

CLINICAL PHARMACOLOGY OF THE CENTRAL NERVOUS SYSTEM-ACTING DRUGS

(Psychotropic drugs: anxiolytic, sedative, antipsychotic, antidepressant, nootropic, psychostimulants, hypnotics, antiepileptics, antiparkinsonian, antispastic of striated muscles-central miorelaxants)

A. Actuality

Psychotropic medication regulates different functions of the CNS (Central Nervous System), that is why drugs acting on the CNS are used in the treatment of a wide range of specific diseases in psychiatric practice, as well as of certain psycho-somatic diseases and conditions in the practice of the doctor of different specialties. Anticonvulsants, antiepileptic drugs, antiparkinsonian drugs and antispasmodic drugs are used to treat specific diseases and, as well, some nonspecific psychopathological diseases and pathological conditions. The majority of drugs from these groups also have side pharmacodynamical effects (antihypertensive, anticonvulsive, antihistaminic, antimuscarinic, antivomitive effects, etc.) that are often disregarded in the course of pharmacotherapy and increase the incidence of adverse drug reactions or lead to the failure of drug therapy. Knowledge and adequate use of all properties of CNS-acting drugs may improve the results of treatment in patients with CNS pathologies, inclusively mental pathologies on the background of some internal diseases.

B. Training aim

Acquisition and use of clinical pharmacokinetic and pharmacodynamical principles in the course of individualization and optimization of CNS-acting drugs administration.

C. Teaching objectives

The student should be able to:

- a) distinguishing the groups of CNS drugs, based on their pharmacokinetic and pharmacodynamical properties
- b) selecting the CNS drugs depending on disease, pathological states and age peculiarities
- c) knowing the criteria for assessment of clinical efficacy of drugs from the relevant groups
- d) forecasting the occurrence of adverse drug reactions, depending on the intake and dosing regime
- e) applying the up-to-date methods of prophylaxis and treatment of CNS-acting drugs adverse reactions
- f) forecasting the interaction of CNS drugs with each other and other medications

D. Knowledge from previously studied disciplines and related subjects

Anatomy and physiology. Principles of CNS and PNS (peripheral nervous system) functioning. Peculiarities of the autonomic and somatic nervous system. Physiology of the cerebral cortex. Excitation and inhibition processes in CNS. Anatomic and physiological peculiarities of: neuron, receptors and synapsis. Thalamus. Hypothalamus, limbic system: anatomic and physiological properties. Characterization of the cognitive process. Personality as a result of psycho-physiological and social factors. Sleep and its structure, the implications of different structures of the CNS in sleeping.

Physiopathology and clinical disciplines. Pathogenesis of CNS and PNS diseases. Neuroses: general characteristics; role of biological and social factors in occurrence of neuroses; clinical implications. Somato-neurological implications and psychosomatic implications in different pathological states. Psycho-vegetative syndrome. Sleep disorders and treatments. Convulsions, epilepsy, parkinsonism and spastic states of antispasmodic-general characteristics; Alzheimer's disease. Treatment principles.

Pharmacology. Classifications according to the pharmacotherapeutic and pharmacokinetic principles, mechanisms of action, effects, prescriptions, and adverse reactions of CNS drugs.

E. Questions for self-training

I. Clinical and pharmacological characteristics of CNS-acting drugs

1. Clinical pharmacology of sedatives. Classification. Particularities of the sedative effect, indications and principles of use and dosage, adverse effects.
2. Clinical pharmacology of anxiolytics (tranquilizers): classification according to therapeutic use and duration of action, particularities of mechanism of action, pharmacological effects and clinical manifestations, indications and principles of selection, use and dosage, contraindications, adverse reactions and prophylaxis their drug interactions.
3. Clinical pharmacology of antipsychotics (neuroleptics): classification according to clinic effects, pharmacological effects (mechanisms and manifestations), pharmacokinetic peculiarities, prescriptions, selection and dosing principles, contraindications, adverse drug reactions and clinical manifestations, drug interactions.
4. Clinical pharmacology of antidepressants: classification according to clinical use, mechanism of action, pharmacological effects, clinical effects and manifestations, prescriptions, use and dosing principles, pharmacokinetics, adverse reactions, drug interactions. Peculiarities of antidepressants use in elderly.
5. Clinical pharmacology of nootropics: classification, peculiarities of the mechanism of action, pharmacological effects, clinical effects and manifestations, indications and aspects of clinical use, dosage principles, adverse reactions, drug interactions.
6. Clinical pharmacology of excitatory CNS: classification, particularities of mechanism of action, pharmacological effects and clinical manifestations, indications and aspects of clinical use, dosing principles, adverse reactions and their manifestations, drug interactions.
7. Clinical Pharmacology of Hypnotics. Classification according to the pharmacodynamic, pharmaco-therapeutic criterion and duration of action. Particularities of hypnotic and adverse effects, pharmacokinetic aspects. Principles of sleep disorders correction.
8. Clinical pharmacology of symptomatic anticonvulsants: classification according to group and influence on the respiratory center, peculiarities of the convulsive effect. Principles of selection and use of anticonvulsants from the group of benzodiazepines, barbiturates, GABA and aliphatic derivatives, magnesium. Pharmacokinetic peculiarities, adverse reactions, drug interactions.
9. Clinical pharmacology of antiepileptic drugs: classification according to the forms of epilepsy, mechanisms of action, prescriptions, principles of selection and use, pharmacokinetic aspects, adverse reactions, drug interactions.
10. Clinical pharmacology of antiparkinsonian drugs. Classification, principles of antiparkinsonian drugs selection and use. Pharmacokinetic peculiarities, adverse reactions and drug interactions.
11. Clinical pharmacology of antispastic preparations of striated musculature (central miorelaxants). Classification. Pharmacodynamic and pharmacokinetic particulars, indications and principles of selection and use, adverse reactions, contraindications and precautions for benzodiazepines, GABA derivatives, benzoxazolone derivatives and preparations in various groups.
12. Clinical pharmacology of Alzheimer's disease drugs. Classification, principles of action, selection and use.
13. The particularities of the administration of CNS-acting drugs during pregnancy and lactation as well as the pharmacokinetic, pharmacodynamic and pharmacogenetic principles in the individualization and optimization of the administration of these drugs to children and the elderly.

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

Principles of selection and use of antipsychotics in psychiatric practice and somatic diseases treatment.

Principles of selection and use of antiepileptic drugs of first choice and alternative medication according to the forms of epilepsy.

Principles of selection and use of benzodiazepines as sedatives, anxiolytics and hypnotics.

Principles of selection and use of nootropic preparations in acute and chronic pathologies.

Principles of selection and use of psychostimulants as stimulants of work performance and somatic pathologies.

Principles of selection and use of antidepressant preparations according to the forms of depression and depressive syndrome of somatic pathologies.

Principles of selection and use of drug preparations in Alzheimer's disease based on evidence-based medicine.

F. Individual work

1. Brief characterization of main drugs

Vertically. International Non-Proprietary Name (INN) of the drug.

Horizontally. Synonyms, forms of delivery, way of intake, doses (therapeutic, maximal doses), mechanisms of action, prescriptions, contraindications, adverse reactions:

Flunitrazepam, temazepam, clonazepam, lorazepam, alprazolam, doxylamine, zopiclone, zolpidem, sertraline, risperidone, chlorprothixene, entacapone, ramelteon, escitalopram, levetiracetam, zonisamide, pregabalin, lamotrigine, topiramate, pramipexole, melatonin, memantine.

2. Exercises on medical prescription (see methodological instructions for practical works on pharmacology for the 3rd year): Phenobarbital, diazepam, nitrazepam, phenazepam, oxazepam, flumazenil, chlorpromazine, levomepromazine, perphenazine, droperidol, haloperidol, clozapine, sulpiride, buspirone, lithium carbonate, amitriptyline, imipramine, fluoxetine, moclobemide, meprobamate, ethosuximide, piracetam, caffeine, phezam, Valerian root extract, Rhodiola Roseaextract, phenytoin, sodium valproate, carbamazepine, amantadine, bromocriptine, levodopa, sinemet, trihexyphenidyl.

3. Indicate the drugs used in (for): Psychomotor agitation in mental diseases; psychomotor agitation in alcohol withdrawal syndrome in alcoholics; vegetative neuroses in somatic diseases; febrile states; manic depressive disorder; delirium psychotic syndromes; hyperirritability; schizophrenia; delirium and hallucination psychotic syndromes; vomiting of central origin; vegetative neuroses in neurocirculatory-dystonias; neuroses; pre-anesthetic preparation and postoperative care; preparation for diagnostic manipulations and procedures; idiopathic convulsions; induction and maintenance of general anesthesia; somatic diseases with psycho-vegetative syndrome; analgesia potentiation; agitated depression; inhibiting depression; anxious depression; endogenous depressions; depressive psychoses; obsessive-phobic depressive syndromes; asthenic depressive states; mental strain; rehabilitation following traumas, infections and intoxications; nocturnal enuresis; hypertensive episodes; chronic cerebrovascular insufficiency; encephalopathy; behavioral and adaptation disturbances in children; migraine and vascular headache; sequelae of traumatic brain injury; traumatic and toxic coma; transitory cerebral circulation disturbances; initial hyposomnia; intermittent hyposomnia; terminal hyposomnia; transitory hyposomnia; chronic hyposomnia; major epileptic crises; minor epileptic crises; epileptic seizures; myoclonic seizures; akinetic crises; partial crises; Parkinson's disease; drug-induced Parkinson's disease; mild forms of idiopathic Parkinson's disease; severe forms of idiopathic Parkinson's disease; central spastic states; spastic states with anxiety; attention deficit hyperactivity disorder (ADHD), Alzheimer's disease.

4. Tests on Clinical Pharmacology (for faculty of medicine), Chisinau-2004, page 74.

5. Clinical cases in Clinical Pharmacology, Chisinau-2017, page 110.

6. Virtual Cases.

7. Personal Drug (P-Drug) Selection and P-Treatment (Personal Treatment) according to the criteria of effectacy, safety, acceptability and cost for inclusion in the personal form (P drugs).