies some states of emergency, being a manifestation of some hemodynamic disorders, which endanger the life of the patient.

The orientation of the antihypertensive and antihypotensive treatment should correspond to the clinical variants of the given conditions.

## **B. Purpose of training :**

Acquiring the clinico-pharmacological principles of argumentation of prescription, dosage modalities and assessment of the effectiveness of antihypertensive and antihypotensive medications.

## **C. Teaching purposes :**

*The student must have the ability to:*

- a) choose the minimum complex of investigations, in order to assess the pharmacodynamic effect of drugs with antihypertensive and antihypotensive action;
- b) analyze and evaluate the study results of the antihypertensives and antihypotensives pharmacodynamics ;
- c) predict the possible complications and adverse reactions of the drugs in this group;
- d) predict the dependence of adverse reactions on the dosage regimen of the drugs and the functional state of the heart and other organs and systems;
- e) apply the contemporary methods of pharmacological correction of the adverse reactions, caused by this drugs;
- f) draw up the personal form (P-medicines).

## **D. Knowledge from the subjects studied previously and those of tangency**

**Anatomy, physiology and pathological physiology.** The anatomy and physiology of the cardiovascular system. The role of the sympathetic and parasympathetic system in heart function regulation, hemodynamics in norm and pathology. The main factors that determine blood pressure. The main mechanisms of blood pressure regulation.

**Clinical disciplines.** Etiopathogenic and clinical features of blood pressure disorders in different diseases. Clinical manifestation of hypertension, classification, its complications. Classification of hypertensive emergencies, treatment principles. The etiopathogenic peculiarities of hypertension, essential and symptomatic (caused by pheochromocytoma, coarctation of the aorta, etc.). The etiopathogenic peculiarities of hypotension in different types of shock.

**Pharmacology.** Classification, mechanism of action, indications, contraindications, adverse reactions of antihypertensive and antihypotensive medications.

## **E. Questions for self-training:**

## ***1. Clinico-pharmacological characteristic of the drugs used in the diseases of the cardiovascular system.***

1. Classification of antihypotensive remedies by mechanism and duration of action, pathogenesis, character and actio selectivity on vessels.
2. Clinical pharmacology of antihypotensives that increase heart rate and vessel tone (alpha-beta-adrenomimetics, dopaminomimetics): features of antihypotensive effect, influence on central and regional hemodynamics, on heart, indications and principles of use, adverse reactions, pharmacokinetics.
3. Alpha-adrenomimetics used as antihypotensives: the peculiarities of the antihypotensive effect, the influence on central, regional hemodynamics and heart , indications and principles of use, adverse reactions, pharmacokinetics.
4. Antihypotensives from the group of isothiuretic derivatives: the peculiarities of the antihypotensive effect, the influence on central and regional hemodynamics, on the heart, indications and principles of use, adverse reactions, pharmacokinetics.
5. Dopaminomimetics and beta-1-adrenomimetics as antihypotensive: the particularities of the antihypotensive effect, the influence on central and regional hemodynamics and heart; indications and principles of use, adverse reactions, pharmacokinetics.
6. Antihypotensives that increase the volume of circulating blood (plasma): the particularities of antihypotensive effect, influence on central and regional hemodynamics and heart , indications and principles of use, adverse reactions, pharmacokinetics.
7. Classification of antihypertensive remedies.
8. Clinical pharmacology of centrally acting antihypertensives: particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics.
9. Particularities of antihypertensive effect and indications of ganglioplegic and sympatholytic.
10. Alpha-adrenoblocks used as antihypertensives: classification, particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics.
11. Beta-adrenoblocks as antihypertensives: classification, pharmacokinetic, pharmacodynamic, dosage and use characteristics, adverse reactions.
12. Clinical pharmacology of diuretics used as antihypertensives: particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prevention, pharmacokinetic.
13. Angiotensin converting enzyme inhibitors: classification, particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prevention, pharmacokinetic.
14. Clinical pharmacology of angiotensin receptor blockers as antihypertensives: particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prevention, pharmacokinetic.
15. Clinical pharmacology of calcium antagonists as antihypertensives: classification, particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prevention, pharmacokinetic.
16. Clinical pharmacology of nonprilizine inhibitors as antihypertensives: particularities of mechanism of action and antihypertensive effect, indications and principles of use, adverse reactions and their prevention, pharmacokinetic.

17. Principles of hypertension and hypertensive emergencies treatment. Antihypertensive combined drugs.

## ***II. Clinico-pharmacological selection and use of SM in some clinical conditions of the cardiovascular system.***

- Principles of hypertension treatment according to degree and concomitant diseases.
- The principles of healthcare in hypertensive emergencies (common and extreme).
- The principles of the combination of antihypertensive medications: the combined drugs.
- Principles of drug selection and use in hypotonic, hypertonic and hypovolemic hypotension.

### **F. Individual work:**

#### ***1. Short description of the main drugs:***

***Vertically:*** the name of the medication (Romanian).

***Horizontally:*** Synonyms, delivery forms, way of administration, doses (therapeutic, maximal), indications, contraindications, adverse reactions.

Trimetafan, clonidine, labetalol, sodium nitroprusside, moxonidine, lysinopril, enalapril, enalaprilate, captopril, amlodipine, diltiazem, verapamil, lercanidipine, prazosin, losartan, sacubitril + valsartane, hydralazine, spironolactone, torasemide, dopamine, dobutamine, propranolol, atenolol, bisoprolol, nebivolol, carvedilol, epinephrine, norepinephrine, phenylephrine, isoturon, difetur, raviten.

#### ***2. Medical prescription exercises:***

Trimetafan, clonidine, labetalol, sodium nitroprusside, moxonidine, lysinopril, enalapril, enalaprilate, captopril, amlodipine, diltiazem, verapamil, lercanidipine, prazosin, losartan, sacubitril + valsartane, hydralazine, spironolactone, torasemide, dopamine, dobutamine, propranolol, atenolol, bisoprolol, nebivolol, carvedilol, epinephrine, norepinephrine, phenylephrine, isoturon, difetur, raviten.

#### ***3. Indicate the medications used in (for):***

Grade I essential hypertension; grade III essential hypertension; renal hypertension; renovascular hypertension; hypertension with hyperaldosteronism; diagnosis and treatment of pheochromocytoma; hypertension with hypercholesterolemia (atherosclerosis); hypertensive crisis; hypertensive emergencies in eclampsia; hypertensive emergencies in encephalopathy; controlled hypotension; hypertension with heart failure; hypertension in young patients; hypertension in elders; hypertension in diabetics; hypertension in obese; hypertension after acute myocardial infarction; hypertension in patients with obstructive pulmonary disease; obliterative endarteritis; Raynaud's disease; trophic ulcers of the lower limbs; alpha-adrenomimetic resistant hypotension; orthostatic hypotension produced by alpha-adrenoblocks; chronic hypotension; hypovolemic hypotension; hypotonic hypotension (collapse, etc.); hypertonic (cardiac) hypotension; esophageal hemorrhages.

**4. Tests. "Farmacologia clinică" (self-assessment tests), Chisinau, 2000, pages 116-14**

**5. Клиническая фармакология (тесты для самоподготовки. Кишинэу 2014, стр. 31 и 51)**

**6. Clinical cases. Ghid cazuri clinice, Chisinau, 2017, page 66**

**7. Virtual situations: Îndrumar pentru lucrări de laborator la farmacologie. Chisinau, 2016, pag. 165**

**8. Selection of antihypertensive and antihypotensive drugs according to the criteria of effectiveness, harmlessness, acceptability and cost, for inclusion in the personal form (P drugs).**