1.1.2. DRUGS ACTING ON ADRENERGIC TRANSMISSION ADRENERGIC AND DOPAMINERGIC ANTAGONISTS. SYMPATHOLYTICS.

A. Actuality. The sympathetic nervous system is involved in regulating the function of internal organs and metabolic processes. Drugs that act on the sympathetic system exhibit various pharmacodynamic actions and have a broad pharmaco-therapeutic use.

B. The purpose of the training is to familiarize students with the pharmacological properties of adrenoblockers, dopamine blockers and sympatholytics.

C. Learning objectives:

1) The student must **know:** the general characteristic of adrenoblockers, sympatholytics and dopaminolytics; principles of classification, mechanism of action, indications, contraindications, adverse reactions, the clinical picture of acute and chronic poisoning with some drugs of these groups and their treatment.

2) The student must **be able to:** make out prescriptions of mandatory drugs in various forms and indicate them in various diseases and pathological conditions.

D. Initial level of knowledge required for interdisciplinary integration:

Biochemistry. Neurotransmitters of adrenergic and dopaminergic synapses (noradrenaline, dopamine). Structure, biosynthesis and inactivation of mediators, actions on lipid, carbohydrate and protein metabolism.

Histology. The sympathetic autonomic nervous system, morpho-functional features. The structure of the adrenergic synapse.

Human physiology. Adrenergic synapse. Types and subtypes of adrenergic receptors. Their location. The effects of activation of adrenergic receptors of tissues innervated and non-innervated by the autonomic nervous system.

Pathophysiology. Deregulation of the excitability and conductivity of neurons. Disruptions of synaptic conductivity. Pathology of the vegetative nervous system.

E. Self-training questions:

1. α-adrenoblockers. Classification. Pharmacodynamics (mechanism of action, pharmacological effects). Indications and contraindications. Adverse reactions.
2. β-adrenoblockers. Classification. Pharmacodynamics (mechanism of action, pharmacological effects). Indications and contraindications. Adverse reactions.
3. α,β -adrenoblockers. Pharmacodynamics (mechanism of action, pharmacological effects). Indications and contraindications. Adverse reactions.

4. Sympatholytics. Classification, mechanisms of action, pharmacological effects. Indications, contraindications, and adverse reactions.
5. Drugs with influence on the dopaminergic system. Classification. Pharmacodynamics (mechanism of action, pharmacological effects). Indications, contraindications and adverse reactions.

F. The student's individual work. The student's individual work (points 1, 2, 3, 4 are done in written form during the preparation process)

1) Medical prescription exercises.

To prescribe the following drugs in all medicinal forms: 1. Phentolamine. 2. Prazosin. 3. Propranolol. 4. Atenolol. 5. Nebivolol. 6. Carvedilol. 7. Reserpine. 8. Guanethidine. 9. Dihydroergotoxin.

2) List the groups and drugs used in (for): trophic ulcers of leg and foot, prostate adenoma, myocardial infarction, migraine, metrorrhagia, cerebral circulatory insufficiency, pheochromocytoma, vascular spasms, hypertension , angina pectoris, cardiac arrhythmias, hyperthyroidism, endarteritis, hypoglycemic coma.

3.) Tests (Guidelines for Laboratory Work in Pharmacology).

4.) Clinical case (Guidelines for Laboratory Work in Pharmacology).

5.) Virtual situations (Guidelines for Laboratory Work in Pharmacology).

6.) Virtual didactic movie.

7.) Tables

Table 1

Indications of alpha-adrenoblockers

Indications	Phentolamine	Dihydroergotoxin	Prazosin	Tamsulosin
Hypertensive crisis				
Hypertension				
Pheochromocytoma				
Migraine				
Spasm of peripheral vessels				
Heart failure				
Urination disorders in prostate adenoma				

Note! The presence of the indication is marked with the "+"

Table 5

Mechanism of action of guanethidine and reserpine

Mechanism of action	Guanethidine	Reserpine
Deregulates the release of NA from presynaptic nerve endings		
Competitively blocks reuptake of NA by presynaptic nerve endings		
Is accumulated in the vesicles of the nerve terminal and displaces		

NA		
Inhibits vesicular monoamine transporter and consequently storage in vesicles of noradrenaline, dopamine and serotonin		

Note! The presence of the mechanism is marked with the "+"

Table 6

Comparative characteristic of guanethidine and reserpine

Parameters	Guanethidine	Reserpine
Sedative effect (+/-)		
Drug induced Parkinson syndrome (+/-)		
Depression (+/-)		
Influence on adrenal medulla (does not influence / decreases the content of catecholamines)		
Orthostatic (postural) hypotension (+/-)		

8.) Solve the case:

The patient with recurrent bouts of tachycardia and asthma predisposition has been given a drug. The tachycardia has disappeared, but dyspnea has appeared.

What medicine was indicated?

What was the cause of dyspnea?