CLINICAL PHARMACOLOGY OF DRUGS USED IN AFFECTIONS OF THE RESPIRATORY SYSTEM. ANTIALLERGIC DRUGS.

A. Actuality

Respiratory system affections are the most frequent encountered in internist's practice, especially in ambulatory health care. Unserious attitude, of the patients towards these diseases, leads in many cases, to the development of chronic process with appearance of serious complications. Drugs' diversity that can be used in these affections imposes a scrupulous study of their pharmacodynamics and pharmacokinetics. This will allow to select a harmless and suitable treatment, which in case of such chronic diseases as bronchial asthma, obstructive bronchitis are administrated for a long period, accompanied by drugs efficiency decreasing.

Allergy is a universal response of the body to the action of various endogenous and exogenous noxious factors, it is a pathological process characteristic of most diseases.

Technical and scientific progress modified significantly the environment, this favoring the vertiginous growth of allergic affections incidence.

Currently there is a rich arsenal of anti-allergic drugs, but for efficient and rational using of their is important to know their pharmacological features.

B. Training aim

To deepen knowledge of the pharmacology of drug groups used in the treatment of respiratory and antiallergic diseases. Acquire and apply the pharmacokinetic and pharmacodynamic principles to individualize and optimize the administration of these drugs.

C. Teaching objectives

The students should be able to:

a) Elucidate pharmacodynamic and pharmacokinetic peculiarities of drug groups used in respiratory system diseases.

b) Establish dosage principles of drugs depending on group affiliation and etiology and severity of the disease.

c) Forecast possible side effects and complications, to establish their dependence on dosing regimen, their prophylaxis.

d) Apply contemporary methods of pharmacological and non-pharmacological correction of drug-induced adverse drug reactions.

e) Write down the personal form (P-medicines) of drugs used to treat respiratory system diseases.

D. Knowledge from previously studied disciplines and related subjects

Medico-biological subjects. Respiratory system anatomy. Neurological and hormonal influence on the respiratory system. Chemoreceptors importance in regulation of respiration. Trachea, bronchi, alveolar acinus: structure, functions. Autonomic nervous system influence on respiratory system. The main causes of respiratory failure. Bronchial obstruction, mechanisms of development. Allergic reactions. The basic components of the immune response. Interdependence of alteration, protection and adaptation reactions in pathologies involving immune system.

Clinical subjects. Respiratory system diseases (bronchitis, pneumonia, bronchial asthma, pulmonary abscess, pulmonary edema etc.). Their classification, clinical manifestation, pathogenesis and etiology, treatment principles.

Pharmacology. Classification of drugs affecting respiratory system (analeptics, antitussives, expectorants and mucolytic, bronchodilators). Drug groups used in pulmonary edema – mechanism of action, effects, indication, side effects. Classification of anti-allergic drugs. Mechanism of action, effects, indications, side effects.

E. Questions for self training

I. Clinical-pharmacological characteristics of drug groups used in respiratory diseases.

1. The bronchodilators classification.
2. The bronchodilators from β-adrenoreceptor agonists group: classification, mechanism of action, benefit in bronchial asthma, indications and principles for selection and use in various clinical situations, adverse reactions and their prophylaxis, comparative pharmacokinetics of inhaled beta-adrenomimetics, synergistic drug interactions. Pharmacogenetic principles of β-adrenomimetic drugs use.
3. Selective M-cholinoblockers as bronchodilators: peculiarities of mechanism of action,benefit in bronchial asthma, indications and principles for administration, side effects pharmacokinetics, drug interactions.
4. Methylxanthin group as bronchodilators: peculiarities of mechanism of action and benefit in bronchial asthma, indications, principles for selection and use in various clinical situations, adverse reactions and their prophylaxis, pharmacokinetics, drug interactions. Prolonged action methylxanthines.
5. Inhaled and systemic glucocorticoids as antiasthmatic drugs: classification, features of the mechanism of action in bronchial asthma, indications and principles of chronopharmacological use, dosage regimen, adverse reactions and their prophylaxis, pharmacokinetics, drug interactions. Advantages of the inhaled glucocorticoids.
6. Inhibitors of mast cell degranulation in asthma and other allergic diseases: classification, features of mechanism of action in bronchial asthma, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics, drug interactions.
7. Antileucotrienes used as antiasthmatic and anti-allergic drugs: features of the mechanism of action in bronchial asthma, indications and principles of selection and use in those situations, adverse reactions and their prophylaxis, pharmacokinetics.
8. Inhibitors of 5-lipoxygenase as antiasthmatics. The features of the mechanism of action in bronchial asthma, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics.
9. Biological drugs: monoclonal antibodies to E (class) E immunoglobulins for the treatment of bronchial asthma: features of the mechanism of action, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics, drug interactions.
10. Principles of treatment of asthma status.
11. Particularities of use of bronchodilators in pregnant, pediatric and geriatric.
12. Clinical pharmacology of antitussive remedies: classification, peculiarities of mechanism of action and antitussive effect, indications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics. Peculiarities of use in various clinical, pediatric and geriatric situations.
13. Clinical pharmacology of expectorant and mucolytic remedies. Principles of selection and use in clinical situations. Particulars of use in pediatrics and geriatrics.
14. Clinical pharmacology of drugs used in di-stress respiratory syndrome in newborn.
15. Principles of action and use of drugs administered in pulmonary edema.
16. Classification of anti-allergic drugs. The medication of immediate and delayed allergic reactions.
17. Classification of H1-histaminoblocks by generation: classification, peculiarities of mechanism of action and pharmacodynamic effects, indications, contraindications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics, drug interactions.
18. Principles of selection and dosage of drug preparations used in immediate-type allergic reactions: allergic rhinitis, urticaria, angioneurotic edema, anaphylactic shock.
19. Classification of drugs used in delayed allergic reactions: Clinical pharmacology of minor immunodepressive drugs (4-aminoquinoline derivates, gold compounds, thiol derivatives): peculiarities of the mechanism of action and pharmacodynamic effects, indications,

contraindications and principles of use, adverse reactions and their prophylaxis , pharmacokinetics. Principles for the selection and dosing of medicinal products.

20. Clinical pharmacology of glucocorticoids: classification, peculiarities of the mechanism of action and pharmacodynamic effects, indications, contraindications and principles of use, adverse reactions and their prophylaxis, pharmacokinetics. Chronopharmacological principles of glucocorticoid use.
21. Principles of selection and use of anti-allergic drugs in pregnant women, children, the elderly.

II. Clinical pharmacological selection and use of drugs in some pathological conditions and diseases:

Principles for the selection and use of drugs in exacerbation of asthma;
Principles of drug selection and use in the treatment of atopic bronchial asthma;
Principles for the selection and use of drugs in pulmonary edema;
Principles for the selection and use of drugs in anaphylactic shock.

F. Individual work (the 1.1 and 1.2 sequences are to be done in writing form):

1.1. Indicate the pharmacological groups and drugs used in (for): mild to moderate asthma exacerbations, status asthmaticus, long-term management of bronchial asthma, prevention of bronchospasm in surgical interventions, exercise-induced bronchospasm, or inhalation of gases and dust, bronchial asthma resistant to beta-adrenergic agonists, chronic obstructive pulmonary disease (COPD), chronic mucopurulent bronchitis, pertussis (whooping cough), non-productive cough in pneumonia, neonatal apnea, cheyne-Stokes respiration disorder, pulmonary edema with hypertension, pulmonary edema with hypotension, non-cardiogenic pulmonary edema, urticaria (hives), allergic rhinitis, contact dermatitis, angioedema (Quincke's edema), anaphylactic shock.

1.2. Prescribe the following medications in their respective pharmaceutical forms, indicating the dosage regimen according to the respective pathology.

	Drug Name	Pharmaceutical Form / Dosage
1	Salbutamol	Aerosol – 200 doses (100 mcg/dose) / Solution 0.1%-2ml vials
2	Aminophylline	Tablets 0.15 / Solution 2.4%-5ml vials
3	Sodium Cromoglycate	Ophthalmic/nasal solution 2%-10ml
4	Ketotifen	Tablets 0.001
5	Montelukast	Tablets 0.004; 0.005; 0.01 / Granules 0.004
6	Dexamethasone	Tablets 0.0005; 0.002; 0.004 / Solution 0.4%-1ml; 2ml vials / Ophthalmic ointment 0.1%-3.5 / Ophthalmic solution/suspension 0.1%-5ml
7	Prednisolone	Tablets 0.005 / Solution 3%-1ml vials / Ointment 0.5%-10.0
8	Acetylcysteine	Tablets/Granules 0.6 / Powder for oral solution 0.1; 0.2; 0.6 / Capsules 0.2 / Solution 10%-3ml vials
9	Bromhexine	Tablets 0.008; 0.004 / Oral solution 0.08%-60ml bottles
10	Diphenhydramine	Tablets 0.05 / Solution 1%-1ml vials / Gel 2%-35.0; 20.0
11	Cetirizine	Tablets 0.01 / Oral solution 1%-20ml
12	Loratadine	Tablets/capsules 0.01 / Syrup 0.1%-120ml; 150ml
13	Clemastine	Tablets 0.001; 0.002 / Solution 0.1%-2ml vials
14	Fluticasone	Aerosol – 120 doses (125mcg/dose) / Nasal aerosol – 120 doses (27.5 mcg/dose)
15	Clenbuterol	Tablets 0.00002; 0.00004
16	Tiotropium bromide	Capsules with inhalation powder 0.000018
17	Ambroxol	Tablets 0.03; 0.06 / Syrup 0.3%-100ml; 0.6%-100ml
18	Epinephrine	Solution 0.18%-1ml vials
19	Salmeterol/Fluticasone	Inhalation powder 60 doses - 50 mcg/500 mcg/dose, 50 mcg/250

		mcg/dose, 50 mcg/100mcg/dose / Aerosol – 60 doses – 25 mcg/250 mcg/dose, 25 mcg/125 mcg/dose, 25 mcg/50 mcg/dose
20	Theophylline	Capsules 0.1; 0.2; 0.3
21	Dextromethorphan	Syrup 0.18%-200ml
22	Desloratadine	Tablets 0.005 / Syrup 0.05%-150ml

2. Tests on clinical pharmacology (for faculty of medicine). Chisinau, 2014, p.21.
3. Clinical cases in clinical pharmacology. Chisinau, 2017, p.34.
4. Virtual situations.
5. Selection of Personal drugs (P- drugs) and Personal treatment (P- treatment) according to the criteria of efficacy, safety, acceptability and cost for inclusion in the personal form (P drugs).