PHARMACOKINETIC, AND PHARMACODYNAMIC PRINCIPLES OF RATIONAL USING OF GENERAL AND LOCAL ANESTHETICS, OPIOID ANALGESICS AND ANTIPYRETICS

A. Actuality
Acute and chronic pain therapy is and will be one of the most important problems of medicine. To know the pharmacokinetics and pharmacodynamics of drugs from different groups used in the treatment of acute or chronic pain, allows a rational selection of anesthetics, adequate associations of different drugs, and establishment of the best dosing regimen.

The study of anaesthetic drugs as well as of those that mitigate the pain, modify psychic state, functional activity of vital organs and presents a great importance for anesthesiology. Anaesthesia assures pain abolition, good functioning of vital important organs and systems, facilitates the operations’ performance and post anaesthetic and postoperative recuperation.

B. Training aim
To study the pharmacological and clinical principles underlying the use of analgesics and anesthetics: suitable selection of drugs for pain treatment, dosing adjustment and estimation of general and local anaesthetics, opioids analgesics and antipyretics effectiveness.

C. Teaching objectives:
The student must have the skills to:

- Select the investigation methods in assessing the pharmacodynamic effect of local and general anaesthetic, opioid analgesic and antipyretic drugs.
- Analyze and appreciate the results of pharmacodynamic study of drugs used in pain therapy, obtained through laboratory and instrumental methods.
- Predict the possible complications and side effects of anaesthetic and analgesic drugs.
- Predict the dependence of side effects to the dosage regimen and the functional state of the body organs and systems;

D. Knowledge from previously studied disciplines and related subjects

**Histology, morphopathology, physiology and microbiology.**

**Clinical disciplines.** Acute and chronic pain pharmacotherapy in internal medicine, surgery, anesthesia, and reanimation. Preanaesthetic examination, preoperative and preanesthetic sedation. Notion of surgery and anaesthetic risk, fundamental criteria of anaesthesia. Preoperative preparations of patients with broncho–pulmonary affections, cardiac failure, diabetes, hemophilia, obesity, nervous and muscles affections. Signs and stages of general anaesthesia.


F. Questions for self training:
2. Pharmacokinetics and pharmacodynamics of inhalational general anaesthetics (desflurane, halothane, enflurane, nitrous oxide, etc.). Clinical uses, contraindications and side-effect.


4. Pharmacodynamic and pharmacokinetic peculiarities of inhalational general anaesthetics used for general anesthesia in patients with septic and hypovolemic shock.

5. Clinical pharmacology of intravenous general anaesthetics:
   a) barbiturates (hexenal, thiopental);
   b) benzodiazepines (diazepam, flunitrazepam, midazolam, lorazepam);
   c) fenciclidins (ketamine). Dissociative anesthesia.

6. Pharmacokinetic and pharmacodynamic peculiarities of intravenous general anaesthetics used in septic patients with hypovolemic (traumatic, hemorrhagic etc.) shock.

7. Interaction of intravenous and inhalational general anaesthetics with drugs from other groups: adrenoceptor activating drugs, cardiac glycosides, antibiotics, myorelaxants, antihypertensive, anticoagulants, hypoglycemic drugs.


11. Clinical pharmacology of opioid analgesics and their antagonists.


16. Peculiarities of anaesthetics and analgesics use in pregnant women.

D. Supplement for students
   of stomatological faculty
   1. Peculiarities of general and local anaesthetics use in stomatological diseases.
   2. Pharmacodynamic and pharmacokinetic aspects of opioid analgesics and antipyretics use in stomatological disorders.

General medicine
   1. Peculiarities of anaesthetics and analgesics use in infants and children.

E. Short characteristic of main drugs
   Vertically: drugs’ names
   Horizontally: synonyms, delivering forms, administration routes, and doses (therapeutic, maximum), indications, contraindications, side-effect.

1. Diethyl ether
2. Halothane
3. Cyclopropane
4. Nitrous oxide
5. Enflurane
6. Methoxyflurane
7. Procaine
11. Midazolam
12. Diazepam
13. Ketamine
14. Propanidide
15. Morphine clorhidratum
16. Fentanyl
17. Pentazocine
F. Exercises on medical prescription

Indicate medicines for:
1) Painful acute myocardial infarction
2) Traumas and burns
3) Acute toothaches
4) Contact anaesthesia
5) Conducting anaesthesia
6) Epidural anaesthesia
7) Infiltrative anaesthesia
8) Analgesic potentiation of anaesthesia
9) Traumatic shock, combustions
10) Incurable cancer
11) Biliary colic
12) Induction of general inhalational anaesthesia
13) Overdosage of opioid agonist analgesics
14) Anaesthesia for short surgery.

I. General and local anaesthetics, opioid analgesics and antipyretics selection according to efficiency, innocuousness, acceptability and cost criterions in order to include them in personal form (P - medicines)

PHARMACOKINETIC AND PHARMACODYNAMIC PRINCIPLES OF RATIONAL USING OF ANTI-INFLAMMATORY, ANTI-ALLERGIC AND INFLUENCING IMMUNE PROCESSES DRUGS

A. ACTUALITY

Inflammation is an universal reaction of organisms to the action of different endogenous and exogenous harmful factors. Doctors’ interest for inflammatory process has increased at the same time with the inflammation mediators’ discovery, especially of prostaglandins.

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

Nowadays, a large arsenal of anti-inflammatory, antiallergic and immunomodulatory drugs are available. For an efficient and rational using of those drugs it is important to know their pharmacokinetic and pharmacodynamic peculiarities.

B. TRAINING AIM

The studying and applying of pharmacokinetic and pharmacodynamic principles for individualization and optimization of anti-inflammatory, immunomodulatory and antiallergic drugs administration.

C. TEACHING OBJECTIVES:

The student must be able to:

a) Select the minimum complex of investigational methods concerning pharmacodynamic effect estimation of anti-inflammatory antiallergic, immunomodulatory drugs.
b) Analyze and estimate the pharmacodynamic study results of anti-inflammatory, antiallergic, immunomodulatory drugs, obtained by laboratory and instrumental methods.

c) Prognose possible side-effect reactions and complications.

d) Prognose the dependence of side-effect by dosing regimen and functional state of body organs and systems.

e) Apply contemporary methods of pharmacological and non-pharmacological correction of adverse reactions produced by drugs from these groups.

D. Knowledge from previously studied disciplines and related subjects

**Biological subjects.** Inflammation. Basis components of inflammatory process: alteration, vascular reactions with exudation and phagocytosis, proliferation. Classification of inflammation mediators. Interdependence of alteration and protection and adaptation reactions within inflammatory process.

**Pharmacology.** Classification of anti-inflammatory remedies according to their pharmacological effect and chemical structure. Mechanism of action. Pharmacodynamics. Pharmacokinetics.

Classification of anti-allergic and affecting immune system drugs. Mechanism of action, pharmacological effects, indications, side-effects.

E. Questions for self training

1. Anti – inflammatory drugs classification
   a) steroid anti – inflammatory drugs
   b) non-steroidal anti – inflammatory drugs
      • with immediate effect (short duration)
      • slow-acting (basic, antirheumatic) agents


19. Classification of drugs used in immediate and delayed allergic reactions. Pharmacokinetics and pharmacodynamics aspects.


21. Clinical usage of immunosuppressive drugs. Their role in suppression of autoimmune process in allergic and infection diseases, in transplantation tissue incompatibility. Complications that appear during treatment with immunosuppressive drugs.

22. Other drugs with immunosuppressive action: cyclosporine, anti-lymphocytes globulins. Peculiarities of usage in rheumatic diseases and transplantology.


F. Supplement for students of stomatological faculty

1. Non-steroidal anti-inflammatory drugs used in stomatology (salicylates, pirazolidinic derivatives, antranilic, phenylacetic acid derivatives etc.) for treating rheumatoid arthritis, temporo - mandibular articulation arthritis, myalgias, neuroalgias and other inflammatory affections of maxillo-facial region, lupus erythematosus and other collagenosis.

2. Use of antranilic acid derivatives (mphenamic acid) in local therapy of ulcerous affections of buccal mucosa for improving regeneration processes.

3. Stomatological complications in non-steroid anti-inflammatory drugs medication. Stomatitis developed after a long period of pirazolidinic derivatives usage.)
4. Glucocorticoids use in stomatology (enteral and local) for treating maxillo-facial inflammations, infection-allergic diseases: paradontosis, cheilitis, lupus eritematosus, arthritis and arthrosis of temporomandibular articulation.

5. Anti-inflammatory steroids using in make-up of drugs used for treating pulpitis (biological method). Stomatological complications in cortizonic medication (osteoporosis and osteomalacia, dental enamel necrosis and multiple caries development), calcium and potassium drugs usage for their prophylaxis.

G. General medicine
Pharmacokinetic and pharmacodynamic disposition of non-steroidal, steroidal anti-inflammatory, antiallergic and immunomodulating agents in infants and children.

H. Short characteristic of main drugs
Down: drugs names
Across: synonyms, delivering forms, administration roads, doses (therapeutic, maximum), indications, contraindications, side-effect reactions.

1. Acetylsalicylic acid 28. Chlorambucil
2. Lizine acetylsalicylat 29. Mercaptopurine
3. Diflunisal 30. Azathioprine
4. Salicylamide 31. Methotrexat
5. Sodium salicylate 32. Cyclosporine
6. Methil salicylate 33. Antilimfocytis globuline
7. Phenylbuthasone 34. Levamisol
8. Oxyphenylbuthasone 35. Timaline
10. Indomethacin 37. Prednizolon
11. Sulindac 38. Methylprednizolon
12. Diclofenac 39. Triamcinolone
13. Tolmetin 40. Dexamethasone
15. Ketoprofen 42. Hydrocortisone
16. Naproxen 43. Dифенидримин
17. Piroxicam 44. Prometazine
18. Mephenamic acid 45. Chloropiramine
19. Flufenamic acid 46. Clemastine
20. Sodium aurotiomalat 47. Quifenadine
22. Auronafine 49. Astemizole
23. Chlorochine__ 50. Terfenadine
24. Hydroclorochine 51. Loratadine
25. Penicilamine 52. Ketotifenum
26. Sulfasalazine__ 53. Disodoc cromoglicat
27. Cyclofosfamide

I. Exercises on medical prescription
Indicate drugs for
1. Rheumatism
2. Rheumatoid arthritis
3. Primary degenerate arthrosis
4. Lupus erithematosus
5. Scleroderma
6. Dermatomyositis
7. Ankylosic spondilarthritis
8. Gout
8. Glomerulonephritis
9. Anaphylactic shock
10. Bronchial asthma accesses
11. Urticaria
12. Contact dermatitis
13. Quincke’s edema