Concluding session

GENERAL PRESCRIPTION. GENERAL PHARMACOLOGY.

A. Actuality. The treatment of patients of any profile requires, in most cases, the use of medicinal drugs. General prescription exercises are intended for training and strengthening the practical skills of prescribing mandatory drugs in different medicinal forms. Medical prescription tends to form skills for selecting medicinal drugs in various diseases and concrete pathological conditions.

B. The purpose of the training. Consists in consolidating students' knowledge regarding the prescription forms used in the country, with the requirements of the Pharmacopoeia for the drugs (purity, storage and their dosage).

C. Learning objectives:

a) The student must **know:** structure of the prescription, the notion of medicinal raw material, medicinal substance and medicinal form; masterly and official prescription, according to the nomenclature of medicines; the chemical, commercial, common international (CIN) and officinal (pharmacopoeia) names of the drugs; abbreviations of Latin words and signs used in recipes.

a) The student should **be able to:** prescribe drugs in various forms, differentiate a correct prescription from one wrong, to apply the accumulated knowledge to solving situational problems.

D. Initial level of knowledge required for interdisciplinary integration

Latin language. Declension of nouns; the prepositions used in the prescription; the main abbreviations and signs.

E. Self-training question:

1. Classification of medicinal forms by consistency.
2. Powders and their varieties (for internal use, for use external).
3. Capsules.
4. Tablets, granules, films and pills.
5. Dragees, caramels, lighters, pencils and the species.
6. Ointments and their varieties.
7. Suppositories and other semisolid medicinal forms.
8. Solutions and their varieties (for internal use, for external use).
9. Suspensions and the emulsions.
10. Injectable forms and special packaging: ampoules and vials (solutions, suspensions and lyophilized powders).
11. Extractive solutions (aqueous and oily). Derivatives of extractives solutions.
12. The liniments.
13. Aerosols.
14. Organic drugs.
15. Notion of transdermal therapeutic systems.
16. Pharmaceutical forms with modified release and medicinal transport systems.
17. Types of drug transport systems and their fields of use.
18. Classification of pharmaceutical (medicinal) forms according to the route of administration.
19. Notion of phytotherapy and aromatherapy .
20. Pharmacology, definition. Pharmacology as a discipline. Its relations with other disciplines. The importance of pharmacology for medicine practice.
21. Notion of drug, pro-drug, remedy, placebo, drug. Allopathic and homeopathic drugs, original and generic, orphan, essential, OTC (over the counter) medicines. Notion of active principle (medicinal substance). Their classification by origin and systemic principle. The sources of obtaining medicines. Nomenclature medicines.
22. The main stages of the development of new drugs, the assessment of effectiveness and harmlessness their.
23. Subdivisions of pharmacology (general and special). The fundamental and applied branches of pharmacology.
24. Pharmacokinetics . Pharmacokinetic parameters : bioavailability , plasma concentration, apparent volume of distribution (Vd), biological half-life ($T_{1/2}$) , clearance (Cl), elimination rate constant (Ke). Their importance.

25. Classification of drug administration routes. The particularities of enteral , topical , intracavitary and parenteral drug administration routes . Notion of transdermal therapeutic systems . The particularities of the administration routes at children.
26. Absorption of drugs. Absorption mechanisms. Factors that influence the absorption of drugs. The importance of pH and ionization constant (pKa) for drug absorption. The Henderson-Hasselbach equation for the absorption of acidic and basic drugs. The influence of food on the absorption and effect of drugs. The interaction of medicines with the components of food products. P-glycoprotein and other systems involved in drug absorption. Peculiarities of the absorption of drugs when they are administered together. Peculiarities of drug absorption in children.
27. Penetration of drugs through membranes and biological barriers. The factors that influence the permeability of membranes for drugs. The characteristic of biological barriers. Peculiarities of drug penetration through blood brain barrier and placental barrier. Accumulation of drugs in tissues.
28. Distribution of drugs in the body (transportation, distribution and storage). The free and bound fraction of drugs in blood and tissues. The particularities of the distribution of drugs at children.
29. Biotransformation (metabolism) of drugs in the body. The phases of biotransformation and their importance. Notion of presystemic metabolism (first pass effect). The significance of presystemic metabolism . The particularities of biotransformation to children.
30. Notion about the purification and excretion of drugs. The main ways of drug excretion. Renal excretion: the importance of urine pH and other factors for drug elimination. Renal and hepatic clearance. Elimination of drugs through the digestive tract, lungs, skin, milk. Peculiarities of elimination in children and newborns. Pharmacokinetic models of the order "0" and "1".
31. Pharmacodynamics. Factors that influence the pharmacodynamics of the drug. Pharmacodynamic action and primary action of drugs. The overall pharmacological effect. Notion about receivers. Drug interaction with receptors. Receptor types and subtypes. The typical mechanisms of action of drugs (mimetic, lytic , allosteric , modification of the functional structure of DNA, RNA macromolecules, membrane permeability and enzyme activity). Types of drug action: local (topical) and systemic (resorptive), direct and indirect (reflective), primary and secondary, selective and non-selective, reversible and irreversible drug action.
32. Pharmacogenetics . The involvement of genetic factors in drug effects. Genetic polymorphism (type of metabolizers). Enzymopathies . Induction and suppression of hepatic microsomal enzymes . Drugs with enzyme induction and inhibition effect.
33. Notion of pharmacology, dosage. Notion about dose and its varieties. Therapeutic doses: minimum, average and maximum for a (single) intake and for 24 hours, attack dose, maintenance dose, dose for a treatment course. Toxic and lethal dose. Safety parameters (therapeutic index, safety limit, therapeutic range) and their importance. Graphic representation of the dose-effect relationship. The principles of drug dosing in children and the elderly. Biological standardization. Adverse reactions in overdose.
34. Medicines and the factors that influence their action: sex, age, body condition, heredity, biorhythms. The (embryotoxic, teratogenic, fetotoxic) action of the drug during pregnancy.
35. Notion about chronopharmacology . Chronopharmacokinetics . Chronopharmacodynamics . Principles of drug administration according to biological rhythms.
36. The phenomena triggered by the associated administration of drugs: synergism (direct, indirect, infraadditive , summary and potentiated) and antagonism (direct, indirect, unidirectional and bidirectional, physiological, chemical, competitive). Indifference.
37. The phenomena triggered by the repeated administration of drugs: sensitization, tolerance, withdrawal syndrome, rebound effect , functional insufficiency, drug addiction, tachyphylaxis , accumulation and its varieties .

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

Questions on medical prescriptions

Simple undivided powders

1. Urodan 70 g. Administer one teaspoon orally 3 times a day. It is previously dissolved in a glass with the water.

Compound undivided powders

1.Calcium carbonate 100 g. Magnesium oxide 30 g. Internal. One teaspoon each 3 time per day.

1. 15 sodium paraaminosalicylate powders 1 g each. Administer 1 powder orally.

Compound divided powders

1. Rifampicin powders of 150 mg each. Internally one powder 3 times a day.
2. 10 rutin powders of 1 mg each together with 50 mg of ascorbic acid. Internally one powder 3 times a day for 5 days.

Granulated powders

1. Take 100 g. Internally, one teaspoon 3 times a day.

powders

1. Chinosol 2% - 15 g. External. To powder the damaged part of the skin.

capsules

1. Paline of 20 dg each, No. 10. Internally one capsule 2 times a day.

tablets

1. Metronidazole 250 mg each, No. 15. To administer orally, one tablet three time per day.
2. ,, Nacom ", N. 100. Orally 1 tablet 2 times a day.

dragees

1. Bromhexine dragees of 4 mg each. Internally one dragee 3 times a day.

pills

1. 30 pills containing 1 milligram of arsenic anhydride at one time. Internally , one pill twice a day, 5 days.

films

1. 30 ophthalmic films containing 1 milligram of atropine sulfate. Retropalpebral , one film once a day, 5 days.

caramels

1. 50 candies containing 15 centimilligrams of decamine to an outlet. Intraoral , one caramel 6 times a day, 5 days.

lighters

1. 6 " regulax " lighters. Internally , one lighter twice a day, 3 days.

species

1. Cholagogue species. Internal. An infusion is prepared, one spoon per glass of water, 2 times a day, 10 days.

ointments

1. Decamine 0.5% -30 g. External.
2. Viprosal 50 g. Insert into the conjunctival sac every 3-4 hours.

paste

1. Clindamycin 2% - 25 g. External.

gel

1. Diclofenac 1% - 25 g. External

cream

1. Terbinafine 1% - 15 g. Apply to the skin 2-3 times a day.

suppository

rectal suppositories

1. Benzocaine suppositories of 5 dg. Rectal one suppository 2 times day.
2. 15 cefecon suppositories . Rectal one suppository 2 times a day for 6 days.

vaginal suppositories

1. Clotrimazole suppositories of 1 cg. Intravaginally one suppository 2 times a day.

rods

1. 8 xeroform candles of 25 centigrams each, 2 cm long and 0.5 cm thick. In the cervical canal, once a day for 10 days.

plasters

1. Adhesive plaster with a length of 500 cm and a width of 3 cm. For fixing the dressing.

Solutions for internal use

1. Sodium thiosulphate in the dose for one intake equal to 3 g. One tablespoon each 3 times a day. Time of 4 days.
2. Potassium acetate dose per intake of 1 g. One tablespoon 3 times a day. For 4 days.

Solutions for external use

- watery
1. Resorcine 2% - 100 ml. For compresses.
- alcoholic
1. Chlorophyllipt 1% - 200 ml. External.
- Oily
1. Vinylin 20% - 100 ml. For dressing.

Drops for internal use

- watery
1. Tilidine 5% - 10 ml. Internal. 10 drops 2 times a day.
- alcoholic
1. Menthol 15% - 10 ml. Internal. 5 drops in 1/4 glass of water 3 times a day.
Drops for external use
- watery
1. Sulfathiazole 10% -10 ml. Eyewash.
- oily
1. Benzocaine 10% - 10 ml; It is applied topically for mucosal anesthesia.
- glycerol
1. Phenol 5% - 5 ml. Otic drops.
- alcoholic
1. Salicylic acid 2% - 5 ml. Otic drops.

emulsion

1. Almond oil 20 ml. Internal. One teaspoon each 3 times a day.
2. Pumpkin seeds 15 g. Internal. One teaspoon each 3 times a day.

Injectable solutions

1. Sodium iodide 10% - 50 ml. For truncular anesthesia.
2. 100 ml of sterile 5% albumin solution. For slow intravenous infusions.
3. 200 ml of sterile 0.5% procaine solution prepared on the basis of 0.9% sodium chloride solution. To use the solution for infiltration anesthesia.
- ampoules
Injectable medicinal forms in special packaging
1. Sodium oxybutyrate 20% - 1 ml (10 ampoules). Each 1 ml intravenously.
2. Silabolin oily solution 2.5% - 1 ml (20 ampoules). Each 1 ml intramuscularly.
3. Fotretamine 10 mg (10 ampoules). Dilute before use in one ml of water
injectable and to be administered intramuscularly.
- vials
1. Gentamicin 8 centigrams (10 vials). 2.5 ml each 3 times a day intramuscularly.
2. Benzathine-benzpenicillin 1200000 UA (10 vials). Dilute the contents of the vial in water for injection and administer intramuscularly once every 2 weeks.
3. Albumin 5% - 100 ml (5 vials). Intravenous infusion of 40 drops each minute.
- infusions

Aqueous extractive solutions

1. Corn silk in the dose for a intake equal to 0.75 g. Internal. One tablespoon 3 times a day.
- decoctions
1. Blueberries 1.0, 180 ml. For gargling.

Alcoholic extractive solutions

- tinctures
1. The sole of the goose. Internal. 30 drops each 3 times a day.
- fluid extracts
1. Black pepper, 25 ml. Internal. 25 drops 3 times a day.
liniments

1. Aloe liniment 100 ml.
2. Sintomycin 1% - 25 ml. To apply on the damaged parts of the skin.

aerosol

- dose

1. Berodual 1 bottle (15 ml). For inhalations, one puff as needed in bronchial asthma, without exceeding 3 doses per day.

- not dosed

1. Livian 100 ml. For spraying infected wounds.

Review exercises

1. Select the dose equal to 3 mg: a) 3.0 b) 0.3 c) 0.03 d) 0.003 e) 0.0003.
2. Select the dose equal to 15 centigrams: a) 0.15 b) 0.015 c) 0.0015 d) 0.00015 e) 0.000015.
3. Select the dose equal to 15 decimilligrams: a) 0.15 b) 0.015 c) 0.0015 d) 0.00015 e) 0.000015.
4. Calculate the amount of active substance contained in a tablespoon of 10% calcium chloride solution: a) 1.5 b) 0.15 c) 0.015 d) 0.1 e) 1.0.
5. Calculate the amount of active substance contained in 2 tablespoons of 3% sodium bromide solution: a) 2.0 b) 0.45 c) 0.9 d) 0.03 e) 0.3.
6. What amount of active substance is contained in 1 ml of 0.05% neostigmine solution: a) 5.0 b) 0.5 c) 0.05 d) 0.005 e) 0.0005.
7. What amount of active substance is contained in 10 drops of 1% pilocarpine solution: a) 0.005 b) 0.0005 c) 0.05 d) 0.01 e) 0.0001.
8. To the patient was prescribed 30 drops of 0.1% atropine sulfate solution internally. The maximum dose for one intake (MDI) being 1mg. Calculate: a) MDI is increased b) MDI is not increased.
9. One patient was given 1 ml of 5% ephedrine solution subcutaneously. The maximum dose for one intake (MDI) being 5 centigrams. Calculate: a) MDI is increased b) MDI is not increased.
10. One patient was prescribed 180 ml of potassium iodide solution, 1 tablespoon each 3 times a day. Indicate the concentration of the solution, so that the patient receives 0.45 potassium iodide at one outlet: a) 3% b) 0.3% c) 0.03% d) 0.003% e) 0.0003%.

Tests (Guidelines for Laboratory Work in Pharmacology)

G. Integrative activity

1.) Clinical cases (Guidelines for Laboratory Work in Pharmacology).

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