

Concluding:
DRUGS ACTING ON THE PERIPHERAL NERVOUS SYSTEM

A. Actuality. Drugs with influence on the peripheral nervous system (vegetative and somatic) exert a varied range of pharmacological effects aimed at modulating the activity of systems and organs, the perception and transmission of impulses on related pathways. Cholinomimetics, anticholinesterases, cholinoblockers, adrenomimetics, adrenoblockers, sympatholytics, local anesthetics, astringents, adsorbents, mucilaginous, irritants are widely used in practical medicine.

B. The purpose of the training is to strengthen the students' knowledge about pharmacodynamics of drugs that affect peripheral innervation, their selection according to the indications, knowledge of side effects and first aid measures in case of poisoning.

C. Learning objectives:

a) The student **must know:** the pharmacological characteristics of these drug groups (pharmacokinetics and pharmacodynamics), the main indications for administration, side effect and first aid measures in poisoning.

b) The student must **be able to** make out prescriptions of mandatory drugs in various forms and indicate them in various diseases and pathological conditions and, first of all, in emergencies.

D. Self-training questions:

1. Classification of medicinal drugs with influence on cholinergic synapses.
2. M-cholinomimetics. The mechanism of action. The influence on the eye, heart, smooth muscles of the internal organs, the secretion of the exocrine glands. Indications, contraindications, side effect. Muscarine intoxication, clinical picture and treatment.
3. N-cholinomimetics. The mechanism of action. The influence of N-cholinomimetics on sinocarotid chemoreceptors, vegetative ganglia, striated muscles, adrenal medulla, organs and systems. Indications. The toxic action of nicotine. The use of N-cholinomimetics for smoking cessation.
4. Anticholinesterase drugs. Classification and mechanism of action. Characteristic of the interaction with cholinesterase. The effects. Indications. Contraindications and side effect. The particularities of the action of organophosphorus compounds. The clinical picture of poisoning with organophosphorus compounds . Antidotes: the particularities of action and use.
5. Classification of cholinoblockers. M-cholinoblockers. Classification according to the mechanism of action. Its influence on the CNS, eye, cardiovascular system, tone of the bronchi, smooth muscles of the digestive tube, biliary and urinary tracts, detrusor and sphincter of urinary bladder, secretion of the glands (gastric, etc.). The particularities of the action of M-cholinoblockers. Indications. Contraindications and side effect. The clinical picture of poisoning with atropine and plants containing these alkaloids. Antidotes and mechanism of action.
6. Classification of N-cholinoblockers. Ganglioblockers. Classification according to chemical structure and duration of action. The influence on the cardiovascular system, digestive tube, myometrium. Indications, contraindications and side effect .
7. Miorelaxants with peripheral action. Classification by duration and mechanism of action. Indications, contraindications and side effects. Myorelaxant antagonists and decurarization principles.
8. Alpha,beta-adrenomimetics. Their influence on the cardiovascular system, microcirculation, smooth muscles organs, metabolism. Indications, contraindications and side effect.
9. Alpha-adrenomimetics. Classification. Their influence on the cardiovascular system, microcirculation. Indications. Contraindications. Side effect.

10. Beta-adrenomimetics. Classification. Beta-1-adrenomimetics: influence on the heart and kidneys, indications, contraindications and side effect. Beta-2-adrenomimetics: their influence on the tone of the bronchi, myometrium, vessels and metabolism, indications, contraindications and side effect.
11. Alpha-adrenoblockers. Classification. Pharmacodynamics. Main properties, indications and contraindications. Side effect.
12. Beta-adrenoblockers. Classification. Mechanism of action. Effects. Indications. Contraindications. Side effect.
13. Alpha- and beta-adrenoblockers. The effects. Indications. Contraindications.
14. Classification of drugs with influence on the dopaminergic system. Dopaminomimetics, dopaminoblockers: mechanism of action, effects, indications.
15. Sympatholytics. Classification, mechanism of action, effects. Their influence on the cardiovascular system, gastrointestinal tract, CNS and the content of catecholamines. Indications. Contraindications. Side effect.
16. Local anesthetics. Classification according to chemical structure, types of local anesthesia, activity, toxicity, latency and duration of action. Requirements for local anesthetics. Mechanism of action and effects of local anesthetics. Indications. Side effect. Pharmacokinetics.
17. Astringent drugs. Classification. Mechanism of action, pharmacological effects. Indications.
18. Adsorbent drugs. Mechanisms of action, pharmacological effects. Indications.
19. Irritant drugs. Mechanisms of action, effects. Indications.
20. Mucilaginous drugs. Mechanism of action, pharmacological effects. Indications.

E. Independent work (is done in written form while preparing for the lesson)

1.) To prescribe the following drugs in all medicinal forms: 1. Pilocarpine hydrochloride. 2. Aceclidine. 3. Cititon. 4. Neostigmine. 5. Galantamine hydrobromide. 6. Physostigmine salicylate. 7. Trimedoxime. 8. Atropine sulfate. 9. Scopolamine hydrobromide. 10. Platifylline hydrotartrate. 11. Hexamethonium. 12. Treprium iodide. 13. Suxamethonium. 14. Melictine. 15. Methocinium iodide. 16. Pirenzepine. 17. Tubocurarine chloride. 18. Ipratropium bromide. 19. Trihexyphenidyl hydrochloride. 20. Adifenine. 21. Tropicamide. 22. Norepinephrine hydrotartrate. 23. Epinephrine hydrochloride. 24. Isoprenaline. 25. Salbutamol. 26. Dopamine. 27. Phentolamine. 28. Propranolol. 29. Reserpine. 30. Guanethidine. 31. Dihydroergotoxine. 32. Dobutamine. 33. Phenylephrine. 34. Prazosin. 35. Ephedrine hydrochloride. 36. Naphazoline. 37. Atenolol. 38. Nebivolol. 39. Procaine. 40. Lidocaine. 41. Benzocaine. 42. Tetracaine. 43. Medicinal charcoal. 44. Articaine. 45. Trimecaine. 46. Bupivacaine. 47. Carvedilol.

List the groups and drugs used in (for): glaucoma, intestine and urinary bladder atony, breathing stimulation, residual phenomena of poliomyelitis, gastric ulcer, asthma attacks, intoxication with fly agaric mushrooms, fundoscopic eye examination, muscle relaxation during intubation, premedication, biliary colic, hypertensive crisis, acute arterial hypotension, cardiac arrhythmias, hypoglycemic coma, hypertension, anaphylactic shock, angina pectoris, pheochromocytoma, vascular spasms, infiltrative anesthesia, surface anesthesia, conductive anesthesia, endarteritis, rhinitis, imminent miscarriage, controlled hypotension, radiological diagnosis of the gastrointestinal tract, conjunctivitis, acute poisoning, cardiogenic shock, acute heart failure, poisoning with organophosphorus compounds, residual phenomena of CNS and peripheral nerve trauma.

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

3.) Tables (recapitulation of knowledge)

Table 1

Pharmacological effects of sympathetic and parasympathetic stimulation

Organs and systems	Parameters	Effects of sympathetic stimulation	Effects of parasympathetic stimulation
Eye	Pupil diameter		
	Accommodation		
Heart	Heart rate		
	Strength of contraction		
	AV conduction		
	Automaticity		
Smooth muscles of blood vessels	Tone		
Smooth muscles of internal organs	Tone		
Exocrine glands	Secretion		

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

Table 2

Mediators and receptors of efferent innervation

Type of nerve fibers	Released neurotransmitter	Sensitive receptors
Parasympathetic preganglionic		
Parasympathetic postganglionic		
Somatic		
Sympathetic preganglionic		
Sympathetic postganglionic		
Sympathetic fibers that innervate adrenal medulla		

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

Table 3

Types, localization, and effects of stimulation of cholinergic receptors

Type of cholinergic receptors	Localization	Effects of stimulation
Nn	1. Ganglionic neurons 2. Neurons of the CNS 3. Adrenal medulla 4. Sinocarotid zone	
Nm	Skeletal muscles	
M1	1. CNS 2. Parietal cells	
M2	1. Heart 2. Presynaptic membrane	
M3	1. Smooth muscles of internal organs 2. Exocrine glands 3. Endothelium	

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

Table 4

Types, localization, and effects of stimulation of adrenergic receptors

Type of adrenergic receptors	Localization	Effects of stimulation
Alpha 1	1. Radial muscle of the iris 2. Blood vessels	
Alpha 2	1. Blood vessels 2. Presynaptic membrane	
Beta 1	1. Heart 2. Juxtaglomerular apparatus	
Beta 2	1. Bronchi 2. Myometrium 3. Blood vessels 4. Liver 5. Presynaptic membrane	
Beta 3	Adipocytes	

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

F. Interactive activity

1) **Clinical case (Guidelines for Laboratory Work in Pharmacology).**

2.) **Virtual situations (Guidelines for Laboratory Work in Pharmacology).**

3.) **Solve the case:**

A patient suffering from hypertension, after a long-term treatment with a drug, complains of pain in the epigastric region, hypersalivation, congestion of the nasal mucosa. After the patient's investigation, the diagnosis of gastric ulcer was established.

Determine the group and the possible drug that the patient used.

What is the mechanism and cause of complication?

What groups and medications could be used to avoid this complication?