

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**PRACTICAL APPLIED SCIENCE-II**

**BSN 2307P**

**PHARMACOLOGY**



**BANGLADESH OPEN UNIVERSITY  
SCHOOL OF SCIENCE AND TECHNOLOGY**

# PRACTICAL APPLIED SCIENCE-II

## BSN 2307P

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## **Preface**

Anatomy, Physiology and Pharmacology are very important subject for B. Sc.-in-Nursing students. In distance and open learning system all course books are written in the modular form. All modules for distance learners have some specificity and specialty related to the format of presentation. Like any other modules, here lesson begins with learning objectives and ends with exercises. Learning messages are compiled with easy communicative language. Self-activity questions are very much vital to keep learner on pace in distance mode of education. Self-activities are so designed that the learner will have the base at the text and will have to work a little more for a completed answer. Important messages can easily be given in the self-activity exercises that have not been totally covered in the short text. In fact learners will get the clue for further reading through the self-assessment questions. Most of the portions of the course are self-illustrating but some identified areas have been recorded for audio-visual aid. The assigned teacher will demonstrate practical portion of the course. And marking will be completed at the end of every class. This mark will be added at the final examination. This course has been prepared by active participation of the Course Development Team and has been examined by the referee. In spite of it any suggestion would be highly appreciated regarding further enrichment of the book.

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# PHARMACOLOGY

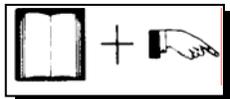
## Notes to Pharmacology Practical Supervisor

Students in distance mode are self-guided and self-motivated. A definite need lead them to seek education. Students here are from different background. They have limited valuable time. So every instruction must be proper in time and demonstration. Please mark the assignments at the end of the day. Please keep one copy of the mark for your record. Every practical marking has got several components like- *procedure maintenance, promptness in performance, neatness in report writing and perfection of results*. Every aspect is to be evaluated individually. This marking is very important because certain percentage of these markings will be added for the final term-end examination. Your judgment is the best means for career of the student.



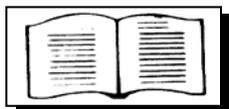
## Assignment 1: Classify the Drugs in your Ward's Medicine Cupboard

### 1.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand drug classification
- ◆ differentiate drugs acting on different systems
- ◆ differentiate drugs for different routes of administration
- ◆ separate routine and emergency drugs
- ◆ reach easily to the target drug for supply
- ◆ learn stock- keeping and house-keeping for medicine
- ◆ tell about storage issues.



### 1.2. Principle

Drugs can be classified in a number of ways. But a nurse will dress up her/ his ward with medicine cupboard for her/ his clinical purpose and also for easy sorting by the concerned physician. The nurse deals drugs for patient purposes. For classifying drugs on the ward cupboard a nurse have to consider the following points -

#### Presentation form of the Medicine (Tab./ Inj.)

1. Temperature control required or not
2. Expiry date how much left
3. Frequency of use of the drug
4. Quantity of the drug
5. Drugs acting on which system
6. Usage of alphabetical index
7. Antagonist properties of the peer drugs
8. Visibility of the drug

#### Required Equipment

1. Cupboard with dust proof glass cover
2. Drugs in good visible package
3. Transparent adhesive tape
4. Marker pen and pencils

## Pharmacology

5. Marker eraser
6. Stool or ladder to reach cupboard height
7. Napkins (dry, absorbable)
8. Registrar book

### Activity

Dress up drugs in the cupboard in accordance to the drug classification narrated in lesson-VII of the theoretical part of the pharmacology module.

- ◆ Label one corner of the cupboard for drops.
- ◆ Eye drops (mydriatics, myotics, anesthetics, analgesics, antihistamines, steroids, antimicrobials, etc.)
- ◆ Ear drops - (antibiotics, antihistamines, analgesics, etc.)
- ◆ Nasal drops - (decongestants, antihistamines, analgesics, etc.)
- ◆ Carefully separate oral drops/ oral suspensions from other drops.
- ◆ Label one corner for topical applications like ointment, cream, gel, lotions, etc.
- ◆ Label one corner for dangerous or toxic drugs and drugs to be delivered on prescription.
- ◆ Label one corner for injectables and infusions.
- ◆ Label one corner for OTC products.
- ◆ Separate the above-mentioned drugs from other drugs by hygienic products.
- ◆ Classify the rest of drugs according to the clinical use or as has been discussed in lesson-VII of the theoretical part.

### Limitations

- ◆ Most of the drugs are not unique in function. One drug may be effective or used for many purposes e.g. lignocaine can be used both as anesthetic drug as well as antiarrhythmic drug. So setting of drug in any of the group is to be decided individually.
- ◆ Alphabetical order of the drug setting is not practical. e.g. dimoxyl (antibiotic), dimerol (antidiabetic) and dimeral (aanitidine) are closely named drugs with quite different activity. So any single mistake may result a dangerous event.

- ◆ Drugs are not supplied in generic names. Brand names are very much different from each other. So drugs cannot be satisfactorily set up in any unique way.

### **Conclusion**

Write your observations and further recommendation in tabular form. Your remark must be substantive reflecting the real activity report. Your guide/ supervisor on spot must check your observations. Your performance sheet should be kept well recorded and well documented for your final evaluation purpose. Your recommendation may be guide for future learners.

## Assignment 2: Adrenaline-Action on Blood Pressure

### 2.1 Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand about brodie's kymogram
- ◆ examine the effect of adrenaline on blood pressure
- ◆ detect the change of blood pressure on rotating drum in graphic pattern
- ◆ confirm the fall of blood pressure after fall of the blood adrenaline level.



### 2.2. Principle

Adrenaline raises blood pressure by stimulating  $\alpha$ - receptors causing visceral and cutaneous vasoconstriction. Adrenaline also stimulates  $\beta$ -receptors in heart increasing the force of contraction and heart rate causing increasing cardiac out put and hence rises of blood pressure.

### Required Equipment

1. Kymograph drum
2. Graph paper
3. Cat
4. Phenobarbitone
5. Cannula
6. Dissecting apparatus
7. Tray.

### Activity

1. Give phenobarbitone anaesthesia to a cat trough cannula set at the external jugular vein.
2. Record normal mean arterial pressure.
3. Give a dose of adrenaline.
4. Record the rise of blood pressure followed by a secondary fall.
5. Give an equal second dose of adrenaline.
6. Record the rise of blood pressure again.
7. Take off the graph from the drum.

### Limitation

Secondary fall of blood pressure is due to stimulation of  $\beta_2$ -receptors at lower concentration of drug causing muscular and coronary vasodilation. This may not be found in all tracing.

It is a very crude method of experiment for drug action and excretion.

**Observations**

Adrenaline has effect on heart muscle and blood pressure through different mechanisms. Effect of adrenaline is to be judged by several parameters.

**Conclusions**

Write your inferences and remarks for this experiment.

## Assignment 3: Azithromycin - Absorption, Action and Excretion

### 3.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of azithromycin
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 3.2. Principles

Antibiotics may fail to produce therapeutic effect because of patient compliance and also because of the absorption or excretion issues in comparison to other antimicrobial drugs. Azithromycin has unique pharmacokinetic properties. It yields high and sustained tissue levels in excess of serum levels showing about 95% clinical success rate.

Acid stability of azithromycin protects the drug against destruction by stomach pH. Its higher lipid solubility leads to quicker absorption of the drug into tissues. Again tissue directed pharmacokinetics of the drug encourages better penetration into tissues and such high intracellular penetration permits the treatment of intracellular pathogens like chlamydia, mycoplasma and toxoplasma.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition
2. Give 500 mg tab. azithromycin orally
3. Take 5 ml blood sample after 2-hour medication
4. Assay the blood level
5. Repeat step 3 and 4 after 10 hour.

### Observations

1. Azithromycin produces peak plasma concentration of around 0.4 µg/ml within 2 to 3 hours following an oral dose of 500 mg.
2. Azithromycin acts on most of the organisms causing respiratory tract infections, skin and soft tissue infections and urogenital infections.
3. Mostly (about 66%) eliminated unchanged with stool and also 33% through urine. The mean elimination half-life is about 11-14 hours

### **Conclusion**

Food reduces absorption of azithromycin. Hepatic and renal impairment may alter excretion of the drug.

## Assignment 4: Amoxycillin - Absorption, Action and Excretion

### 4.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of amoxycillin
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 4.2. Principle

Amoxycillin is a semi-synthetic broad-spectrum antibiotic. It acts on wide range of gram-positive and gram-negative pathogens. It is commonly used against respiratory tract infections, GI tract infections, UTI, VD, skin and soft tissue infections and severe systemic infections like septicaemia, septic abortions, puerperal sepsis, endocarditis, osteomyelitis and intra-abdominal sepsis. This drug is preserved in a cool, dry place, away from light and children. Side effects may include skin rashes and mild reversible diarrhoea. It is not used in-patients with hypersensitive to penicillin.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition
2. Give 250 mg amoxycillin capsule orally
3. Take 5 ml blood sample after 2-hour medication
4. Assay the blood level
5. Repeat step 3 and 4 after 6 hour.

### Observations

1. Amoxycillin produces peak plasma concentration of around within following an oral dose of 250 mg.

2. Amoxicillin acts on most of the organisms causing respiratory tract infections, skin and soft tissue infections, GI tract infections and urogenital infections.
3. It is metabolized to a limited extent and about 60% are eliminated in unchanged form through urine. Some may be excreted in faeces.

### **Precaution**

Amoxicillin is a well-used and comfortably prescribed drug by physicians. But irresponsible use of the drug with inauthentic dose and duration are making treatment difficult. So every health related person should be careful enough about using the drug.

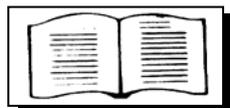
## Assignment 5: Ciprofloxacin- Absorption, Action and Excretion

### 5.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of ciprofloxacin
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 5.2. Principles

Ciprofloxacin is a fluoroquinolone with empirical formula  $C_{17}H_{18}FN_3O_3$  where carboxyl group and keto groups are present in  $C_3$  and  $C_4$  position, respectively.

Ciprofloxacin differs from older quinolones in that it has a fluorine atom at  $C_6$  position, which result increased efficacy against enterobacteriaceae and broader spectrum for Gram-positive pathogens.

The side chains, cyclopropyl at  $C_1$  position and piperazine ring at  $C_7$  position, result in a favorable pharmacokinetic property of new fluoroquinolones with high-serum concentration, longer elimination half-life, and effective against *pseudomonas aeruginosa*.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition
2. Give 500 mg ciprofloxacin tab. orally
3. Take 5 ml blood sample after 2 hour medication
4. Assay the blood level
5. Repeat step 3 and 4 after 05 hours.

### Observations

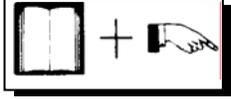
1. Ciprofloxacin produces peak plasma concentration at around 1 to 2 hours following an oral dose of 500 mg.
2. Ciprofloxacin acts on most of the organisms causing respiratory tract infections, severe systemic infections, and skin and soft tissue infections, pelvic infections and urogenital infections.
3. Ciprofloxacin is eliminated mainly by urinary excretion (about 40 to 50% in unchanged form and 15% as metabolites). Fecal excretion over 5 days has accounted for 20 to 35% of an oral dose.

### **Conclusion**

Concurrent administration of ciprofloxacin with theophylline may lead to elevated plasma concentrations of theophylline and prolongation of its elimination half-life. Ciprofloxacin may be taken with or without meals and the preferred time of dosing is 2 hours after a meal.

## Assignment 6: Aspirin - Absorption, Action and Excretion

### 6.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of Aspirin
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 6.2. Principle

Aspirin is commonly used to treat rheumatic disease to suppress the signs and symptoms of inflammation and also effective as antipyretic and analgesic agent. Presently used mostly to prevent platelet aggregation for IHD. The other name of aspirin is *Acetylsalicylic acid* derived from german words according to name of the plants of origin of the drug. Aspirin is readily absorbed from stomach and upper GI tract yielding a peak plasma level within 1-2 hours. It is bound to albumin but a greater portion remains free to be available to tissues. Aspirin may be eliminated unchanged but mostly converted to water-soluble conjugates rapidly cleared by kidney. When aspirin is used in low dose half-life remains 3-5 hour while the half-life is 15 hour in high doses.

**M/A:** Aspirin inhibits prostaglandin biosynthesis by irreversibly blocking enzyme cyclooxygenase. In high doses it decreases the formation of both prostaglandin and thromboxane A<sub>2</sub>. Aspirin also interferes with kallikrein mediator system. It inhibits granulocyte adherence to damaged blood vessels, stabilizes lysosomes and inhibits movement of leukocytes and macrophages to the inflammation site. Adult analgesic and antipyretic dose is 600 mg or 50-75 mg/kg/day for children.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition and give him/her light breakfast
2. Give 300 mg Aspirin tab. orally
3. Take 5 ml blood sample after 2-hour medication
4. Assay the blood level
5. Repeat step 3 and 4 after 05 hour.

### **Observations**

1. Plasma peak level is reached within 2 hour and half-life remains about 5 hour.
2. Single dose of aspirin produces a slightly prolonged bleeding time.
3. Aspirin absorption is influenced by *gastric emptying, pH of mucosa, rate of disintegration, rate of dissociation.*

### **Conclusion**

Aspirin is a commonly used medicine in developed world for its effectiveness against cardiac problems and in the developing world because of the low cost with greater benefit. Aspirin has been with civilization, changing scope of use only.

## **Assignment 7: Paracetamol - Absorption, Action and Excretion**

### 7.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of paracetamol
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 7.2. Principle

Paracetamol is also known as Acetaminophen in some of the pharmacopoeias. It is an analgesic, anti pyretic and mild antiinflammatory agent. The drug is recommended for the treatment of most painful and febrile conditions; for example headache, cold, influenza, toothache, pain due to rheumatic disorder and dysmenorrhoea. Suspension is recommended for the treatment of painful and febrile conditions of childhood such as teething pain, toothache, earache, headache, colds, influenza, general aches and pains and reactions after immunization and vaccination. There is epidemiological evidence of safety of paracetamol in human pregnancy. Less than 1% of the dose ingested by a nursing mother appears in human milk; therefore, maternal ingestion of therapeutic dose is not a risky for the infant. This drug is to be stored at normal room temperature and to be protected from light.

Patients who have taken barbiturates, tricyclic antidepressants and alcohol may show diminished ability to metabolize large doses of paracetamol, the plasma half-life of which can be prolonged.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition and give him/her light breakfast.
2. Give 500 mg paracetamol tab. orally.
3. Take 5 ml blood sample after 4 hour medication
4. Assay the blood level

5. Repeat step 3 and 4 after 12 hour.

### **Observations**

1. Plasma peak level is reached within 4 hour and half-life remains about 1-3 hour.
2. Paracetamol has antipyretic and analgesic property with mild anti-inflammatory effects.
3. Paracetamol causes fewer disturbances in peptic ulcer diseases or gastric irritation.

### **Conclusion**

Paracetamol has been a part and parcel of our daily life. It is an OTC drug and hence within easy reaches of people. But it should be handled with care to avoid any misfortunate effect of the drug. You should write notes on how this drug can be better utilized with more rationale approach.

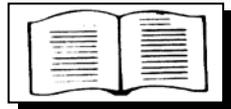
## Assignment 8: Diclofenac - Absorption, Action and Excretion

### 8.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand the mode of absorption of diclofenac
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 8.2. Principle

Diclofenac is a nonsteroidal antiinflammatory agent with marked analgesic, antiinflammatory and mild antipyretic properties. Diclofenac inhibits cyclo-oxygenase activity with a reduction in the tissue production of prostaglandins such as PGI<sub>2</sub> and PGE<sub>2</sub>. Diclofenac causes gastric erosions and prolongs the bleeding time. Orally administered diclofenac is almost completely absorbed (>90%). At therapeutic concentrations it is more than 99% bound to plasma proteins. Diclofenac penetrates synovial fluid where concentrations may persist even when plasma concentration falls. The terminal plasma half-life is about 1 to 2 hours. It is excreted in the form of glucuronide and sulphate conjugates, mainly in the urine (about 65%) but also in the bile (about 35%). Diclofenac should not be given in peptic ulcer patients and patients with previous hypersensitivity to this drug. It should not be given in asthmatic patients and in who attacks of asthma, aspirin or other NSAIDs precipitates urticaria or acute rhinitis.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition and give him/her light breakfast.
2. Give 50 mg diclofenac tab. orally
3. Take 5 ml blood sample after 2-hour medication
4. Assay the blood level

5. Repeat step 3 and 4 after 10 hour.

### **Observations**

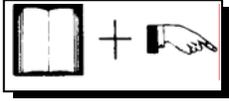
1. Plasma peak level is reached within 2 hour and half-life remains about 1-2 hour.
2. Diclofenac has antipyretic, anti-inflammatory and analgesic property.
3. Diclofenac is excreted in the form of glucuronide and sulphate conjugates, mainly in the urine (about 65%) but also in the bile (about 35%).

### **Conclusion**

Diclofenac sodium is very friendly to general practitioners and commoners. It's scientific knowledge; hence, to be disseminated to grassroots level of the society before any crisis happens or develops. Your recommendation over this experiment will be a good reference for us.

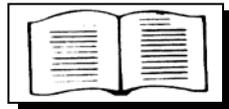
## Assignment 9: Heparin - Absorption, Action and Excretion

### 9.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of Heparin
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 9.2. Principles

Heparin is a mucopolysaccharide occurring in mast cells and usually prepared from porcine intestine or bovine lung commercially. It carries strong electronegative charge and possibly the strongest synthesized organic acid in the body.

In presence of blood cofactor, it is converted into its active form antithrombin and antithromboplastin. It also reduces lipaemia after a fatty meal by releasing the enzyme Lipoprotein lipase which hydrolyses triglycerides to free fatty acids to pass into the tissues.

Heparin must be given parentally either in a deep subcutaneous site or intravenously. Intramuscular use is discouraged to avoid haematoma formation.

Heparin is used in a bolus i.v. dose followed by lower doses or continuous infusion.

Adverse effects include haemorrhage, hypersensitivity reactions like chills, fever, urticaria or anaphylactic shock, thrombocytopenia-causing thromboembolism. Alcoholics or patients with surgery to brain, eye or spinal cord should not be given heparin.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition
2. Give 50-150 mg (10,000-12,500 iu) iv heparin
3. Take 5 ml blood sample after 03 minutes, 5 hours and 8 hours medication
4. Assay the blood level
6. Arrange for BT, CT from laboratory.

### **Observations**

1. Heparin is immediately available in the blood after injection.
2. Anticoagulant therapy has become comfortable for the discovery of Heparin.
3. Low molecular weight Heparin is a common practice during these days for treating unstable conditions of the heart in ischaemic diseases.

### **Conclusion**

Heparin is a blessing of the century for anticoagulant therapy. This drug has saved so many lives after thromboembolic disorder. Still it needs careful application. Protamine is the antagonist.

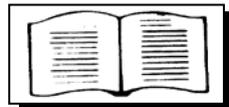
## Assignment 10: Warfarin and Dicumarol - Absorption, Action and Excretion

### 10.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ understand mode of absorption of warfarin and dicumarol
- ◆ describe amount of absorption of this drug
- ◆ tell about action of the drug
- ◆ write about elimination of the drug.



### 10.2. Principles

Dicoumarol has been discovered after about 20 years of research on cattle death issues in North America. It was detected as a toxin in fodder crops and now also used in perfume industry. Warfarin and coumarin are superior to heparin in the sense that those can be administered orally. They are absorbed from gut and are largely bound to plasma protein and are partly metabolized in the liver.

Usage of these drugs for myocardial infarction and hip arthroplasty has been debated though widely used as an oral anticoagulant. Adverse effects include bleeding disorders. Drug interaction influences on hypoprothrombinaemic state of the patients. This drug is teratogenic and can cause abortion. Hence it is not used during pregnancy.

### Required Equipment

1. Blood drawing apparatus
2. A sophisticated micro-lab for assaying of the sample
3. Other accessories for patient support.

### Activity

1. Tell the patient to come in fasting condition.
2. Give dicoumerol 600 mg orally or warfarin 30-50 mg orally or 50 mg i.v.
3. Take 5 ml blood sample for dicoumerol after 24 hours and warfarin 14 hours medication.
4. Assay the blood level.
5. Repeat steps 3 and 4 after 120 hours for each.

## Pharmacology

6. Arrange for BT, CT from laboratory.

### **Observations**

1. Dicoumerol and warfarin are orally acting anti-coagulants.
2. Dicoumerol and warfarin are longer acting than heparin.
3. Dicoumerol and warfarin are comfortable for maintenance therapy.

### **Conclusion**

Oral anticoagulants are preferred for maintenance therapy in most cases. Their onset of action is very slow and slow is the excretion. Fresh plasma, whole blood and vitamin K are possible tools to recover from any drug toxicity.

## Assignment 11: Ranitidine-Dosage, Indications, Contraindications, Side Effects and Precautions

### 11.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### 11.2. Principles

Ranitidine is a potent H<sub>2</sub> receptor antagonist, which inhibits basal and stimulated secretion of gastric acid. Ranitidine is readily absorbed after oral administration with no interference by antacid or meal. Ranitidine eliminates ulcer pain, accelerates healing, and prevents relapses and complications.

#### Dosage and Administration

Duodenal and Gastric ulcer: The usual dosage is 150 mg twice daily taken in the morning and evening or 300 mg as a single daily dose at night for 4 to 8 weeks.

Reflux Oesophagitis: 150 mg twice daily or 300 mg at bed time for up to 8 weeks.

Zollinger-Ellison Syndrome: 150 mg 3 times daily increased if necessary up to 6g daily in divided doses. Dosages should continue as long as clinically indicated.

Episodic Dyspepsia: 150 mg twice daily or 300 mg at bed time for up to 6 weeks.

Maintenance: 150 mg at night for preventing recurrences.

#### Indication

For the treatment of duodenal ulcer, benign gastric ulcer, post operative ulcer, reflux oesophagitis, zollinger-ellison syndrome and in other conditions where reduction of gastric acidity is useful.

#### Contraindication

## Pharmacology

Ranitidine is contraindicated in case of known hypersensitivity to ranitidine or other H<sub>2</sub> receptor antagonists. It is also relatively contraindicated with concomitant use of azithromycin.

### **Side Effects**

Ranitidine is well tolerated and side effects are usually uncommon. Altered bowel habit, headache, dizziness, tiredness, reversible confusion states, rash, decreased blood counts, muscle or joint pain have rarely been reported.

### **Precautions**

Ranitidine should be given in reduced dosage to patients with impaired renal and hepatic function. Ranitidine crosses the placenta but there is no evidence of impaired fertility or harm to the foetus. Ranitidine is excreted in human breast milk. Caution should be exercised when the drug is administered to a nursing mother.

### **Required Equipment**

1. Ranitidine 150 mg tablets
2. Pen, paper and other record materials
3. Clinical check-up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side-effect record sheet
7. Check your precaution sheet
8. Follow-up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

## Pharmacology

Ranitidine is more effective if taken after meal. Ranitidine is a preferred drug by users with negligible reported side effects.

### **Conclusion**

This drug is randomly used now-a- days. But little consideration is done about its pharmacological issues like side effects, precautions etc. Your observation may be a good guide for future users of the drug. We recommend a healthy society with proper usage of the pharmaceutical preparations.

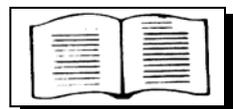
## **Assignment 12: Hyoscine N-Butyl Bromide-Dosage, Indications, Contraindications, Side Effects and Precautions**

### **12.1. Learning Objectives**



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side-effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **12.2. Principles**

Gastric secretion and motility is caused by muscarinic receptor stimulation. Cholinergic antagonists are, hence, used as adjuncts in the management of abdominal pain, PUD and Zollinger-Ellison syndrome. They relieve spasmodic pain by relaxing smooth muscles of hollow organs of the abdominal and pelvic cavities.

A quaternary alkaloid and competitive antagonist of acetylcholine are having no effect on nicotinic receptors. About 2 to 8% of the oral dose is absorbed and 90% excreted in faeces.

### **Indication**

It is indicated for the following conditions like -

- ◆ Spasm of the gastrointestinal tract
- ◆ Spasm of the genitourinary tract
- ◆ Spasmodic dysmenorrhea.

### **Contraindication**

Hyoscine N-butyl bromide is contraindicated in patients with prostatic enlargement and should be used with caution in elderly men. It is also contraindicated in patients suffering from paralytic ileus or pyloric stenosis. It should not be administered to patients with glaucoma, because of a possible mydriatic effect. As with any preparation caution should be observed during the first trimester of pregnancy.

### **Side Effects**

## Pharmacology

Side effects include dryness of the mouth, dilatation of the pupil, increased intra-ocular pressure, flushing and dryness of the skin, bradycardia followed by tachycardia and arrhythmias. Occasionally tiredness, vomiting, giddiness and staggering may occur. Hyoscine may cause drowsiness and dulling of mental alertness.

### **Precautions**

The drug should be used with caution in conditions characterized by tachycardia such as thyrotoxicosis, cardiac insufficiency or failure and in cardiac surgery, where it may further accelerate the heart rate. Concomitant administration of other drugs with anticholinergic properties, such as amantadine, some antihistamines, butyropohenones and phenothiazines and tricyclic antidepressant may enhance the effect of hyoscine, the dose which may therefore need to be reduced.

### **Required Equipment**

1. Hyoscine 10 mg tablets
2. Pen, paper and other record materials
3. Clinical check-up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

## Pharmacology

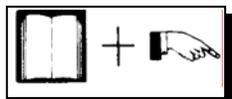
Write your observations with record sheets.

### **Conclusion**

Hyoscine is a commonly used drug. This drug has got wide variety of usage including bradycardia conditions of the heart. But this drug is used in many occasions without carefully analyzing the contraindications. Hence contraindication of this drug should be thought first before thinking of the use specially where the dose is near the upper level of therapeutic dose range.

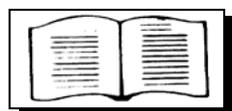
## Assignment 13: Metronidazole-Dosage, Indications, Contraindications, Side Effects and Precautions

### 13.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### 13.2. Principles

Metronidazole is a *nitroimidazole antiprotozoal drug* also effective against some anaerobic bacteria and is well-absorbed and reached peak serum level one hour after oral administration. The serum half-life is more than 8 hour. Concomitant use of phenobarbitone enhances the rate of metabolism while cimetidine prolongs the plasma half-life. The drug accumulates in-patients with hepatic dysfunction.

### Indications

Metronidazole is a drug of choice to treat infections with *E.histolytica*, *Giardia lamblia* and *Trichomona vaginalis* and used to treat infections caused by anaerobic cocci, anaerobic gram-negative bacilli (viz. bacteroides) and anaerobic gram-positive bacilli (viz. Clostridia) causing pseudomembranous colitis.

### Side Effects

Side effects include dryness of mouth, unpleasant metallic or bitter taste, nausea, coated tongue, gastrointestinal discomfort, diarrhoea, weakness, headache, pruritus, skin rashes, ataxia, vertigo, depression, insomnia, drowsiness, urethral discomfort and darkening of the urine. Occasionally there may be temporary moderate leukopenia. Peripheral neuropathy has been reported in patients on prolonged therapy.

### Precautions

Metronidazole should not be used in patients with blood dyscrasias or with active diseases of the central nervous system. It is suggested that it should not be given in the first three months of pregnancy. Since

## Pharmacology

metronidazole is found in the breast milk, caution should be taken during therapy to nursing mother.

### **Required Equipment**

1. Metronidazole 400 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

Should not be given in conjunction with alcohol. Metronidazole enhances the anticoagulant effect of warfarin.

### **Conclusion**

Metronidazole is very commonly used. It is available in every corners of the country even in many of the grocery shops. But its use should be restricted to physicians only. In countries like Iran, metronidazole is used very carefully even by the general practitioners. Physician needs to maintain extra record book for prescribing this drug.

## **Assignment 14: Albendazole-Dosage, Indications, Contraindications, Side Effects and Precautions**

### **14.1. Learning Objectives**



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **14.2. Principles**

Albendazole is a very potent benzimidazole carbamate anthelmintic used in the treatment of various intestinal worm infestations and hydatid diseases. The drug is thought to exert its anthelmintic effect by blocking glucose uptake in susceptible helminths. Albendazole has low absolute absorption and the parent drug is undetectable in plasma.

#### **Indications**

Albendazole is used to treat-

- ◆ Ascariasis, trichuriasis, strongyloidiasis and hookworm infestations
- ◆ Enterobiasis, capillariasis, cysticercosis and cutaneous larva migrans
- ◆ Hydatid disease.

Surgery as an adjunct therapy (either pre or postoperatively).

#### **Contraindication**

Albendazole is absolutely contraindicated during pregnancy.

#### **Side Effects**

Gastrointestinal disturbance, headache and dizziness have been reported during treatment. These symptoms are usually mild and resolved without treatment. Rash, fever and rarely alopecia may occur during treatment.

#### **Precautions**

Elevations in hepatic enzyme levels and reversible reduction in total white cell count have occasionally been reported. These changes appear to be more common during treatment of *echniococus multilocularis*.

### **Equipment Required**

1. Albendazole 400 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

Mean peak plasma concentrations of albendazole sulphoxide is in the range of 0.22-0.25 mg after two to three hours of administration. Plasma half-life of albendazole sulphoxide is about 8.5 hours. The metabolite is excreted in the bile. albendazole is extensively metabolized, probably in the liver.

### **Conclusion**

Helminthiasis is a common problem among rural and urban slum area peoples in Bangladesh. Poor socio-economic condition, poor hygienic living status and lack of proper health education may be important contributory factors for infestations. In that perspective, albendazole is a drug for majority of the people helminthiasis in the country.

## **Assignment 15: Propranolol - Dosage, Indications, Contraindications, Side Effects and Precautions**

### **15.1. Learning Objectives**



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **15.2. Principles**

Propranolol is a beta adrenoreceptor-blocking agent usually used for treatment of hypertension. Oral medication is used for routine management of the patients. Intravenous medication is used for emergency management of arrhythmias and thyrotoxic crisis. This drug is avoided in overt heart failure. However, may be used in cases where signs of failure have been controlled. Heart failure due to thyrotoxicosis often responds to propranolol alone.

### **Indications**

Propranolol is also used for-

- ◆ the management of angina pectoris
- ◆ long term management after myocardial infarction
- ◆ controlling cardiac arrhythmias and dysrhythmias
- ◆ migraine prophylaxis
- ◆ anxiety treatment
- ◆ hypertrophic obstructive cardiomyopathy
- ◆ pheochromocytoma management.

### **Contraindication**

Propranolol should not be used in-

- ◆ bronchial asthma

## Pharmacology

- ◆ uncontrolled heart failure
- ◆ patient in cardiogenic shock
- ◆ second or third degree heart block
- ◆ prolonged fasting
- ◆ metabolic acidosis (e.g. in some diabetics)
- ◆ sick sinus syndrome
- ◆ Prinzmetal's angina.

### **Side Effects**

Propranolol may have minor side effects like nausea, diarrhoea, sleep disturbances and lassitude. Instances of cold extremities, paraesthesia of the glove area have been reported. Cases of skin rashes dry eye thrombocytopenia and purpuras have been recorded.

### **Precautions**

Care should be taken with patients whose cardiac reserve is poor. Caution should be exercised when transferring patients from clonidine to propranolol. If propranolol and clonidine are given concurrently, clonidine should not be discontinued until several days after withdrawal of the beta-adrenoceptor blocking drug. Cessation of therapy with beta-adrenergic blockers should be gradual.

### **Required Equipment**

1. Propranolol 10 mg, 40 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage

## Pharmacology

6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

## Observations

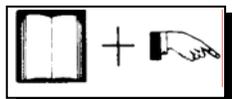
1. Propranolol 10mg reduces tachycardia, relaxes mind and removes restless-ness.
2. Propranolol 40 mg reduces hypertension, provides aid to ischaemic heart.
3. Propranolol deteriorates asthmatic conditions.

## Conclusion

Propranolol is used widely in clinical practices. Other than its usage as antihypertensive agent, it is also prescribed for thyroid over activity, migraine headache, anxiety, tensions, short P-R intervals and various clinical emergencies like SVT and crisis in fallot's tetralogy. Propranolol is commonly mistaken with the brand "*Propanin*" whose action is exactly reverse. So this drug should be prescribed carefully and in clear handwriting excluding the cautionary diseases like asthma.

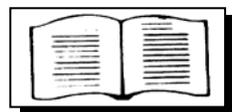
## Assignment 16: Amlodipine - Dosage, Indications, Contraindications, Side Effects and Precautions

### 16.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### 16.2. Principles

Amlodipine is dihydropyridine competitive blockers of the voltage operated slow calcium channel. It inhibits calcium influx with a greater effect on vascular smooth muscle cells than on cardiac muscle cells. Amlodipine blocks the inward movement of calcium by binding to L-type calcium channels in the heart and in smooth muscle cells in the coronary and peripheral vascular. Amlodipine is well absorbed following oral administration with peak blood concentrations occurring after 6 to 12 hours. Amlodipine is reported to be about 97.5% bound to plasma protein. It has a prolonged half-life of 35 to 50 hours. Amlodipine is metabolized in the liver and mostly excreted in urine with less than 10% of a dose as unchanged drug.

### Indications

Amlodipine is used to treat hypertension with or without any other drug combination, chronic stable angina and also in vasospastic angina.

### Contraindication

Amlodipine is contraindicated to patients known to have hypersensitivity to the drugs. Also relatively contraindicated to patients having persistent peripheral oedema.

### Side Effects

Common complains might be peripheral oedema. Other side effects include skin erythema, facial flushing, fatigue, etc.

### Precautions

## Pharmacology

Particular attention to be given to patients with aortic stenosis or other conditions with peripheral vasodilatation. This drug is metabolized in the liver, so specific care should be taken while using the drug in patients with liver diseases. Patients with heart failure should not be given this drug.

### **Required Equipment**

1. Amlodipine 5 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

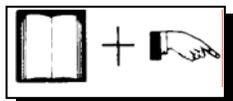
1. Amlodipine reduces blood pressure smoothly, promptly and with minimum side effect.
2. Sustained action of amlodipine is preferred to short-acting nifedipine.
3. Tachycardia is comparatively less with amlodipine than nifedipine.

### **Conclusion**

Introduction of amlodipine in the calcium channel blockers series has made treatment easier with better patient compliance because of the once daily dose facility. Single drug at the beginning of the day or during retirement makes treatment more acceptable to patients with busy schedule. Slow and sustained action of the drug is another positive aspects for the drug.

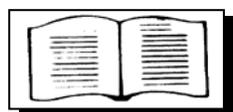
## Assignment 17: Enalapril - Dosage, Indications, Contraindications, Side Effects and Precautions

### 17.1. Learning Objectives



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### 17.2. Principles

Enalapril is the ethyl ester of enalaprilat, the long acting angiotensin converting enzyme inhibitor. It is highly effective in the management of hypertension and heart failure. Following oral administration, about 60% of enalapril is absorbed from the gastrointestinal tract and peak plasma concentrations are achieved within about 1 hour. Enalapril is extensively hydrolyzed in the liver to enalaprilat, peak plasma concentration of enalaprilat is achieved 3 to 4 hours after an oral dose of enalapril. About 60% of an oral dose is excreted in urine and the rest in feces. Enalaprilat is 50 to 60% bound to plasma proteins and accumulation half-life is about 11 hours in patients with normal renal function.

#### Indications

Enalapril is used to treat essential hypertension, renovascular hypertension and heart failure.

#### Contraindication

Enalapril is contraindicated during pregnancy and hypersensitivity to this drug.

#### Side Effects

This drug may cause hypotension and impaired renal functions. Angioneurotic oedema and cough, etc. has also been reported.

#### Precautions

Enalapril should be carefully used in elderly patients and lactating mothers.

### **Required Equipment**

1. Enalapril 5 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

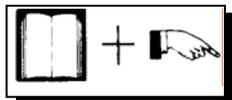
### **Observations**

1. Other antihypertensive drugs have synergistic effect with enalapril.
2. Enalapril is the drug of choice for treating hypertensive patients with heart failure.
3. Overdose is treated with infusion of normal saline.

### **Conclusion**

Enalapril is used extensively during these days for multiple facility reasons. But its use should be proper and justified. Specially, when it is used in combination with other antihypertensive medicines. Adrenergic-blocking agents should be used with enalapril with proper care and caution. Simultaneous use of propranolol may reduce clinically nonsignificant bioavailability of this drug.

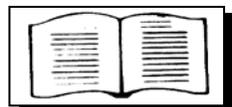
## **Assignment 18: Isosorbide Mononitrate - Dosage, Indications, Contraindications, Side Effects and Precautions**



### **18.1. Learning Objectives**

At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **18.2. Principles**

Isosorbide mononitrate is an antianginal drug used to reduce the frequency and severity of recurrent angina; but may not effective in acute anginal pain. This drug acts on vascular wall relaxing and dilating arteries and veins causing improved blood flow to the heart muscle and reduced workload of the heart.

#### **Indications**

Used for treatment and prophylaxis of angina pectoris.

#### **Contraindications**

Contraindicated in-patients with known hypersensitivity to this drug or isosorb-ide dinitrate.

#### **Side Effects**

Adverse effects include orthostatic hypotension, headache, vertigo and feeling of dizziness.

#### **Precautions**

Excretion in breast milk and safety in pregnancy has not been established. No dose adjustment is required for elderly patients or patients with hepatic or renal impairment.

#### **Required Equipment**

## Pharmacology

1. Isosorbide mononitrate 20 mg tablets
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

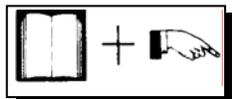
Isosorbide mononitrate causes throbbing headache because of vascular reasons. If the headache is more than tolerance level, patient can take Paracetamol for symptomatic relief. Feeling of flushing of face may be experienced. Transient hypotension is also observed.

### **Conclusion**

Isosorbide mononitrate is a life saving drug taken orally. It bypasses the liver for metabolism; hence it is preferred over isosorbide dinitrate. Isosorbide mononitrate is also given if bundle branch block or any ischaemia is suspected. Indeed it is a giant leap for medical discovery.

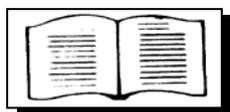
## **Assignment 19: Chlorpheniramine maleate - Dosage, Indications, Contraindications, Side Effects and Precautions**

### **19.1. Learning Objectives**



At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **19.2. Principles**

Chlorpheniramine maleate is a potent antihistamine used clinically in most of the allergic conditions as a first line drug available in different forms for usage and for all age groups. It reduces catarrhal disorders, weeping eczema and all sorts of pruritus conditions.

#### **Indications**

Allergic conditions and hypersensitivity reactions like -

- ◆ Hay fever - sneezing, itching, rhinitis, conjunctivitis
- ◆ Urticaria - pruritus and reddening, wealing and swelling of skin
- ◆ Eczema (nervous origin) with pruritus.

#### **Contraindications**

Patients allergic to this drug and patients with prostatic hypertrophy with residual urine formation.

#### **Side Effects**

Drowsiness, gastrointestinal complaints, dryness of mouth, palpitation, urinary retention. Higher doses may cause drowsiness, hallucination, restlessness, confusion. Raised intraocular pressure is possible in patients with narrow angle gaucoma.

### **Precautions**

Should be avoided at pregnancy and lactation. Also should be avoided to patients who need acuity and alertness at their job. Caution should be taken while given with other drugs acting on CNS and also with MAO inhibitors.

### **Required Equipment**

1. Chlorpheniramine maleate 4 mg tablets
2. Pen, paper and other record materials
3. Clinical check-up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

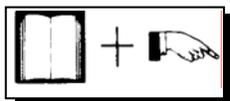
### **Observations**

1. Feeling of dryness of the mouth is usually felt.
2. Drowsiness makes daily life difficult.
3. Bitter taste of the drug is difficult to serve to babies.

### **Conclusion**

Diagnosis and management becomes difficult if the drug itself is allergic to the patient. It is sometimes preferred to promethazine because it is less metabolized in liver than chlorpheniramine maleate. Usage of sedatives along with it potentiates drowsiness discomfort of the patient.

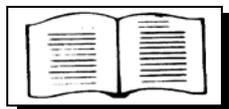
## **Assignment 20: Dextromethorphan - Dosage, Indications, Contraindications, Side Effects and Precautions**



### **20.1. Learning Objectives**

At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### **20.2. Principles**

Dextromethorphan is a cough suppressant. It is the d-isomer of the codeine analogue of levorphenol. Its chemical name is d-3-methoxy-N-methylmorphinan. Dextromethorphan has depressant effect of the brain. It has little sedative effect with no analgesic property. It is rapidly absorbed from GI tract. It is metabolized in liver and is excreted in urine partly as unchanged and partly as demethylated metabolites.

#### **Indications**

It acts as antitussive.

#### **Contraindications**

Known hypersensitivity to this drug and liver disease.

#### **Side Effects**

Drowsiness, dizziness, confusion, excitation and GI disturbances. Very high doses may produce respiratory depression.

#### **Precaution**

Should be used with caution to asthmatic patients.

#### **Required Equipment**

1. Dextromethorphan hydrobromide syrup
2. Pen, paper and other record materials

## Pharmacology

3. Clinical check-up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

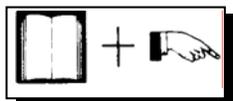
### **Observations**

Write your observations and submit it to your guide or supervisor. Please remember that every part of the practical has got its separate markings. These markings are cumulated to add on the term end final exam score.

### **Conclusion**

Dextromethorphan is used as an antitussive for patients with respiratory diseases. Abuse of the drug has been occasionally reported. Though not an addictive material still abuse is done. Hence prescription of the drug should be done with caution. Concomitant use of sedative or alcohol is discouraged.

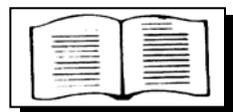
## Assignment 21: Salbutamol-Dosage, Indications, Contraindications, Side Effects and Precautions



### 21.1. Learning Objectives

At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### 21.2. Principles

Salbutamol is a synthetic sympathomimetic selective  $\beta_2$ -adrenergic agonist having bronchodilator effect on bronchial smooth muscles. It has adequate oral bioavailability, lower rate of metabolism, lack of  $\alpha$ -adrenergic activity and diminished adverse cardiovascular effects. Salbutamol activates pulmonary receptors that relax bronchial smooth muscle thereby decreases airway resistance. It may suppress the release of leukotrienes and histamine from mast cells in lung tissue, enhance microvascular permeability, and inhibit phospholipase  $A_2$ . It is rapidly absorbed when given orally. It is metabolized primarily in the liver and excretion is mainly via kidneys.

### Indications

Salbutamol is indicated for the relief of bronchospasm in bronchial asthma, bronchitis and emphysema and also in bronchospasm where heart disease or hypertension is co-existing.

### Contraindications

Known hypersensitivity to this drug and liver disease.

### Side Effects

Fine tremor, palpitation, muscle cramp, tachycardia, headache, hypokalaemia, hypoglycemia, paradoxical bronchospasm, angioedema may occur.

### Precaution

## Pharmacology

Should be used with caution to asthmatic patients.

### **Required Equipment**

1. Salbutamol 4 mg tab.
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

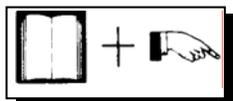
### **Observations**

When used at the upper level of therapeutic dose, it causes palpitation, tremor and dryness of mouth. For children liquid presentation is flavoured to avoid the bitter taste. Salbutamol nebulizer induces rapid and effective bronchodilatation.

### **Conclusion**

Salbutamol is not encouraged to use before six month of age because of the incomplete development of respiratory network. It is not given to patients having palpitation and tremor. Because of multiple routes of application of the drug, salbutamol is better preferred for asthma patient.

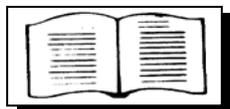
## Assignment 22: Aminophylline-Dosage, Indications, Contraindications, Side Effects and Precautions



### 22.1. Learning Objectives

At the end of this assignment you will be able to-

- ◆ know the dose calculation for the drug
- ◆ identify indications of the drug
- ◆ select contraindications and side effects of the drug
- ◆ describe specific precautions taken while administering the drug to a patient.



### Principles

Aminophylline is the theophylline ethylenediamine complex commonly used for therapeutic purposes containing about 86% theophylline. Theophylline is 1,3-dimethylxanthine. It is most selective in its smooth muscle effect. It has direct positive chronotropic and inotropic effects on heart. It relaxes vascular smooth muscles except cerebral blood vessels where it causes contraction. It is a weak diuretic. Aminophylline inhibits enzyme adenosine phospho-diesterase which prevents conversion of 3',5'-cAMP to 5'-cAMP resulting in increased concentration of 3',5'-cAMP. This 3',5'-cAMP relaxes bronchial smooth muscle and thus causing bronchodilatation.

### Indications

Aminophylline is used as an effective bronchodilator in bronchospasm cases like asthma, emphysema and chronic bronchitis. It is also used to treat left ventricular failure (LVF).

### Contraindications

Aminophylline is contraindicated in cardiac failure or liver disease, peptic ulcer, pregnancy.

### Side Effects

Tachycardia, palpitation; cardiac arrhythmia, nausea and convulsions (if i/v given rapidly). Proctitis (if suppository is used). Pain if i/m injection is given.

### Precautions

## Pharmacology

Should be taken after meal.

### **Required Equipment**

1. Aminophylline 100 mg tablet
2. Pen, paper and other record materials
3. Clinical check up instruments
4. A dependable pathological laboratory.

### **Activity**

1. Diagnose a patient to be treated
2. Calculate dosage of the drug for this patient
3. Prepare separate record sheets for indications, side effects, contraindications and precautions for this drug
4. Check your indication, contraindication record sheet
5. Prescribe drug in proper dosage
6. Give the patient side effect record sheet
7. Check your precaution sheet
8. Follow up the patient
9. Write your report completely
10. Submit the report.

### **Observations**

Aminophylline causes gastric irritation in many cases. Concurrent use of any other diuretic enhances diuretic effects. Aminophylline has little tremor effects.

### **Conclusion**

Aminophylline is to be given very slowly through intravenous route. Oral medication should be administered after meal. Suppository is to be used with caution so that proctitis is not developed. Drug interaction chart is to be consulted while prescribing aminophylline along with any other drug.