KING ABDULAZIZ UNIVERSITY
Faculty of Medicine

PHYSIOTHERAPY

Study Guide

Table of content

Course Description and Organization

This course introduces the physical therapy students to understand the ration use of drugs use in treatment of disease. It introduces 1- pharmacokinetics : ; formulations administration -pharmacodyamics , mechanism of actions ; -Adverse drug reactions - factors that influence drug response . The course focus on clinical pharmacology of drugs encountered by physical therapists in clinical practice

The course consists of lectures, practical classes and tutorials.

Core Course	Code/No	Course Units				Credit Hours
		Lectures	Practical	SPP	Tutorial	
Pharmacology		**19**		**2**	**5**	2

Major Course Objectives

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The course offered to physiotherapy students in pharmacology consists of scheduled lectures and tutorial which ensure smooth flow of the scientific material, in a controlled manner, through several pathways to achieve our objectives. There is some suggestion for optimal utilization of these classes by the students.

A. Lectures: The aim of the lecture is not to give all information but to highlight the clinically relevant topics and to explain difficult points: students are advised to

1) Understand the course objectives of each lecture and read the topic from the recommended textbook.
2) Pay attention during the lecture; write down your notes and, questions.
3) Make a summary, utilize self-testing in order to assess your grasping of the subject if is possible to study the lecture in the same day which is highly recommended.

B. Tutorials: For optimal benefit of the tutorial, the tutorial will be reserved for open discussion about the subjects listed in the tutorial schedule. The students will be assigned these topics and will be asked to present them and be ready to discuss the most recent knowledge about these topics and how to defend their thoughts on scientific bases

At the end of this course the student will be able to:

1. know drug sources, naming, and routes of administrations
2. recognize .; the most important factors which affecting drug pharmacokinetic (ADME)
3. understand : how the drug work , dose –response relation ship (Pharmacodynamic)
4. Identify the classification of adverse drug reactions and toxicity .
5. Know the clinical pharmacology of drugs for encountered by physical therapists in clinical practice common cardiovascular, pulmonary, orthopedic, , and neurological. disease

STUDY STRATEGIES AND CLASS PARTICIPATION EXPECTATIONS

Instructional Methods

The main instructional material includes lectures and practical to streamline the applied and clinical aspects of the lectures, and tutorials session to stimulate the students to participate in the teaching/learning activities.

Instructional Materials And Resources

1. Required Text(s) *1)* **LIPPINCOTT'S ILLUSTRATED REVIEWS: PHARMACOLOGY, 5TH EDITION** **BY RICHARD A HARVEY ;PAMELA C CHAMPE ;RICHARD FINKEL ;LUIGI CUBEDDU &, MICHELLE A CLARKE (EDITORS) . LIPPINCOTT WILLIAMS & WILKINS 5TH ED.** **)**
2.
3
4-.Electronic Materials, Web Sites etc (assessed September 2015) http://www.icp.org.nz/ (very important for pharmacokinetics)

Assessment

1. Formative:

This form of assessment is designed to give you feedback to help you to identify areas for improvement. It includes a mixture of MCQs, short answer-questions (SAQs), and independent learning activities in all subjects. These will be given during tutorial sessions. The Answers are presented and discussed immediately with you after the assessment. The results will be made available to you.

2. Summative

This type of assessment is used for judgment or decisions to be made about your performance. It serves as:

a. Verification of achievement for the student satisfying requirement

b. Motivation of the student to maintain or improve performance

c. Certification of performance

d. Grades

IN THIS COURSE YOUR PERFORMANCE WILL BE ASSESSED ACCORDING TO THE FOLLOWING:

6.. SCHEDULE OF ASSESSMENT TASKS FOR STUDENTS DURING THE SEMESTER DATES			
Assessment	Assessment task (eg. essay, test, group project, examination etc.)	Week due	Proportion of Final Assessment
1.	Quiz 1)		**20 %**
2.	Quiz 2		**20 %**
	Activities		**10 %**
3.			
4.	Final exam		**50%**
	Total		**= 100 Marks**

Grades

95-100	**5**	**A+**
90-94	**4.75**	**A (excellent)**
85-89	**4.5**	**B+**
80 - 84	**4**	**B (very good)**
75 - 79	**3.5**	**C+**
70-74	**3**	**C (Good)**
65 - 69	**2.5**	**D+**
60 - 64	**2**	**D (pass)**
Less than 60	**1**	**F (fail)**

All grades will be assigned as follows:

Exams: Exams might include short answer and multiple choice questions (MCQs). They will cover material presented in lecture, tutorials and integrated with the practical sessions . Practical exams might include : MCQ , problem solving short essay and prescription writing .

STUDENTS SUPPORT

All teaching staff are available daily for individual student consultations and academic advice from the start time of the module throughout the whole module period. Office hours would by announced as a schedule at the start of the module showing periods per week each faculty member are available in his office to be contact with students to answer their quires) . The following is a list of the faculty members and staff of the Department of Pharmacology. Students are welcome to contact any of the members of the department to answer any of their inquiries.

MALE SECTION: MEN MEDICAL COMPLEX

Pharmacology dept., Bld No.**(7)**

Name/Status	Room No	Phone No	E-Mail Address	Office Hours
Dr. Sameer E. Alharthi Dept. Head	763/G	20106	Salharthe@Kau.edu.sa	10 am-1.00 pm
Dr. Ahmed Shaker Ali (instructor)	755G	22330	Asali@kau.edu.sa	1.00- 2.00 PM
Dr. Lateef Mohiuddin Khan	740G	**20343**	**lmkhan@kau.edu.sa**	10AM- 11.00 daily

FEMALE SECTION: WOMEN MEDICAL COMPLEX

Pharmacology dept., Bld No.**(6)**

Name/Status	Room No	Phone No	E-Mail Address	Office Hours
Dr. Mai Abdul Alim Abdul Sattar	672 G,	23102	drm_aalim2000@yahoo.com	9. -11. AM
Dr Huda Alkreathy	672 G	23090	halkreathy@kau.edu.sa	1-12 AM
Dr. Fatma Kamel	674 A	23564?	foakamel@kau.edu.sa	10-12 AM?

Department Web Site

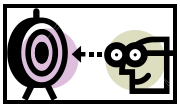
http://medical-pharmacology.kau.edu.sa

Time Allocations

List of topics	Contact hours		
	Lecture	SPP	Tutorial
1. General pharmacology &Pharmacokinetics	1		
2. Pharmacodynamics	1		
3. Cholinergic Agonists :	1		
4. Cholinergic Blockers:	1		
5. Adrenergic Agonists	1		
6. Adrenergic Blockers	1		
7. Nuromuscular blockers & Centrally acting M. Relaxant	1		
8. Diuretic in cardiovascular disorders			
9. Antihypertensive drugs &	1		
10. Antianginal drugs	1		2
11. Drugs for heart failure	1		
12. Corticosteroids (as anti-inflammatory)	1		
13. Anabolic steroids (misuse)	1		
14. Non-steroidal anti-inflammatory drugs:	1		
15. Opioid analgesics ,	1		
16. Pharmacotherapy of bronchial asthma	1		
17. Management of osteoporosis, & obesity	1		
18. Pharmacotherapy parkinsonism	1		
19. Adverse drug reaction, factors affecting drug response			
20. Drug addiction & misuse		1	
21. Spp : **Drug overdose and acute poisoning**		1	
Tutorials	**19**	2	
1. .General pharmacology			1
2. Drug forms &-Routes of administration			1
3. ANS discussion			1
4. CVS discussion			1
5. Analgesics (discussion)			1
			1
Tutorials			**5**
Total contact	**26 h**		

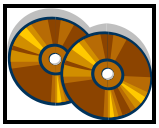
Icons (standards)

The following icons have been used to help you identify the various experiences you will be exposed to.

 Learning objectives

 Content of the lecture

 Independent learning from textbooks

 Independent learning from the CD-ROM.
The computer cluster is in the 2nd floor of the medical library, building No. 7.

Independent learning from the Internet

 Problem-Based Learning

 Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

The main concepts

Topic Outlines

15: Lectures ,
6 : Tutorials

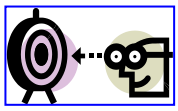
1-Lectures

Lecture: **1. Introduction & Pharmacokinetics**

Department : Pharmacology

Lecturer: *Dr Lateef)* *Dr Huda*

TEACHING LOCATION : **Faculty of allied science**



Objectives

At the end of the lecture you should be able to

a- Knowledge

1. Define the drug , its sources ,
2. Define PK process (ADME) & parameters (half life, volume of distributions , clearance)
3. Recognize PK terms e.g bioavailability , first pass metabolism, protein binding , blood brain barrier, CYP450 , enzyme induction & inhibition, phase I & II metabolism , GFR.
4. List the source of variability for each PK process

b- Comprehension

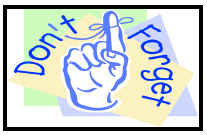
1. 1-Explain how does formulation affect bioavailability,
2. how does pathological factors e.g liver or renal impairment affect drug metabolism & elimination

Topics

1. Variables affecting , bioavailability, formulation , : & first pass effect
2. Variables affecting drug distribution , , blood flow , capillary permeability, blood brain barrier, , , protein binding , ,
3. phase 1 & phase II metabolic pathways , enzyme induction and enzyme inhibition
4. Renal elimination , Assessment of renal

Student Notes:

Continued



Remember

√ Factors affecting drug bioavailability , what is the meaning of 1st pass effect ,(pre-systemic metabolism) ; what is the difference between phase 1 & phase II metabolism

√ Half- life , time to attain steady state & dosing interval

√ Clinical Importance of altered protein binding for drugs strongly bound to plasma protein

√ Clinical Importance of Enzyme induction & inhibition

√ Assessment of renal function & dose adjustment.

√ Difference between phase1 & phase 2 drug metabolism

Text book

Independent learning from the Internet

valuable web *www.icp.org.nz* (pK animation)

Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions or with staff during office hours)

1- : If a drug is displaced from plasma protein binding sites

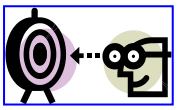
A. the half-life will be markedly prolonged
B. the drug will tend to achieve higher tissue concentrations
C. renal excretion will be impaired
D. the peak pharmacological effect will be reduced
E. the bioavailability will be enhanced

Lecture : 3 Cholinergic Drugs (1hr)

Department : Pharmacology

Lecturer D r. Shaker (M.sec) Dr Fatemah. (F. sec)

TEACHING LOCATION :



Objectives

At the end of the lecture you should be able to:

1. Classify cholinomimetic (cholinergic) agents.
2. Summarize cholinomimetic agonists for its major clinical uses., adverse effects
3. Understand treatment organophosphate insecticide poisoning

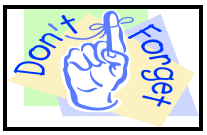
.

Topics

Cholinomimetic drugs (Direct-acting cholinergic drugs)

1. Direct-acting: **Muscarinic choline esters**, eg. Ach, Methacoline, Carbacol and Bethanecol.
2. **Naturally occurring alkaloids** e.g. Muscarine , pilocorpine and Nicotine

Students Notes



Remember ***write down important key points provided during the lectures***

Prerequisite:

- Review of the clinical physiology of the autonomic nervous system
- Review of neurotransmitters involved in major central and peripheral neuronal pathways

Lecture : 4- Cholinergic blockers (1hr)

Department : Pharmacology

Lecturar: Dr. Shaker (M.sec) Dr Fatemah. (F. sec

TEACHING LOCATION

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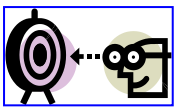


Objectives

At the end of the lecture you should be able to:

4. Classify different muscarinic antagonists
5. Describe the effects of atropine on the major organ systems
6. List the signs and symptoms of atropine poisoning
7. Summarize the major clinical indications and contraindications for the use of muscarinic antagonists

Topics

Cholinergic antagonist (Muscarinic antagonists))

1. Antimuscarinic agents: atropine, scopolamine, and ipratropium

Remember ***write down important key points provided during the lectures***

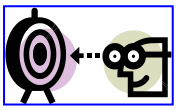
Students Notes

Lecture: **5. Adrenergic Agonists**

Department : Pharmacology

Lecturer Dr. Shaker (M.sec) Dr Fatemah. (F. sec

TEACHING LOCATION :



Objectives

At the end of the lecture you should be able to:

- Review the major organ system effects of a pure alpha agonist, a pure beta agonist, and a mixed alpha and beta agonist.
- Give examples of a prototype drugs acting as pure alpha agonist, a pure beta agonist, and a mixed alpha and beta agonist.
- Summarize the clinical indications, ADE of adrenoceptor agonists (direct and indirect).

Topics

1- Direct -acting agonists: alpha agonists, alpha-one selective, alpha two selective and non-selective
2- Beta agonists: beta-one selective, beta-two selective and non-selective
3- Indirect-acting: amphetamine, tyramine, mixed-acting: ephedrine

Prerequisite:

- Review of the clinical physiology of the autonomic nervous system (Sympathetic NS)
- Review of neurotransmitters involved in major central and peripheral neuronal pathways
- Review of Alpha and Beta adrenoreceptors and their subtypes

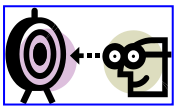
Students Notes

Lecture: 6. Adrenergic blockers

Department : Pharmacology

Lecturer Dr. Shaker (M.sec) Dr Fatemah. (F. sec)

EACHING LOCATION :



Objectives

At the end of the lecture you should be able to:

1. Summarize pharmacological effect alpha blocker,
2. Summarize pharmacological effect Beta blocker
3. Describe their major clinical indications, and side effects
4. Recognize the use of adrenergic blockers for pharmacotherapy of "cardiovascular disorders

Topics

1- Non-selective **Alpha-adrenergic blockers**, such as phenoxybenzamine, phentolamine,
2- **Selective-Alpha-one blockers** such as prazosin, terazosin, tamsulosin
3- **Non- selective Beta-adrenergic blockers**: such as propranolol. **Selective-beta-one blocker**: such as atenolol, metoprolol, and esmolol. **Beta-antagonists with partial agonist activity** such as pindolol and acebutalol.
4- **Antagonists of both alpha and beta adrenoceptors** such as labetalol and cravedilol
5- **Drugs affecting neurotransmitter release or uptake**: reserpine, guanethidine and cocaine

Student Notes:

Summarize the mechanism, indication , adverse effects of the most clinically important drugs acting on sympathetic NS

Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

- One of the following drugs is an indirect acting cholinergic agonist. It is a reversible anticholinesterase.

A. Bethanechol.
B. Pilocarpine.
C. Physostigmine.
D. Carbachol.

- **Bethanechol and Neostigmine are:**

A. Adrenergic agonists used to treat asthma
B. Adrenergic antagonists used to treat glaucoma
C. Muscarinic agonists used to treat urinary retention
D. They are toxic substances used to kill insects.

Propranolol can produce bradycardia by blocking:

A. Beta 1 adrenergic receptors.
B. Beta 2 adrenergic receptors.
C. Alpha 1 adrenergic receptors.
D. Alpha 2 adrenergic receptors.

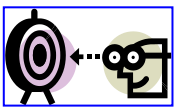
Which of the followings sympathomimetic drugs is used for treatment of anaphylactic shock due to drug allergy?

A. Norepinephrine.
B. Dopamine.
C. Dobutamine.
D. Epinephrine.

Which of the following is a selective α_1 receptor blocker that affords symptomatic relief in benign prostatic hypertrophy without producing significant fall in blood pressure?

A. Terazocin.
B. Doxazocin.
C. Trimazocin.
D. Tamsulosin.

Lecture: 7 . Skeletal muscles relaxants
Department : Pharmacology
Lecturer Dr. Lateef (M.sec) Dr Fatemah. (F. sec)
EACHING LOCATION :



. Skeletal muscles relaxants

Learning Objectives

By the end of the self study you should be able to:

1. **Describe the difference between the drugs relaxing the skeletal muscles and neuromuscular blocking agents.**
2. **Describe the indication of skeletal muscles relaxants.**
3. **Drugs used in acute muscular spasm.**
4. **Drugs used in chronic muscular Spasticity**

Neuromuscular blocking agents

1. **Describe the major indication for the clinical use of neuromuscular blocking agents**
2. **Explain how the effects of a non-depolarizing blocker can be rapidly terminated by the administration of an anticholinesterase and atropine.**

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Topics : Skeletal muscles relaxants

- **Carisoprodol Chlorzoxazone Cyclobenzaprine**
- **Metaxalone Methocarbamol**
- **Orphenadrine Baclofen Tizanidine**

Neuromuscular blocking agents

- **Nondepolarizing NMJ blockers:**

  Tubocurarine PancuroniumRocuronium Mivacurium

- **Depolarizing NMJ blocker:**

Succinylcholine

- **PHARMACOKINETICS: Almost always administered IV.**
- **DRUG-INTERACTIONS: Lots of interactions**

Text book

1. Katzung & Trevor's Pharmacology Examination and Board Review: latest ed. by Anthony Trevor, Bertram Katzung, and Susan Masters . MCGraw Hill,
2. Lippincott's illiterate review , 4th d Edition, R.D. Howland M.J. Mycek.

   Lippincott's Williams & Wilkinsp 1-22
3. Clinical Pharmacology, 9th edition P.N. Bennett and M.J. Brown. Churchill Livingstone
4. Handout & solved problems provided by the lecturers

Remember (1)

Antispasmodic agents are used to treat musculoskeletal conditions associated with spasm.
Antispasticity agents are used to relieve musculoskeletal pain associated with multiple sclerosis, spinal cord injuries, and cerebral palsy

- **GENERAL ANESTHETICS: Increase sensitivity to muscle relaxants, with additive effect (block of Na+ channels).**
- **AMINOGLYCOSIDES, TETRACYCLINE: Decrease ACh release and thus inhibit muscular activity.**
- **CALCIUM-CHANNEL BLOCKERS: Potentiate the effects of muscle-relaxants.**

Remember (2)

Neuromuscular Blocking Drugs are used to produce muscle paralysis for **intubation** to facilitate mechanical ventilation, Orthopedic procedures for alignment of fractures and as **adjunct** during general anesthesia to prevent muscle contractions obstructing the surgeon.
Non-Depolarizing NMJ Blockers are selective competitive antagonist for skeletal muscle nicotinic receptors
Depolarizing NMJ Blockers (Succinylcholine) is ultrashort acting produces an initial depolarization of the muscle end plate region followed by a flacid muscle paralysis

S tudents notes

Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

1. Which of the following agents produces its therapeutic action by causing a nondepolarizing block of end plate receptors at the skeletal neuromuscular junction?
    a. Hexamethonium
    b. Nicotine
    c. **Rapacuronium**
    d. Scopolamine
    e. Succinylcholine

2. Indicate the skeletal muscle relaxant, which is a depolarizing agent:
    a) Vencuronium
    b) Scopolamine
    c) Succinylcholine
    d) Hexamethonium

3. Which of the following drugs is a nondepolarizing muscle relaxant?
    a) Pancuronium
    b) Succinylcholine
    c) Hexamethonium
    d) Scopolamine

4. Which of the following drugs has “double-acetylcholine” structure?
    a) Rocuronium
    b) Carbachol
    c) Atracurium
    d) Succylcholine

5. Indicate the long-acting neuromuscular blocking agent:
    a) Rapacuronium
    b) Mivacurium
    c) Tubocurarine
    d) Rocuronium

6. Which depolarizing agent has the extremely brief duration of action?
    a) Mivacurium
    b) Rapacuronium
    c) Rocuronium
    d) Succinylcholine

7. Which of the following neuromuscular blockers causes transient muscle fasciculations?
    a) Mivacurium
    b) Pancuronium
    c) Succinylcholine
    d) Tubocurarine

8. Which neuromuscular blocking agent has the potential to cause the greatest release of histamine?
    a) Succylcholine
    b) Tubocurarine
    c) Pancuronium
    d) Rocuronium

9. Indicate the agent, which effectively antagonizes the neuromuscular blockade caused by nondepolarizing drugs:
    a) Atropine
    b) Neostigmine
    c) Acetylcholine
    d) Pralidoxime

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Formative exam NO 1 (see the annex1)

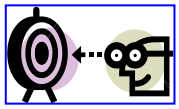
Lecture: 8 **:** DIURETICS IN CARDIOVASCULAR DISODERS

Department : Pharmacology

Lecturer Dr. Shaker **Prof . M. AbdulSattar**

TEACHING LOCATION : will be specified , BL 13, female section room no

Principles of diuretic therapy



Objectives

At the end of the lecture you should be able to:

1- Know the structure and function of the nephron.
2- Understand renal handling of water, sodium and other electrolytes.
3- Know definition and major classes of diuretics.
4- Appreciate the main indications, and adverse effects of each class of diuretics.

Topics

-Different classes of diuretics: their sites and mode of actions, classification, adverse effects and focusing on uses in CV disorders .

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-Diseases of the kidney must be taken into account when prescribing drugs that are eliminated by the kidney.

NSAIDs (anti prostaglandins) may offset part of the diuretic action of thiazides and loop diuretics.
- Potassium sparing diuretics should not be combined with ACEIs to avoid hyperkalemia

1- Diuretics clinical use

- ✓ **Thiazides (e.g bendroflumethiazide, treatment of hypertension**
- ✓ **Loop diuretics (furosemide, treatment of heart failure; acute pulmonary edema .**
- ✓ **Potassium-sparing diuretics (amiloride, triamterene) are weak diuretics, in combination with thiazides or loop diuretics to prevent hypokalaemia.**
- ✓ **Aldosterone antagonists (spironolactone, eplerenone) treatment of the oedema of liver failure, (hepatic cirrhosis) ;**

Common ADE of diuretics *

- Thiazide & Loop diuretics : hypokalemia hyperglycemia in & hyperuricemia
- Loop aminoglycosides: enhance ototoxicity, nephrotoxicity
- K^+-sparing : hyperkalemia & gynecomastia

MCQ : **A diuretic drug indicated for a patient with congestive heart failure with pulmonary edema is ?**

A) Furosemide
B) Bendroflumethiazide
C) Amiloride
D) Eplerenone

Same question (case)

A 70 year-old man is admitted with a history of heart failure and an acute left ventricular myocardial infarction . He has severe pulmonary edema which of the following drugs is MOST appropriate

A. Furosemide
B. Hydrochlorothiazide
C. Mannitol
D. Spironolactone

When used chronically, thiazide diuretics have all of the following properties or effects EXEPT

A- Decreased urinary excretion of calcium
B- Elevation of blood cholesterol
C- Elevations of plasma uric acid
D- Ototoxicity

A patient with long-standing diabetic renal disease and hyperkalemia and recent-onset heart failure requires a diuretic . Which of the following agents would be most

A. Hydrochlorothiazide
B. Losartan.
C. Spironclacrone.
D. Triamterene.

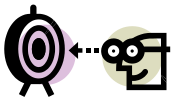
Which of the following is associated with use of thiazide diuretics ?

A- Hypocalciuria.
B- Hypernatremia.
C-Hyperkalemia.
D- Hypouricemia.

A 56 year-old woman is admitted to the emergency department , she suffers Syncope at home her blood pressure is low. Neurologic examinatiorr and an ECG are within normal limits. she has recently starred taking (diuretics for Congestive heart failure and hypertension)
Which of the following drugs is the most likely cause fainting spell?
.

A. Amiloride.
B. Furosemide.
C. Hydrochlorothiazide.
D. -Spironolacrone.

Lecture: 9-11 **:** CRADIOVASCULAR SYSTEM (CVS)
Department : Pharmacology
Lecturer Dr. Shaker Prof . M. AbdulSattar
TEACHING LOCATION : will be specified , BL 13, female section room no



Objectives

At the end of the lecture you should be able to

1. Identify the commonly used drug classes in management of hypertension, angina & CHF.
2. List most important diuretics used in hypertension, & CHF.
3. Summarize the main indications, ADE of ACE inhibitors , Angiotensin receptor blockers , B-blocker, calcium channel Blockers
4. Give example of vasodilator used in ER treatment of hypertension :
5. Recognize the clinical pharmacology of organic nitrate
6. Summarize the clinical pharmacology of cardiac glycoside ,?

Topics

1. Thiazides Loop and Potassium-sparing diuretic (bendroflumethiazide, hydrochlorothiazide, furosemide, spironolactone)
2. ACE Inhibitors Captopril
3. ARBs Losartan .
4. Selective B1 : Bisoprolol Non selective : Atenolol ; Propranolol
5. Calcium Channel Blockers Nifedipine Diltiazem Verapamil
6. Aldosterone Antagonists, Selective
7. Alpha2-Agonists, Central-Acting Methyldopa Clonidine (Catapres)
8. Alpha-Blockers, Antihypertensives Prazosin (Minipress) Terazosin Doxazosin
9. Antihypertensive Combinations

Students Notes

Remember

1st line drugs for hypotension include 1-thiazide diuretics (or loop in case of renal impairment or heart failure , potassium sparing may be added) 2- angiotensin converting enzyme (ACE) inhibitors, 3-calcium channel blockers (CCBs), 4-angiotensin receptor blockers (ARBs), 5-beta-blockers, are all considered acceptable alternative therapies in patients with hypertension

Beta-Blockers: Caution should be used in administering B-blockers in the setting of asthma or severe chronic obstructive pulmonary disease (COPD), regardless of beta-selectivity profile.

In addition, exacerbations of angina and, in some cases, myocardial infarction have been reported following abrupt discontinuance of beta-blocker therapy. The doses should be gradually reduced over at least a few weeks

ACE InhibitorsAngiotensin converting enzyme (ACE) inhibitors are the treatment of choice in patients with hypertension, chronic kidney disease, and proteinuria ADE : Accumulation of bradykinin has been proposed as an etiologic mechanism for the side effects of cough and angioedema. (+ many other , but in my opinion more tolerated than B-blockers), ACE inhibitors can cause injury or even death to a developing fetus. there is also the potential for hyperkalemia when ACE inhibitors are coadministered with potassium supplements or potassium-sparing diuretics.

Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

-  www.pharmacologyonline.org

 **SELF DIRECTED LERNING**

Summarize the clinical pharmacology of antihypertensive , anti angina drugs and drugs for management of acute and chronic heart failure .

Example of MCQ CVS

Cardiovascular

1-The main indication for dobutamine is treatment of

A. unstable congestive heart failure and shock
B. Severe hypertension
C. Bronchial asthma
D. Unstable angina

2-Which of the following cases would be contraindicated for propranolol (a non selective B-blocker)?

A) Hypertension
B) Essential tremor
C) Angina
D) Bronchial Asthma

3--Which of the following drug can cause hypokalaemic metabolic alkalosis ?

A. Spironolactone
B. Triamterine
C. Hydrochlorthiazide
D. Captopril

4-Which of the following is cardioselective β_1 blocker?

A. Propranolol
B. Timolol
C. Labetalol
D. Atenolol

5-Digoxin produce valuable cardovascular effects by inhibiting:

A. Ca^{2+}adenosine triphosphatose (ATPase) of the sarcoplasmic reticulum.
B. Na+/K+-ATPase of the myocyte membrane.
C. Cardiac phosphodiesterase.
D. Cardiac B1 receptors.

6-Which one of the following drugs would be most useful in treating the pulmonary edema in patient with acute heart failure

A. Digoxin.
B. Dobutamine.
C. Furosemide.
D. Spironolactone.

7. Which of the following adverse effects may occur after using sublingual nitroglycerin.

A. Hypertension.
B. Throbbing headache.
C. Bradycardia.
E. Anemia.

8. Which of the following would long duration and useful in preventing nocturnal (night attack) angina?

A. Amyl nitrite.
B. Nitroglycerin (sublingual).
C. Nitroglycerin (transdermal).
D. Esmolol.

9. Which one of the following drugs may cause fall in blood pressure and fainting on initial administration?

A. Atenolol. (b-blocker)
B. Hydrochlorothiazide. (diuretic)
C. Nifedipine. (calcium channel blocker)
D. Prazosin. (alpha –blocker)

10-Which one of the following antihypertensive drugs can precipitate a hypertensive crisis following abrupt cessation of therapy?

A. Clonidine.
B. Diltiazem.
D. Losartan.
E. Hydrochlorothiazide.

11-Regarding Organic Nitrates, which of the following is true

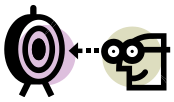
A. Rabid onset formulation are used in case of acute anginal attacks
B. They have very good oral bioavailability
C. Dry mouth is very common adverse effect
D. They are converted inside the cells into Nitric Acid

Match : for each of the following select the most appropriate drug, may be used more than once

A-Prazosin	1. stimulates alpha2-adrenoreceptors in the brain stem, results in reduced sympathetic outflow
B-Enalapril -	2. Considered safe in pregnancy
C-Methyldopa	3. act primarily through suppression of the renin-angiotensin-aldosterone system.
D- Clonidine	4. selectively block postsynaptic alpha1 -adrenergic receptors. They dilate arterioles and veins
	5. Accumulation of bradykinin has been proposed as an etiologic mechanism for the side effects of cough and angioedema.

Unit 3: Management of pain

Lecture: 15 **: Opioid analgesics**
Department : Pharmacology
Lecturer
TEACHING LOCATION : will be specified , BL 13, female section room no



Objectives

At the end of the lecture you should be able to:

1. Identify the term opioid, opiate, opiopeptins
2. List the receptors activated by opioid analgesics and the endogenous opioid peptides
3. Describe the main pharmacodynamic and pharmacokinetic properties of agonist opioid analgesics and list their clinical uses
4. List the main adverse effects of acute and chronic use of opioid analgesics
5. Describe the clinical uses of the opioid receptor antagonists.
6. Clinical significance of partial agonist opioid drugs.

Topics

1. Classification of opioid analgesics,
2. Administration (e.g. oral, infusion, SC, IM, epidural, transdermal)
3. Spectrum of clinical uses (analgesics, antitussives, antidiarrheal)
4. Opioid receptors (Mu , κappa and delta) and their distribution.
5. Opioid peptides (leuenkephalin and met-enkephalin).
   Strong agonists (morphine), moderate agonist (codeine) and weak agonist (propoxyphene), Partial agonists, and antagonists
6. Mechanism of action, pharmacokinetics
7. Acute & chronic effects of morphine: (analgesia, sedation, euphoria, respiratory depression, GIT , miosis), & (Tolerance, dependence)
8. Clinical uses and adverse effects, contraindications, opioid dependence

Students Notes

Remember

1. Accumulation of morphine- active metabolites in pt with renal failure .
2. Infants born to mothers given large doses of opioids may have severe respiratory depression.
3. Infants born to addict mothers may show withdrawal syndrome
4. Opiate can lead to respiratory failure in patients with chronic pulmonary disease.
5. Morphine is contraindicated in acute abdominal pain as it masks pain and interferes with diagnosis., also contraindicated in case of head injury

Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

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www.pharmacologyonline.org

SELF DIRECTED LERNING

1- Opioid used for antitussive effect
2- Opioid used for antidiarrheal effects
3- Role of nurse to insure optimal use of opioids

Example of MCQ

1. Fentanyl transdermal patches have been used postoperatively to provide analgesia. The most common adverse effects is

A. Cutaneous reaction
B. Diarrhea
C. Hypertension
D. Relaxation of skeletal muscle
E. Respiratory depression

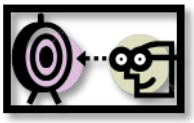
2. Contraindications of morphine include all of the following EXCEPT:

A. Adrenal insufficiency
B. Biliary tract surgery
C. Hypothyroidism
D. Late stage of labor
E. Pulmonary edema

3- The following are contraindications for the use of morphine <u>EXCEPT:</u>

A. Bronchial asthma.
B. Head injuries.
C. Undiagnosed abdominal pain.
D. Acute pulmonary edema

Lecture 16 : NSAIDs	
Lecturer:	
Department: Pharmacology	
Teaching location : Class room BL , Faculty of	



Objectives

By the end of the lecture you should be able to

1. To classify NSAIDs in view of their mechanism, selectivity on COX
2. To discuss the basic PK and PD features of NSAIDs
3. Compare NSAIDs and Opioids regarding efficacy, Pharmacological action & Adverse effects
4. To apply clinical pharmacology in optimal selection of Analgesic .

Topics

1. NSAIDs as Analgesic, Antipyretics and Anti-inflammatory drugs.
2. Mechanism of action, difference between COX I and COX II inhibitors
3. Clinical pharmacology of Aspirin – prototype ,
4. Adverse effects of NSAIDs
5. Most important features of other NSAIDs – Paracetamol, Ibuprofen, Diclofena

Students Notes

Remember

COX 1	in most tissues, active, necessary for cytoprotection of GI tract
COX 2	Enzyme that produces prostanoid mediators, induced in inflammatory cells, important in pain
3 characteristics of NSAIDS	anti-inflammatory, analgesics, anti-pyretic
cheif clinical use for NSAIDs	tx of musculoskeletal disorders
adverse effects of asprin	gastric upset, vertigo, anti-platelet action, Reye's Syndrome
Adverse rx of acetaminophen in high dose	hepatotoxcicity
which NSAID has long half life?	Piroxicam
How do NSAIDs work?	reversible, competitive inhibitor or COX
Celecoxib	COX 2 inhibitor
Which drug has little effect on platelet aggregation with myocardial infarction concerns?	Celecoxib

Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

- W E B www.pharmacologyonline.org

SELF DIRECTED LERNING

Role of nurse to monitor adverse effects in elderly patinas
Interaction of NSAIDs with new oral anticoagulants & oral hypoglycemic

Action of traditional NSAID's

a. Inhibit COX-1
b. Inhibit COX-2
c. Do not inhibit COX-1 or COX-2
d. Both A and B

Which of the following has the risk of Reye's syndrome if given when virus or varicella is present؟

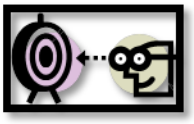
a. Aspirin
b. Acetaminophen
c. Codeine
d. Morphine

A drug used to prevent gastric ulcers caused by chronic use of NSAIDs?

a. Propranolol.
b. Misoprostol..
c. Paracetamol .
d. Salbutamol

Unit 4 : Pharmacotherapy of selected disease (relevant to physiotherapy)

Lecture 16 : Pharmacotherapy of bronchial asthma	
Lecturer:	Dr Shaker & Dr.
Department: Pharmacology	
Teaching location : Class room BL , Faculty of	



Objectives

By the end of the lecture you should be able to

- To understand the treatment strategy for acute and chronic asthma
- To List drugs used for management of asthma
- To discuss the clinical pharmacology of bronchodilators
- To discuss the role anti-inflammatory drugs on management of asthma
- To summarize the mechanism and adverse effects

Topics

- Treatment Strategy,
- Bronchodilators, Corticosteroids
- Mast cell stabilizers
- IV-leukotriene modifiers
- V-Anti –IgE antibody e.g

Students Notes

Remember

I. Bronchodilators
- B2 -adrenoceptor agonists e.g:… *albuterol , terbutaline , theophylline*
- Muscarinic antagonists e.g……*ipratropium bromide*

II. Corticosteroids
- inhalation … *Beclomethazone, triamcinolone*
- systemic. e.g… *prednisolone, methylprednisolone* ……

III. Mast cell stabilizers e.g…Cromolyn & Nedocromil IV

IV-leukotriene modifiers : *Zileuton, Montelukast, zafirlukast*,

V-Anti –IgE antibody e.g……*Omalizumab*

Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

- 

www.pharmacologyonline.org

SELF DIRECTED LERNING

No pharmacotherapy of bronchial asthma.
*Treatment of status asthmaticus***.**
Agents approved as antitussives e.g Dextromethorphan

Examples of MCQs

Which of the following is the most appropriate drug to rapidly reverse bronchoconstriction (acute attack) ?

A. Inhaled cromolyn.
B. Inhaled beclomethasone.
C. Inhaled albuterol.
D. Intravenous propranolol

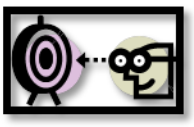
A drug most appropriate for prophylaxis of bronchial asthma

A. Corticosteroids orally
B. Ibratropium
C. Salmeterol
E. Theophylline

A-Bronchodilator which is a 5-lipoxygenase inhibitor:

A. Budesonide
B. Sodium cromoglycate
C. Zileutin
D. d) Beclometazon

Lecture 17 : Pharmacotherapy of osteoporosis	
Lecturer:	Dr Shaker & Dr.
Department: Pharmacology	
Teaching location : Class room BL , Faculty of	



Objectives

By the end of the lecture you should be able to

1. To recognize the treatment strategy of Postmenopausal & Corticosteroid –induced Osteoporosis
2. List currently approved drugs for management of Osteoporosis
3. To summarize their indications ; route of administration and Characteristic adverse effects

Topics

- **Raloxifen Selective estrogen receptor modulators (SERM) Bisphosphonate**
- **calcitonin**

Students Notes

Remember

III. Bronchodilators
- B2 -adrenoceptor agonists e.g:… *albuterol , terbutaline , theophylline*
- Muscarinic antagonists e.g……*ipratropium bromide*

IV. Corticosteroids
- inhalation … *Beclomethazone, triamcinolone*
- systemic. e.g… *prednisolone, methylprednisolone* ……

IV. Mast cell stabilizers e.g…Cromolyn & Nedocromil IV

IV-leukotriene modifiers : *Zileuton, Montelukast, zafirlukast*,

V-Anti –IgE antibody e.g……*Omalizumab*

Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

- 

www.pharmacologyonline.org

SELF DIRECTED LERNING

No pharmacotherapy of bronchial asthma.
*Treatment of status asthmaticus***.**
Agents approved as antitussives e.g Dextromethorphan

Examples of MCQs

Which of the following is the most appropriate drug to rapidly reverse bronchoconstriction (acute attack) ?

A. Inhaled cromolyn.
B. Inhaled beclomethasone.
C. Inhaled albuterol.
D. Intravenous propranolol

A drug most appropriate for prophylaxis of bronchial asthma

A. Corticosteroids orally
B. Ibratropium
C. Salmeterol
E. Theophylline

A-Bronchodilator which is a 5-lipoxygenase inhibitor:

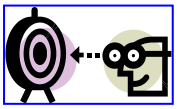
a) Budesonide
b) Sodium cromoglycate
c) Zileutin
d) Beclometazon

Lecture 18 **Antiparkinson Drugs**

Department : Pharmacology

Dr Shaker (M.sec) Dr . Fatma (F. sec

TEACHING LOCATION



Objectives

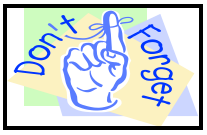
At the end of the lecture you should be able to:

1. Design a strategy for treatment of parkinsonism based on the neurochemical imbalance
2. Identify the mechanisms by which levodopa, dopamine receptor agonists, MAOI, and muscarinic blocking drugs alleviate parkinsonism.
3. Describe the therapeutic and toxic effects of the major antiparkinsonian drugs
4. Identify the compounds that inhibit dopa decarboxylase and COMT and describe their use in parkinsonism.
5. Identify the chemical agents and drugs that cause parkinsonism symptoms

Topics

1. Levodopa, carbidopa combination
2. Bromocriptine, and other dopamine agonists
3. Pramapixole and ropinirole
4. Seligiline, entacapone, tolcapone
5. Trihexphenidyl

Student Notes:



Remember

Pharmacotherapy overview

I- √ L-Dopa* + Carbidopa *(Dopamine precursor),**dopamine metabolism inhibitor**

II-Dopamine Agonists

- **Ergot derivatives Bromocriptine,Pergolide**
- **Non-Ergot derivatives Ropinirole (Requip), √Pramipexole (Mirapex)**

III-Dopamine metabolism Inhibitor

- **MAO-B inhibitors:√ Selegiline , Rasagiline**
- **COMT inhibitors:√ Entacapone ,Tolcapone XX { hepatotoxic)**

IV-Dopamine Release Amantadine

V-Anti-Muscarinic Drugs

- **Benzhexol,**
- **orphenadrine,**
- **Procyclidine**
- **Biperiden (for drug induced parkinsonism)**

Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

An antiprakinsonian drug that is a selective inhibitor of monoamine oxidase type B (MAO-B) is:

A. Bromocriptine.
B. Carpidopa.
C. Tolcapone.
D. Pramipexole.
E. Selegiline.

Reason that dopamine itself is not used to treat in Parkinson's disease:

A) too expensive
B) the problem is cholinergic in nature
C) dopamine does not cross the blood-brain barrier
D) levodopa has a higher affinity for the D2 receptor

Answer: C dopamine does not cross the blood-brain barrier

Carbidopa is useful in the management of Parkinson's disease because it is an:

B) effective D2 antagonist
C) effective peripheral decarboxylase inhibitor
D) effective central decarboxylase inhibitor

E) :effective competitor at the GABA receptor

Answer: (C) effective peripheral decarboxylase inhibitor

3-Which of the following is not used for treatment of PARKINSONISM

A. MAO-B inhibitors (e.g. Selegiline).
B. Low dose of ergotamine
C. L-Dopa + Carbidopa .
D. Ergot derivatives (e.g. Bromocriptine).

Answer b Low dose of ergotamine

Regarding L-DOPA , which of the following statement is correct ?

A. Combination of Selegiline with L-DOPA improve potency of L-DOPA
B. Combination of CARBIDOPA with L-DOPA reduce the incidence adverse effects .
C. L-DOPA is poorly absorbed from small intestine
D. Penetration of L-DOPA into brain is reduced by carbidopa .

Answer b

6- Peripheral adverse effects of levodopa can be diminished by including which of the following drugs in the therapy?

A. Amantadine.
B. Bromocriptine.
C. Carbidopa.
D. Entacapone.

Answer C

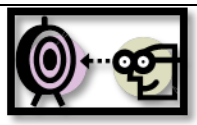
7-Regarding PRAMIPEXOLE ; select the true statement .

A. It is poorly effective in patients who show poor response to L-DOPA.
B. On-off phenomena (fluctuation of response) are less frequent than L-DOPA.
C. No oral preparation are available.
D. It is an agonist at dopamine receptors (D3).

Anser is B

Lecture 19 Adverse Drug reactions and factors affecting drug response

Lecturer : Dr. Lateef Dr. Huda



At the end of the lecture you should be able to:

1. **Recall factors modify drug response (age , disease , gentic)**
2. Classify the types of adverse drug effects.
3. What are the common causes of ADRs?
4. What are the risk factors for ADR?
5. How to prevent and reduce the incidence of ADRs?

Topics

1. Altered pharmacokinetics and phamaodymanics of drugs in elderly , neonates , pregnancy , disease and genetically predisposed individuals

2. Types of ASDE : A – B, C , D, E , F,G , I :

3. Seriousness and severity

4. Overall Drug Risk (Red- Green)

5. .Mechanisms[

- Abnormal pharmacokinetics
- Comorbid disease states**[**
- Genetic factors
- Interactions with other drugs**[**
- Synergistic effects

Remember

- ✓ **Side Effects** – collateral or other unpleasant pharmacological effects of a drug observed in therapeutic doses.
- ✓ **Toxic effects -** Harmful effects of a drug observed in either overdose or due to its prolonged use
- ✓ **Allergic drug reactions:** Harmful effects of a drug due to altered immunological response.
- ✓ **Idiosyncrasy:** Harmful effects of a drug due to genetic defect.
- ✓ **Teratogenecity –** Ability of a drug to produce congenital defects in the developinf fetus during pregnancy
- ✓ **Harmful withdrawal effects of a drug** on prolong use are totally preventable by tapering their doses
- ✓ ADR are common and could be dangerous.
- ✓ Many ADR can be predicated and avoided.
- ✓ Special attention should be given to elderly, neonates, pregnant women those suffering from chronic disorders**.**

Text book

1. **Integrated Pharmacology. Latest edition.** Page, Curtis, Sutter, Walker, and Hoffman. Mosby
2. **Clinical Pharmacology, 9th edition** P.N. Bennett and M.J. Brown. Churchill Livingstone

 Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

MCQs on ADRs

1. Characteristic unwanted reaction which is not related to a dose or to a pharmacodynamic property of a drug is called:
a) Idiosyncrasy
b) Toxic effect
c) Tolerance
d) Teratogenic action

2. Idiosyncratic reaction of a drug is:
a) A type of hypersensitivity reaction.
b) A type of drug antagonism.
c) Unpredictable, due to genetic enzyme deficiency and qualitatively abnormal reaction to a drug.
d) Quantitatively exaggerated response.

3. An undesirable effect of a drug that occurs at therapeutic doses and can be predicted from its pharmacological action is called:
a) Side effect
b) Toxic effect
c) Allergic reaction
d) Idiosyncrasy

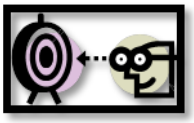
4. Which of the following is a type II (unpredictable) adverse drug reaction?
a) Side effect
b) Toxic effect
c) Idiosyncrasy
d) Physical dependence

5. The side effect of a drug which can been used as a therapeutic effect in another condition is:
a) Dryness of mouth caused by atropine
b) Cough caused by Captopril
c) Uterine stimulation caused by Quinine
d) Diarrhea caused by Ampicillin

6. A pregnant woman developed a urinary tract infection caused by Pseudomonas aeruginosa, and was treated with gentamicin. Which of the following adverse effects was a risk to the fetus ?
a) Skeletal deformity.
b) Hearing loss.
c) Teratogenesis.
d) Blindness.

Students prepared presentations

Spp : 1 **Drug overdose and acute poisoning**	
Supervisors	DR Shaker & Dr. Huda
Department: Pharmacology	
Teaching location : Class room BL , Faculty of	



Objectives

By the end of the lecture you should be able to

1. Reviewing signs of poisoning of certain classes of drugs
2. Identify the general Principles of Management
3. Discussion of Specific management options with certain substances

   ParacetamolVV Opiates (Heroin, Methadone, Morphine) NSAIDs (ibuprofen)Tricyclic Antidepressants
4. To recognize Special challenge with pregnant women

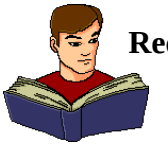
Topics

1. Assessment & management
2. General Management -1 History Specific medications have toxidromes Essential Clinical laboratory tests Summery of ABC Management plan General measures
3. - Decontamination 3-GIT decontamination activated charcoal
4. Gastric Lavage ? Whole bowel irrigation ? Emesis ???? Cathartics????
5. Surgery Antidotes (ANTAGONISING THE EFFECTS OF THE POISON Paracetamol toxicity
6. Pharmacological basis of Acetaminophen toxicity Management Opiate Overdose-Management 2

Students Notes

Remember

Antidote	Poison
N-acetylcysteine	acetaminophen
Atropine ,	organophosphate
Ca gluconate or Ca chloride	Calcium channel blockers
Cyanide kit	cyanide
Deferoxamine	Iron
Fab digoxin	Digoxin
Dimercaprol (BAL)	Arsenic, mercury, lead



Required texts and recourses:

- Lippincott's Pharmacology, 5th Edition, Chapter pp

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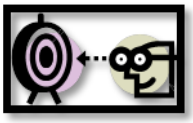
SELF DIRECTED LERNING

Spp : 1 **Drug of abuse and addictions**	
Supervisors	DR Shaker & Dr. Huda
Department: Pharmacology	
Teaching location : Class room BL , Faculty of	



Objectives

By the end of the lecture you should be able to

1- Recognize features of addictions

2- Identify common drug of abuse

3- Recognize medical complications of drug of abuse

Topics

1. Introduction , definition
2. Common features of drug of abuse , brief theory of addiction
3. Common drug of abuse :, classifications
4. Characteristic features of addiction of common drug of abuse and withdrawal syndrome

Students Notes

Remember

المخدرات اضاعة للصحة والمال والشرف فى الدنيا وعقاب الله فى الاخره لم لم يتب
مكافحة المخدرات واجب شرعى ووطنى ومسؤليه على الجميع المشاركة فيها

-

موقع اللجنة الوطنيه لمكافحة المخدرات المملكة العربيه السعوديه
http://www.ncnc.sa/

موقع منظمة الصحة العالميه – قسم مكافحة المخدرات
http://www.who.int/substance_abuse/en/

المخدرات حذر ابنائك من اصدارات قسم علم الادويه
www.authorstream.com/Presentation/drahmedabulhadia-2022877/

2-Tutorials

3-Practical

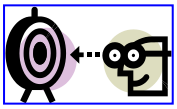
Practical 1 &2 : Drug forms and routes of drug administration

Department : Pharmacology

Lecturer : **Dr Saad Mahrous** & Dr. Fatma Kamel

TEACHING LOCATION : **Parham. Laboratory**

Student Notes:



Objectives

At the end of the lecture you should be able to

Objectives:

1. Know different dosage forms, advantage and disadvantages of each form.
2. Know different routes of drug administration, advantage and disadvantages of each form.

Topics

contents:

1. Different forms of tablets and factors affecting drug absorption
2. Syrup, Suspension and Emulsion.
3. Difference between ampoule and vial.
4. Difference between cream and ointment
5. Inhalers
6. Skin patches
7. Sachets and their solubility
8. Advantages & disadvantages of Enteral route (oral, buccal, rectal and sublingual)
9. Advantages & disadvantages of Parenteral route (IV, IM, ID, SC…..etc)

(Insert here handouts and additional pages for notes if needed)

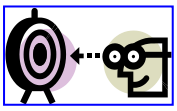
Practical 6 : Case study (ANS)

Department : Pharmacology

Lecturer : Dr Saad Mahrous & Fatma Kamel

Supervisor : Prof Magda

TEACHING LOCATION :



Objectives

At the end of the lecture you should be able to

1. Discuss the pharmacologic effects, adverse drug reactions, contraindications and clinical consideration of cholinergic agonists and antagonists.
2. Discuss the pharmacologic effects, adverse drug reactions, contraindications and clinical consideration of adrenergic agonists and antagonists.
3. Compare and contrast pharmacological characteristics of the sympathetic and parasympathetic divisions of the autonomic nervous system.
4. Compare and contrast the types of responses that occur when drugs activate alpha1-, alpha2-, beta1-, or beta2-adrenergic receptors, and nicotinic or muscarinic receptors.
5. Apply basic science of the 4 categories of ANS drugs to treat different diseases.

Suggested reading:

Ruth Woodrow, Bruce Colbert, David M. Smith (2015).Essentials of Pharmacology for Health Professions

Available from: http://books.google.com.sa/books?

Student Notes:

(Insert here handouts and additional pages for notes if needed)

Annex1 Formative exam NO 1

Formative (self assessment) Examination 2014

3rd YEAR Medical Technology - Physiotherapy

DEPARTMENT OF PHARMACOLOGY

FACULTY OF MEDICINE – KAAU - ACADEMIC YEAR 1428/29H

1- Which of the following adverse effects is NOT commonly seen with cholinergic antagonists e.g Atropine ?

A) Blurred vision (unstable vision)
B) Miosis (reduction in size of the pupil)
C) Constipation
D) Urinary retention

Q2-The route of the drug administration that usually produces most rapid pharmacological response is:

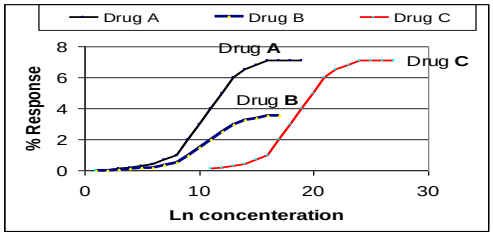
A. Oral route.
B. Subcutaneous route.
C. Intravenous route.
D. Intramuscular route.

Q3- A drug may be subjected to first pass effect (pre-systemic metabolism) when it is administered :

A. Orally.
B. Sublingually (beneath the tongue).
C. Intramuscularly.
D. Intravenously.

Q4 -The maximum effect (E_{max}) achieved by a drug is a measure of:

A. Potency.
B. Efficacy.
D. Mechanism of action .
E. The therapeutic index.



Q5- Regarding this dose-response curve for three drugs acting at the same
receptors which of the following statement <u>IS TRUE</u> ?

A. Drug A is less potent than drug C.
B. Drugs A and drug B have equal efficacy.
C. Drug A and drug C have the same efficacy
D. The three drugs have the same potency.

Q6-All of the following factors may affect the bioavailability of an orally administered drug <u>EXCEPT</u>:

A. Dosage form (capsules, syrup, etc).
B. Stability of the drug in the G.I tract.
C. Extent of drug metabolism before reaching systemic circulation.
D. Presence of food/drugs in G.I tract.
.

Q7- In view of pharmacokinetic principles the following are true <u>EXCEPT:</u>

A. Non ionized form of the drug usually penetrates biological membranes more readily
than ionized form.
B. Renal failure significantly reduces the plasma protein binding of drugs.
C. Hepatic metabolism usually leads to metabolites with high lipid solubility.
D. Bioavailability describes the amount of drug which reaches the circulation in active
form.

.
Q.6 Enzyme Inhibitors are likely to produce

A. Increase rate of breakdown of some drugs.
B. Increase the free level of some drugs.
C. Inhibition of certain enzymes which break down some drugs.
D. Improvement in the bioavailability of some drugs

Q8-The following statements concerning distribution of drugs are true <u>EXCEPT</u> :

A. The rate of delivery of drugs to tissues such as muscles, is usually slow.

B. Drugs with low volume of distribution usually have very low blood concenteration.
C. Blood brain barrier prevents many polar drugs from entering into the brain.
D. Protein bound drugs can't distribute into tissues.

Q9-There are several types of drug receptors, which include the following <u>EXCEPT:</u>

A. Plasma proteins such as albumin.
B. Ligand- gated ion channels.
C. G-Protein coupled receptors.
D. Enzyme –linked receptors.

Q10- All of the following statements about autonomic nervous system (ANS) are correct <u>EXCEPT</u>:

A. ANS differs from somatic nervous system in having ganglionic synapse in the efferent path.
B. ANS is divided into sympathetic and parasympathetic systems.
C. In parasympathetic system the pre-ganglionic neuron is long and the post-ganglionic neuron is short.
D. The parasympathetic system uses norepinephrine as neurotransmitter.
.

Q11- Which of the following is characteristic of parasympathetic stimulation?

A. Decrease in intestinal motility.
B. Inhibition of bronchial secretion.
C. Contraction of sphincter muscle in the iris of the eye (miosis).
E. Increase in the heart rate.

Q12- One of the following drugs is an indirect acting cholinergic agonist. It is a reversible anticholinesterase.

E. Bethanechol.
F. Pilocarpine.
G. Physostigmine.
H. Carbachol.

Q13- All the following drugs are adrenergic agonists act directly on the adrenergic receptors <u>EXCEPT</u>:

A. Epinephrine.
B. Amphetamine
C. Norepinephrine.

D. Isoprenaline (Isoproterenol).

Q14- Bethanechol and Neostigmine are:

E. Adrenergic agonists used to treat asthma
F. Adrenergic antagonists used to treat glaucoma
G. Muscarinic agonists used to treat urinary retention
H. They are toxic substances used to kill insects.

Q15- All of the following neuromuscular blocking drugs act as competitive (non-depolarizing) blockers <u>EXCEPT</u>:

A. Succinylcholine.
B. Tubocurarine.
C. Cisatracurium.
D. Pancuronium.

Q16- All of the following may cause miosis (constriction of the eye pupil) <u>EXCEPT</u>:

A. Physostigmine.
B. Pilocarpine.
C. Neostigmine.
D. Atropine.

Q17- Beta-adrenergic blocking drugs can be used in all the following conditions <u>EXCEPT</u>:

A. Hypertension.
B. Glaucoma.
C. Bronchial asthma.
D. Hyperthyroidism.

Q18- Propranolol can produce bradycardia by blocking:

E. Beta 1 adrenergic receptors.
F. Beta 2 adrenergic receptors.
G. Alpha 1 adrenergic receptors.
H. Alpha 2 adrenergic receptors.

Q19- Which of the followings sympathomimetic drugs is used for treatment of anaphylactic shock due to drug allergy?

A. Norepinephrine.
B. Dopamine.
C. Dobutamine.
D. Epinephrine.

20 - Which of the following is a selective α_1 receptor blocker that affords symptomatic relief in benign prostatic hypertrophy without producing significant fall in blood pressure?

A. Terazocin.
B. Doxazocin.
C. Trimazocin.
D. Tamsulosin.

21- Dobutamine is used intravenously to treat which of the following conditions?

A. Hypertension.
B. Acute congestive heart failure.
C. Angina pectoris.
D. Glaucoma.

22- The parasympathomimetic drug that is used in the diagnosis of myasthenia gravis is:

A. Pilocarpine.
B. Edrophonium.
C. Bethanechol.
D. Physostigmine.

23- Accepted therapeutic uses of atropine include all of the following <u>EXCEPT</u>:-

A. To produce mydriasis for ophthalmological examination.
B. To treat G.I.T spasm.
C. Antidote in organophosphate poisoning..
D. To treat glaucoma.

24- Which of the following substances can cause the release of acetylcholine from cholinergic nerve endings?

A. Spider venom.
B. Insectside .
C. Atropine.
D. Pilocarpine.

25- Which of the following drugs is an alpha adrenergic agonist that is used to treat nasal stuffiness?

A. Norepinephrine.
B. Phenylephrine.
D. Albuterol.
E. Propranolol.

26-Which of the following cholinesterase inhibitors is NOT used in diagnosis or treatement of Myasthenia Gravis because its CNS adverse effects. ?

a) Neostigmine
b) Physostigmine
c) Endrophonium
d) Pyridostigmine

27- Which of the following adverse effects is <u>NOT</u> commonly seen with cholinergic antagonists e.g Atropine ?

A) Blurred vision (unstable vision)
B) Miosis (reduction in size of the pupil)
C) Constipation
D) Urinary retention

28 An antihypertensive drug that acts at central presynaptic α2 receptors is:

A. Minoxidil.

B. Guanethidine.

C. Clonidine.

D. Lisinopril.

29-Selective B2 –adrenergic agonist such as albuterol are used in the treatment of

A. Cardiac arrhythmias

B. Hypertension

C. Diabetes

D. Bronchial asthma

30 Propranolol is not used to treat

A. Bronchial asthma

B. Angina

C. Arrhythmia

D. Hypertension

-31 A non selective alpha –adrenergic agonist drug that is used to treat phaechromocytoma is

A. Prazosin

B. Phenoxybenzamine

C. Phentolamine

D. Tamsulosin

32- Tubocurarine depolarizing neuromuscular blocker act by

A. Blocking nicotinic acetylcholine receptors at the neuromuscular junction of skeletal muscle
B. Blocking muscarinic receptors in the smooth muscle
C. Blocking B-adrenergic receptors in the heart
D. Blocking alpha adrenergic receptors in the arterioles

33-The term is used to describe a decrease in response to a drug which develops in a few minutes?

A. Drug Resistance
B. Tolerance
C. Tachyphylaxis
D. Enzyme induction

34-The term used to describe a decrease in responsiveness to a drug, which develops over days or weeks ?

A. Cumulative effect
B. Tolerance
C. Tachyphylaxis
D. Mutation

35-The term used to describe a decrease in responsiveness to a drug, which develops over days or weeks ?

A. Cumulative effect
B. Tolerance
C. Tachyphylaxis
D. Mutation

36-We administer a pharmacologic dose of epinephrine and observe (among other responses) a direct increase of cardiac rate, contractility, and electrical impulse conduction rates. Which adrenergic receptor was responsible for these direct cardiac effects?

A. α1
B. α2
C. β1
D. β2

37-A patient with chronic obstructive pulmonary disease (COPD, eg, emphysema, chronic bronchitis) is receiving an orally inhaled muscarinic receptor-blocking drug to maintain bronchodilation. What drug belongs to that class?

A. Albuterol
B. Diphenhydramine
C. Ipratropium
D. Pilocarpine

38-A 33-year-old woman becomes poisoned after receiving an injection of illicitly prepared and overly concentrated botulinum toxin. What is the main neurochemical mechanism by which this Clostridium toxin causes its effects?

A. Directly activates all muscarinic and nicotinic receptors
B. Inhibits ACh release from all cholinergic nerves
C. Prevents neuronal norepinephrine reuptake
D. Selectively and competitively blocks nicotinic receptors

39-To facilitate a certain eye exam you want to cause mydriasis, but not alter normal control of accommodation. All of the following drugs are available as topical ophthalmic formulations. Which one will dilate the pupil without altering accommodation?

A. Atropine
B. Epinephrine
C. Homatropine
D. Timolol

40 Which of the following agonists would be used for asthma patients or to delay premature labor?

A. α2-agonist
B. α1-agonist
C. β2-agonist
D. β1-agonist

SECTION II : Short Answers

1- …Neostigmine or others is an indirectly acting reversible cholinergic.

2- Physostigmine is a tertiary amine alkaloid , it can be used for management of certain types glaucoma and treatment of …_……toxicity

3- The following two drugs are used for treatment of toxicity of organophosphate poisoning e.g Echothiophate : and 2-…

4- Scopolamine (Hyoscine) is valuable as pre-anesthetic medication, because it produces ….

5- Adrenaline is added to the local anesthetics to

1- … 2-

6-. ……Dopamine is.

7- ……Dobutamine…. is

8- ……Tyramine….. is

9- Phenoxybenzamine is non selective alpha blocker , it has been used for management of …

10- Adverse effects of non selective β- blockers include :

11- Alpha one selective blockers include :-

1- 2-

12- Tamsulosin used for treatment of … with minimal cardiovascular effects.

13- When adrenaline is injected intravenously it can cause :

1

2-

3- Increase the force and rate of cardiac contraction .

14- Amphetamine can be used in

1- …

2-…

15- … is a mixed – action adrenergic agonist. It is primarily used orally to treat nasal congestion.

16. Mention four variables influence bioavailability of drugs

17. Indicate four characteristic signs of poisoning with organ phosphorus compounds (insectside)

18 . List the drugs used for either diagnosis or management of myasthenia gravis

19 . Provide the main indication of each of the following drugs : Dobamine , Sulbutamol , Bethanechol and Succinylcholine.

20 . List four adverse effects of non selective B-Blockers

21 . List four alpha blocker which are used in management of hypertension