University of Basrah - College of Medicine
Department of Pharmacology

Problems
In
Medical Pharmacology

September 2013

By
The Staff of The
Department of Pharmacology,
College of Medicine, University of Basrah, Iraq.

1. **Assistant professor Jawad H. Ahmed, Head of the Department**
2. **Professor Nabeel A. Ali, , Professor of Pharmacology**
3. **Professor Abdulla M. Jawad, Professor of Pharmacology**
4. **Lecturer Sofik V. Vartan**
5. **Lecturer Athra M. Salman.**.

Problem No. 1 (Evaluation of new drugs)

To evaluate the acute oral toxicity of two new compounds (A and B), thought to be effective orally in treatment of diabetes mellitus; 5 groups of mice (10 mice each, 5 males and 5 females) were used for each compound. Each group received orally, one dose of 4 doses of each compound, and the fifth group received the vehicle in which the compound was dissolved (control group). The behaviour and mortality (immediate and delayed) were observed over a period of 1-2 weeks. The results are as follows:

	Group 1	Group 2	Group 3	Group 4	Group 5
Dose	0	3mg/kg	6mg/kg	9mg/kg	12mg/kg
(A)	0	25%	50%	73%	90%
Mortality					
(B)	0	15%	50%	85%	100%

How would you compare the toxicity of the two compounds?

If the effective oral dose in 50% of diabetic animals (diabetes was induced by alloxan) of compound A is 1mg/kg and compound B is 5mg/kg, How would you compare the therapeutic index of the two compounds?

The students are expected: to take an idea about a simple method to estimate LD50; to compare between the toxicity of various compounds even if they have the same LD50; and to estimate the therapeutic index.

Problem No. 2 (Evaluation of new drugs)

After initial animal experiments, a compound (HK509) with apparent efficacy in treatment of hypertension has been investigated in healthy volunteers and found to have a relatively good safety profile. A clinical trial on patients with mild hypertension is found necessary. Patients are to be selected from a hypertension clinic during their routine visit.

Try to design a double-blind, randomised, placebo-controlled clinical trial to evaluate the efficacy of this compound in patients with mild hypertension.

Points to follow:

A. Write down your selection criteria (exclusion and inclusion criteria) i.e. who is going to be included in the trial?

B. After the patients being selected, how are the patients randomly allocated to the treatments: compound HK509 or placebo? (10 patients are required for a start).

C. How would you achieve blindness? Who is going to dispense the treatment for the patients and to evaluate the outcome?

Problem No.3 (Pharmacokinetics)

A 25-year old lady with repeated attacks of migraine, obtained no relief of her headache after taking two paracetamol tablets. On consulting a physician, he prescribed metoclopramide tablets to be taken half an hour before paracetamol. Explain.

The student should be able to discuss factors that affect drug absorption from GIT, and to list examples of drugs that affect gastric emptying (increase or decrease) and their possible interaction with other drugs taken concomitantly.

Does aspirin differ in its absorption from that of paracetamol?

Problem No.4 (Pharmacokinetics)

The maximum oral dose for propranolol in treatment of hypertension may be up to 320 mg per day (in three divided doses), while the maximum intravenous dose of the same drug is only 10 mg for treatment of cardiac arrhythmias (Discuss).

The students should know the definition of the term bioavailability, methods used for its calculation, and the significance of the first pass metabolism of drugs.

Problem No.5 (Pharmacokinetics)

A patient on warfarin for treatment of deep vein thrombosis (DVT) developed bleeding per rectum after receiving therapeutic doses of indomethacin (a non-steroidal antiinflammatory drug) for severe pain in the inflammed lower limb, explain.

The student is required to discuss binding of drugs to plasma proteins and its significance in the interaction between drugs.

Problem No.6 (Pharmacokinetics)

A 20-year old epileptic female patient has been well controlled on carbamazepine tablets; 200mg twice daily. She developed dizziness, diplopia and ataxia following prescription of erythromycin for tonsillitis. Explain.

The student is required to discuss the terms: enzyme inhibition, enzyme induction, and plasma level monitoring.

Problem No. 7 (Pharmacokinetics)

A patient with severe renal impairmant, his doctor prescribed for him gentamicin 40 mg three times daily for treatment of urinary tract infection. The nurse, by mistake, gave him an ampoule of 80 mg three times daily. He developed deafness. What is the possible explanation?

The student should recognize various methods of drug elimination (clearance) and the effect of disease on drug kinetics.

Problem No.8 (Pharmacokinetic calculations)

Time(hours)	Concentration (ng/ml) Intravenously (15mg)	Oral (40mg)
0	100	-
1	80	20
2	65	50
3	53	63
4	40	53
5	32	42
6	23	32
7	16	25
8	15	18

Try to calculate the following parameters :

Half-life :a) directly from the curve; using semi-log scale

b)$t_{1/2}$ = 0.693/Ke

Volume of distribution: dose/concentration at zero time
Bioavailability (F) = AUC oral/ AUC i.v. x dose i.v./dose oral
Clearance : dose/ AUC i.v.

To find out the answer you have to plot the data both for intravenous and oral doses in a graph paper (linear, graph 1).
As you can see the data are presented as a curve. To make the curve look as a line draw the data on a semi-log paper(graph 2).
Now prepare your self to do the calculations.

1. Half-life ($t_{1/2}$)

There are two ways to calculate $t_{1/2}$
From the plot you can draw lines for concentrations 80 and 40; their intercept at the time axis is $t_{1/2}$;
$t_{1/2}$ = 3 hours

The second way to calculate t1/2 is by using the equation;
$t_{1/2} = 0.693/Ke$

At this stage you have to know what are 0.693 and Ke,
0.693 is the natural log of 2, Ke is elimination rate constant
Ke can be calculated from the slope.

From graph 2 :

$$\text{Slope} = \frac{\log P - \log Q}{\text{Time}}$$

$$= \frac{\text{Log } 80 - \log 40}{3} = \frac{1.9 - 1.6}{3} = 0.1$$

where P and Q are points on concentration scale. Time is the time required for decline of concentration from P to Q.

Slope = 0.1
Ke = slope X 2.303
= 0.1 X 2.303
Ke = 0.23

The value 2.303 is a correction factor between the natural log and log to base 10.
Therefore :

$$\text{Half life } t_{1/2} = \frac{0.693}{Ke} = \frac{0.693}{0.23} = 3.0 \text{ hours}$$

You can see that the $t_{1/2}$ is the same for both ways of calculation.

2. Volume of distribution (Vd)

From i.v. data

$$Vd = \frac{\text{Dose}}{\text{Concentration at zero time}} = \frac{15\,000\,000 \text{ ng}}{100 \text{ ng/ml}}$$

$$= 150 \text{ L}$$

3. Bioavailability (F)

To calculate the bioavailability you have to remember this equation :

$$\text{Bioavailability (F)} = \frac{\text{AUC oral}}{\text{AUC i.v.}} \times \frac{\text{Dose i.v.}}{\text{Dose oral}}$$

AUC = Area under the concentration time curve for oral data (AUC_{oral}) or i.v. data ($AUC_{i.v.}$) that can be calculated by trapezoidal rule.

AUC_{oral} = 298 (please note this AUC is from zero to 8 hours)

$$AUC_{oral} \text{ (zero to infinity)} = 298 + \frac{\text{Last concentration}}{\text{Ke}}$$

$$= 298 + 18 / 0.23$$

$$= 298 + 78 = 376.26 \text{ ng/ml.hr}$$

AUC for i.v. = 367.5 + 65.21 = 432.7 ng/ml.hr

Note : Both 78 & 65.1 are the area of the triangle after the last concentration

$$\text{Bioavailibility} = \frac{376.26}{432.7} \times \frac{15}{40} = 0.32 = 32\ \%$$

$$\text{Clearance} = \frac{\text{Dose}}{\text{AUC i.v.}} = \frac{15\,000\,000 \text{ng}}{432.7 \text{ ng/ml.h}}$$

$$= 34666 \text{ ml/h}$$

$$= 34666 / 60 = 577 \text{ ml/min}$$

Summary

At the end we have to summarize the results as follows:

t ½ = 3 h
Volume of distribution Vd = 150 L
AUC oral (zero to infinity) = 376.26 ng/ml.hr
AUC i.v. (zero to infinity) = 432.7 ng/ml.hr
Bioavailability (F) = 32 %
Clearance = 577 ml/min.

Problem No. 9 (Mechanism of drug action)

A 60-year old patient was diagnosed to have angina pectoris. He was put on propranolol 40mg three times daily for the last six months. He traveled to the north of Iraq, but forgot to take his propranolol with him. After one day of stopping his treatment, he experienced exacerbation in his anginal attacks which were worse than his attacks before treatment.

The student should discuss the following points; receptors as one mechanism of action of drugs; other mechanisms of drug action, types of antagonists, up-regulation, and down-regulation.

Does the exacerbation of anginal attacks differ if the patient used pindolol instead of propranolol? (Pindolol is a beta blocker with intrinsic sympathomimetic activity i.e. partial agonist activity)

Problem No. 10 (Pharmacogenetics)

A 10-year old child received two antimicrobial drugs for the treatment of his urinary tract infection: co-trimoxazole and nitrofurantoin. He became anaemic with mild jaundice and a dark urine. On investigation, he was found to have G6PD deficiency with findings suggestive of haemolytic anaemia.

The student should discuss the above cited case with the following points in mind: causes of haemolysis in such a child and the mechanism behind it; the list of oxidant food and drugs that carry a possible or definite risk of haemolysis in patients with G6PD deficiency; and other examples of the relationship of drugs and genetics.

Problem No:11 (parasympathetic system)

A young female patient complaining of easy muscular fatigability develop ptosis and diplopia with weakness of speech. She was admitted to the hospital. A 10mg injection was given intravenously. She became able to move her eye lids and the muscle weakness is reduced for only three to four minutes.
What is she suffering from and what do you expect the injection to be? What long term oral therapy might be used? Why bethanicol and carbachol are not used for this case.

Problem No.12 (Parasympathetic system)

A 65-year old patient was complaining of severe headache, his eyes were red with pain and visual disturbance. An eye drop was prescribed for him which produces miosis. Frequent administration of this drop resulted in a gradual relief of symptoms.
Which drug do you think the drop might contain?
What is the mechanism of the drug in producing miosis?
Why are the symptoms and signs relieved by this drug?
Which drugs should cautiously be given for such patient ?

Problem No.13 (Parasympathetic system)

A 26-year old woman ingested an insecticide preparation containing an organophosphorus compound in an attempt to commit suicide. She developed headache, miosis, hypersalivation, vomiting, abdominal colic, diarrhea, bradycardia with muscle weakness and fasiculation. She was given a 2mg of a drug i.v. and repeated every 20 to 30 minutes until the skin becomes flushed and dry, the pupil dilated , and tachycardia developed.

Discuss with respect various cholinergic mechanisms mediated by muscarinic and nicotinic receptors and their antagonists.

Problem No. 14 (Sympathetic system)

A patient with endogenous depression on treatment with the tricyclic antidepressant; imipramine for one year. He went for the dentist for tooth extraction. The dentist gave him a local injection of lignocaine containing adrenaline (1/200 000, 5 ug/ml).

The patient developed tachycardia and palpitation and his BP elevated. What is the possible mechanism?

The student should know the methods of terminating nor-adrenaline after being released from the nerve endings, and the drugs that can inhibit them; adrenergic receptors on which adrenaline acts, and the effects they mediate .

Problem No.15 (Sympathetic system)

A patient with bronchial asthma is maintained on oral theophylline and prednisolone with salbutamol inhalation on need. The patient developed a severe asthmatic attack which did not respond to inhaled salbutamol. His doctor gave him s.c. injection of salbutamol (0.5 mg repeated afetr 4 hours). The patient became weak and lethargic. His ECG showed flat T wave and prominent U wave.

The students are required to discuss the above case with respect to the metabolic effects mediated by beta-2 receptor and their role in regulation of potassium level in addition to other metabolic effects.

Problem No.16 (Sympathetic system)

A 50-year old patient with diabetes mellitus, is maintained on glibenclamide (Daonil) as an oral hypoglycemic agent. She was found to be hypertensive (essential hypertension, BP 145/100 on various occassions). Her blood pressure remained high despite low salt diet. A junior doctor started treating her with propranolol 40mg three times daily. Reviewing the patient's treatment by his senior; the latter changed the beta blocker to low dose of atenolol 50mg daily.

Discuss the differences between atenolol and propranolol with specific reference to selectivity and its role in diabetes.

Problem No.17 (Sympathetic system)

A 60-year old hypertensive patient was found to have benign prostatic hypertrophy. What is the suitable drug for this patient?

The student should define the patient problem, specify the therapeutic objective, verify the suitability of his drug, write down a prescription and give instructions and warnings. (See Practical No.2, Prescription order writing).

Problem No.18 (Antianginal drugs)

A 70-year old man with angina pectoris, brought on by exertion. When his chest pain recurs, he usually sits down and places a prescribed tablet under his tongue. This tablet readily dissolves creating a local burning sensation and producing headache and flushing. Two minutes later his chest pain is resolved.

What drug did he take?

How did this drug produce its effect?

What happens if the patient swallows his saliva while the tablet is under his tongue?

What other drugs are effective in this case?

Problem No. 19 (Autacoids)

A 55-year old taxi driver with seasonal rhinitis (hay fever). Try to discuss your choice for a suitable drug in the light of the properties of antihistaminic drugs and their adverse effects. Will your choice be affected if you know that the driver has also ventricular ectopic beats?

Problem No. 20 (Autacoids)

An elderly patient is dependent on non-steroidal antiinflammatory drugs (NSAIDs), to relieve pain and stiffness caused by rheumatoid arthritis. He developed gastrointestinal discomfort and other dyspeptic symptoms. His stool turned black. On endoscopy, small ulcer in a hyperemic gastric mucosa with several bleeding points were seen. Because of the patient's condition, NSAIDs can not be withdrawn. Can these NSAID-associated ulcers be prevented while continuing using these drugs?

Problem No. 21 (Autacoids)

Ergotamine, ondansetron and fluoxetine are three drugs related to serotonin functions and used because of this in treatment of migraine, cytotoxic-induced vomiting and depression respectively. Discuss with respect to serotonin receptors and its re-uptake back into the nerve ending.

Problem No. 22 (anxiolytic drugs)

A 60 year old man had been prescribed phenobarbitone 30mg at bed time because of sleeplessness after his wife death 2 weeks ago. He came to you for repeating the prescription.

Do you repeat the prescription for him?

Try to compare the use of barbiturates and bezodiazepines as hypnotics.

What precautions you take in prescribing sedatives for elderly patients.

Problem No. 23 (anxiolytic drugs)

A 20 year old college student requested a prescription of diazepam (5mg) tablets. He explained to his doctor that he was using this drug for the last 3 months because of family problems and difficulties in his study.

What would you tell such a student?

What pharmacological property does diazepam have if it is used for along time?

Apart from anxiety, what are other uses of diazepam and related benzodiazepines?

Problem No.24 (Antidepressants)

A 56-year old woman, has a newly diagnosed depression with insomnia.
What is the choice of a drug to treat this condition?
What information you give to such patient, especially in relation to the dose, duration of treatment and possible adverse effects?

Problem No.25 (Antipsychotics)

A 25-year old schizophrenic patient was given a sustained release injection intramuscularly. He developed abnormal movements of the hand and face muscles after 3 days.
What type of drug did he receive? Why did it cause abnormal movements?
What do you do for this patient?
What are the other possible adverse effects of this group of drugs?

Problem No. 26 (Antiepileptic drugs)

A 20-year old female patient with tonic-clonic epilepsy. She is well controlled with carbamazepine 400mg twice daily. She developed diplopia, dizziness and ataxia following erythromycin prescription.

1. **Explain what happened to this patient؟**
2. **What are the main adverse effects of carbamazepine؟**
3. **What are the other clinical uses of carbamazepine apart from epilepsy?**

Problem No.27 (antiepileptic drugs)

A 65-year old man developed generalized tonic-clonic (grand mal) seizures following stroke. Phenytoin 300mg/day was available at that time and prescribed to him. The dose was increased to 400mg/day because he is still having the attacks. Then the attacks stopped but he developed nystagmus, ataxia and confusion.

Explain what happened to this patient and why?
How do you manage this patient? (See Practical No.3 Analytical techniques and drug measurements)

Problem No. 28 (Antiparkinsonian drugs)

A 65-year old man is complaining of tremor which occurs at rest; most obvious in hands (pill-rolling), is improved by voluntary movement and by sleep and becomes worse by anxiety. The tremor is associated with rigidity and hypokinesia. Idiopathic Parkinson's disease is diagnosed. The patient is given levodopa orally, the dose is increased gradually according to the response. The patient experiences nausea, vomiting and postural hypotension.
How can you minimise these side effects?
Which parkinson manifestations benefit more from levodopa?
Can excess of levodopa produce involuntary movements?
How does pyridoxine (B6) interact with levodopa?
Which antiemetic drug do you choose to treat the vomiting resulting from the use of levodopa (cyclizine, domperidone, metoclopramide)?

Problem No. 29 (Narcotic analgesics)

A patient with advanced stage of carcinoma of the colon with metastasis to other parts of the body. An injection was prescribed, repeatedly, for him to relieve his pain and to improve his wellbeing.
What do you think the injection to be? Could it be prescribed for any chronic pain?
What are the manifestations of opioid overdose and what are the problems associated with its continuous use?

Problem No. 30 (Narcotic analgesics)

A patient in the terminal stage of cancer, was given morphine injection to control his severe and continuous pain for one day in a dose of 10mg every 4 hours, and once or twice a day, thereafter for the last month. Sometimes, 50mg morphine tablet was given orally when injection was not available.
When morphine ran short, the patient was given an injection of another opioid. He did not get satisfied. Instead, he became nervous and restless. He began to yawn frequently and to sweat profusely with running of the eyes and nose. The pupils started to dilate.
What is the reason for the patient's condition? What could be the nature of the second injection he received?

Problem No. 31 (Non-narcotic analgesics)

A 60-year old patient with a history of myocardial infarction and unstable angina pectoris. His doctor prescribed for him a dose of 75-100mg of aspirin daily.
What is the rationale behind prescribing such a dose of aspirin?
Could such a dose have a harmful effect on the GIT?
Discuss the other principal effects of aspirin.
Can paracetamol be used instead of aspirin for this patient?

Problem No.32 (Non-narcotic drugs)

A known case of female patient with osteoarthritis, her physician prescribed for her indomethacin capsule, 50mg (2 capsules) three times daily with a good response of pain and stiffness. With continuing treatment, she had epigastric pain, heartburn and vomiting.
What do you think the cause of her complaint?
How can you minimise these adverse effects?
What other adverse effects may indomethacin have?
Are there NSAIDs with least adverse effects on the GIT?

Problem No. 33 (Gout)

A 50-year old man who developed severe pain in the joint of his big toe at night. The joint was red, swollen and tender. The doctor suspected an acute attack of gout and confirmed the diagnosis by elevated serum uric acid.
How do you treat such an acute attack?
Is allopurinol a suitable drug to start with?
Can further attacks be prevented?

Prblem No.34 (Antirheumatic drugs)

A 45-year lady was admited to the hospital, complaining from pain, swelling and stiffness in the joints of the fingers and wrists. Investigations showed high titre of rheumatoid factor and high serum IgG. She was diagnosed to have rheumatoid arthritis.

What are the lines of treatment? Slow acting anti-rheumatic drugs (SAARDs) or disease modifying antirheumatic drugs (DMARs) are prescribed under strict medical supervision; why? Comment on the drug that is effective and least toxic among these groups.

Problem No.35 (Migraine)

A 32-year old lady who frequently visited her doctor for severe headache. She noticed an abnormal visual disturbances, nausea and vomiting before headache starts. She described her headache as throbbing and distressing. She reported to her doctor that attacks of headache are triggered or become worse during anxiety or by some types of food.

What is the possible diagnosis? How would you treat such condition? Can such headache be prevented?

Problem. 36 (General anaesthesia)

A 40-year old patient underwent after a good preoperative preparation, an abdominal surgery. He received an intravenous injection of a general anaesthetic drug, which the anaesthetist made sure that it is in the vein and not in the artery. The patient lost consciousness within 10 seconds with hypotonia and slight decrease in blood pressure. The anaesthesia is of short duration and therefore it is maintained by two inhalational anaesthetics: nitrous oxide and another inhalational anaesthetic. The latter is considered as a potent anaesthetic but has poor analgesic and muscle relaxant properties and can produce cardiac arrhythmias although it is non-flammable and non-explosive.

Try to explain each of the above mentioned steps.

Which general anaesthetic is used in this case?

What is the role of muscle relaxant in this type of surgery?

Problem No.37 (Local anaesthesia)

A patient required local infiltration anaesthesia to remove an ingrowing nail. The surgeon had a choice of six local anaesthetics: lignocaine, bupivacaine, amethocaine, procaine, mepivacaine, cociane.

Which one do you think is suitable for this patient?

Can you use adrenaline with the local anaesthetic in this case?

Why should local anaesthetics not be injected into infected or traumatized tissue?

Problem No. 38 (Neuromuscular blocking drugs)

A 40-year old man was admitted to the intensive care unit after a car accident. He was intubated to relieve respiratory distress. To facilitate intubation, the doctor instructed the nurse to give pancuronium 0.1 mg/Kg i.v.

In which conditions is the use of pancuronium contraindicated? What are the side effects of pancuronium? Which drugs can potentiate the effects of pancuronium?

Problem No. 39 (GIT)

A 36-year old man with indigestion following meals, treated himself with one table spoonful of sodium bicarbonate (dissolved in water) which relieves his symptoms. Over several months period he developed a different type of abdominal pain in his epigastrium, which often awakened him at night.

He treated himself with same remedy which makes him feels better, he also noticed that his ankle began to swell. He consulted his doctor for this pain and diagnosed as DU.

Explain why did his ankle swell?

What are the drugs used in treatment of DU?

Problem No. 40 (GIT)

A young woman was bothered by retrosternal pain of reflux oesophagitis, she consulted her doctor who gave her an injection and some tablets. On the second day, she suddenly developed a painful spasm of the muscle of the neck and trunk with a painful twist of the head toward the right. What happens?

The student should be able to link these side effects to the drugs.

Problem No. 41 (Bronchial asthma)

A patient is complaining of episodes of coughing (unproductive), wheezing, chest tightness and shortness of breath. Symptoms are worsened at night. The diagnosis of bronchial asthma was made. The following drugs are available:

Inhaled bronchodilators, inhaled corticosteroids, oral and injectable theophylline and related preparations and cromoglycate.

Is there any difference between short and long beta-2 stimulants?

Before injecting aminophylline, what drug inquiry you should make?

What is the role of corticosteroids, oral and inhaled, in treatment of acute and chronic bronchial asthma?

Are there other causes of dyspnoea apart from bronchial asthma?

Do you use cromoglycate for treatment of acute attack of asthma?

Problem No.42 (Diuretics)

A hypertensive patient receiving for the last 3 months one of the antihypertensive drugs. He was admitted to the medical unit after a severe attack of gastroenteritis, complaining of muscle weakness (flabby muscles), distended abdomen with absent peristaltic sounds and ECG findings of depressed ST segment and flat T wave.

What is the most likely cause of the patient symptoms and signs?

Which antihypertensive drug, the patient might be using? What are its other indications?

How does this drug interact with gastroenteritis to result in the patient condition?

Name other drugs that increase or decrease this condition.

Problem No.43 (Antihypertensive drugs)

A 46-year old taxi driver was diagnosed as having high blood pressure (BP 170/100). Since he has family history of diabetes mellitus, the doctor asked for blood sugar and it was 240mg/dL. Antihypertensive drug was started.
What do you think such drug would be?
Three weeks later the patient started to have some abnormal sensation in the pharynx associated with dry cough particularly at night, without fever. What was going on? The student should relate side effects to the administration of drugs.

Problem No.44 (Antiarrhythmic drugs)

A 55-year old woman with a history of ischaemic heart disease. She came with palpitation and getting fatigue on walking for a short distance. On examination the pulse was irregular. ECG was done, and the diagnosis of atrial fibrillation was made.
How would you treat her condition?
Why did her doctor start her on warfarin?

Problem No.45 (Antiarrhythmic drugs)

A 42-year old man is apparently normal apart from having palpitation. This happened more than three times a day. He consulted a physician, asked for an ECG during the attack of palpitation, but this was not sucsseesful. The palpitation becomes more frequent and in one time associated with dyspnoea and fainting. ECG during this attack showed ventricular ectopics.
The list of drugs available in the hospital pharmacy includes:
Lignocaine, mexiletine, disopyramide and amiodarone.
What is your drug of choice?

Problem No.46 (Antiarrhythmic drugs)

A 35-year old patient who suddenly started to feel distressed with some difficulty in breathing and palpitation. On examination, the heart rate was rapid and measures 180/min. ECG was done. The diagnosis of supraventricular tachycardia was made.
What are the lines of treatment as an emergency case?
What is the treatment if the condition recurs (paroxysmal SVT)?

Problem No.47 (Drugs in Hyperlipidemia)

A 60-year old man, smoker with history of ischaemic heart disease; his serum cholesterol was 270 mg/dl.
Is it necessary to lower his serum cholesterol?
What measures might you follow to lower the level of cholesterol?
What is the relationship between lipoproteins, particularly HDL and Cholesterol?

Problem No.48 (Heart failure)

A 65-year old man was admitted to the medical unit after an acute myocardial infarction. Since his admission, he had complained of worsening fatigue, orthopnoea and paroxysmal nocturnal dyspnoea. His pulse is irregular. The clinical, radiological and ECG findings suggest congestive heart failure with atrial fibrillation.
What drugs might be used to treat this condition?
If diuretics are used, how would these drugs interact with digoxin and captopril?
Comment on the use of digoxin in heart failure.

Problem No. 49 (Anticoagulant drugs)

A 60-year old female developed pulmonary embolism postoperatively. Medical therapy started with i.v. injection of a loading dose (10,000 units of heparin) followed by i.v. infusion of 15-25 units/Kg/hr.

1. **Why is heparin given and not warfarin?**
2. **How can you assess your treatment?**
3. **What possible side effects do you expect, how can you manage?**
4. **What are the contraindications of anticoagulants therapy ?**

Problem No. 50 (Drugs and blood coagulation)

A 35-year old woman suffered from menorrhagia after inserting IUCD (Intrauterine contraceptive device). The doctor prescribed to her antibiotics and other drugs.

1. What are the drugs that stop bleeding in general? How do they act?

2. What are their other clinical indictions?

Problem No. 51 (antianaemic drugs)

A 25-year patient in the third month of pregnancy, visited a prenatal clinic complaining of early morning nausea, vomiting and anorexia with loss of energy, palpitation and pallor, was diagnosed as iron deficiency anaemia.

1. **How would you treat such condition?**
2. **Comment on the interaction of iron.**
3. **What are the indications of parenteral iron therapy?**

Problem No. 52 (Antimicrobial drugs)

A 20-year old manual worker developed severe cellulitis of the hand with axillary lymph node enlargement. Try to choose the suitable antibiotic for this patient. Would this treatment change if the patient has penicillin allergy?

Problem No.53 (Antimicrobial drugs)

A 20-year old male had gonorrhoea. Both tetracycline and amoxycillin (with probenecid) were prescribed for him to be taken simultaneously. The student should give his account on the type of drugs used, the type of dose in treatment of GC, and the alternative drugs that can be used in its treatment.

Problem No.54(Antimicrobial drugs)

A 10-year old child with acute tonsillitis was given cefotaxime 0.5 gm twice daily. Discuss the suitability of this treatment.

Problem No.55 (Antimicrobial drugs)

A young patient with sickle cell disease developed high fever, pain at the tibial side below the left knee. The area was red and tender, X-ray revealed signs of osteomyelitis.

The student should be able to discuss: The relationship between osteomyelitis and sickle cell anemia and the drugs which are effective. Discuss in terms of distribution, side effects and the causative microorganism.

Problem No.56 (Antimicrobial drugs)

A 40-year old lady admitted to the hospital for acute pyelonephritis on treatment. She has a history of repeated similar attacks. On the seventh day she developed difficulty in hearing. Explain the possible cause of this side effect on the basis of pharmacokinetic alteration of the drugs by the disease.

Problem No. 57 (Antimicrobial drugs)

A 35-year old man presented with high fever, headache and loss of appetite. Inspite of regular use of paracetamol, he was still running high fever. Typhoid fever was suspected because he has a young sister having the disease two weeks ago. Widal test was performed twice and a rising titer was reported. Ciprofloxacin was given in a dose of 500 mg twice daily.

a. Is that a right choice?
b. What alternative drugs can be used?
c. Are the dose and duration of treatment important?

Problem No.58 (Tuberculosis)

A 37-year old patient consulted his physician complaining of malaise, anorexia, night sweat, cough and haemoptysis. His X-ray findings and sputum for AFB confirm the diagnosis of pulmonary tuberculosis.

a. What is your treatment strategy in such case?
b. Screening other family members for the disease, reveals that his 6 year old child had also the infection. Would you apply the same treatment course?
c. What chemoprophylactic measure might be taken for the exposed persons in the same family?

The student should be aware that multi-drug therapy is a must in treatment of tuberculosis, and of various regimens of treatment including DOT therapy. The student should also know the different adverse reactions to anti-tuberculosis drugs.

Problem No. 59 (Amoebicides)

A 25-year old patient consulted his physician complaining of recurrent attacks of abdominal cramps, mild nausea and offensive loose bowel motion with passage of mucous and streaks of blood in the stool. Stool examination shows motile trophozoites of E. histolytica.

What is the suitable drug(s) in such a case?

The student should know the treatment course of amoebiasis with particular emphasis on the subject that tissue amoebicide is not enough alone but should be followed by luminal amoebicide; drugs used for the treatment of extra-intestinal amoebiasis; and the role of antibiotics in amoebiasis.

Problem No. 60 (Aantimalarial drugs)

A business man returned from Sudan with attacks of fever and rigor on every other day. His doctor suspected malaria and started him on antimalarial drugs: chloroquine, his temperature declined over the next day (after 16hours) but rose

again sharply. Thinking this was treatment failure, his physician asked for a blood film which revealed P. falciparum.
Why did this patient not respond to chloroquine?
What is the proper way of treating such a case?
Can you arrange a chemoprophylactic program for travelers to areas endemic with malarial parasite?

Problem No.61 (Anti-fungal drugs)

A 25-year old woman noticed that there is brownish discoloration of her middle and index finger-nail plate. Her dermatologist observed cracking of the adjacent skin and the nail plates lost their translucency and were easily broken. Culturing of fragment of the affected nails revealed fungal infection by dermatophytes (onychomycosis).
What is the suitable drug in such a case?

Problem No.62 (Antiviral drugs)

An asthmatic patient on steroid therapy consulted his physician complaining of acute pain and paraesthesia on his left loin. The physician noticed that the area was erythematous and there is a crop of vesicles spread unilaterally on the same area. The physician diagnosed the condition as herpes zoster (shingles).
What is the suitable drug in this case?

Problem No. 63 (Anthelminthic drugs)

A 6-year old child complaining of pruritis ani (itching around anal region). Her mother noticed small whitish worms in her stool. The family doctor prescribed an elixir (10 ml as a single daily dose for 7days). The child responded well to this treatment but her condition recured after 3 weeks. The doctor then prescribed a chewable tablet as a single dose and the child got better and worm free for a couple of weeks. However, the condition recurred again.
What is the problem?
What are the types of drugs prescribed for the child?
Can they be used for a child below 2 years of age?
Why did the condition recur after the initial response?

Problem No. 64 (Anthelminthic drugs)

A young patient had the following features in sequence, dermatitis (ground itch), paroxysmal cough with blood stained sputum with patchy consolidation in the lung, vomiting and epigastric pain, sometimes frequent stools, anemia and hypoprotienemia, and retarded physical and mental development.
Investigations revealed iron deficiency anemia, occult blood in the stool with ova of certain type of worms. What worm infestation could it be? What drugs available for your choice?

Problem No. 65 (Corticosteroids)

A 20-year old female patient presented with fever, malaise, anorexia, weight loss and painful knee joints. On examination, the knee joints were red, warm and tender with facial eruption of butterfly distribution. She was diagnosed as systemic lupus erythematosus (SLE) and an oral corticosteroid was given.
What could be the name of such corticosteroid?
What is the mechanism of action of corticosteroids in treatment of SLE?

What information should you tell the patient regarding the use of corticosteroids?

Problem No. 66 (Corticosteroids)

A known case of bronchial asthma (female, 24-year old) on prednisolone tablets for the last one year. She consulted her physician when a wound on her leg becomes infected and does not heal. She looks obese, having round face and protruding abdomen. Her arms and legs are thin and covered with bruises. She has not menstruated for several months. She is worried about her facial hair and atrophied breasts.

What do you think this syndrome to be? Why does it occur?

Mention the name of steroids that are given by inhalation. Do they cause such a syndrome?

What are the other side effects of corticosteroids?

Problem No. 67 (Diabetes mellitus)

A 38-year old obese female, is complaining of fatigue and leg cramps. She awakens 2 - 3 times at night to void. Recently, she complained of vulvular itching (pruritus vulvae). Her blood and urine investigations confirmed that she had type II diabetes mellitus.

What are the lines of management of such case?

If you decide to give oral antihyperglycemic drugs, which group do you choose first?

Do you change her drug(s) if she becomes pregnant?

Problem No.68 (Diabetes mellitus)

A 35-year old manual worker, was admitted to the emergency unit in a comatose state. By history, he was found to be diabetic for the last 20 years and is on insulin therapy. His brother claimed that he took the morning dose of insulin without breakfast and went to his job. He was diagnosed as case of hypoglycaemic coma.

What is the possible cause of his hypoglycaemic coma?

What are the warning symptoms of hypoglycaemia?

What are the drugs that can be used to treat his condition?

Problem No.69 (Antithyroid drugs)

A 40-year old woman, had a recent unexplained weight loss despite an increased food intake and good appetite. She is complaining of sweating, intolerance to heat, tremor, nervousness, diarrhea and easily getting fatigue. On consulting her doctor, investigations showed high level of T3 and T4.

What are the lines of treatment of such a case?

What are the advantages and disadvantages of each group of drugs used in this patient?

What warnings should be given to the patient when carbimazole is prescribed?

What is your decision if this patient becomes pregnant?

Problem No. 70 (Vasopressin)

A 9-year old child with nocturnal enuresis. Desmopressin was described for him.

What is desmopressin? What is its mechanism of action, route of administration and duration of treatment in such condition?

Are there other drugs that can be used in treatment of nocturnal enuresis?

What are other clinical uses of vasopressin and its analogues?

Problem No.71 (Drugs acting on the uterus)

A 25-year old pregnant woman, had two children and was post for date. She had no pain and fetal movement became weak. On consulting her doctor she admitted her to the hospital for induction of labor and intravenous infusion was started.
What is the drug of choice in such condition?
What are the other drugs that can be used for induction of labor?
What are the differences between oxytocin and ergometrine?

Problem No. 72 (Sex hormones)

A 30-year old infertile female, consulted her gynaecologist for lower abdominal pain, pelvic discomfort, dysmenorrhoea and menorrhagia. She was diagnosed as a case of endometriosis and danazol was prescribed.
Why is this drug prescribed for such a case? What is its mechanism of action?
Mention other clinical uses of danazol.
Are there other drugs that can be used in treatment of endometriosis?

Problem No.73 (Contraceptive pills)

A 30-year old married woman developed hypertension (160/110). She has completed her family and consulted her gynaecologist for contraception. A contraceptive pill was prescribed to her.
What type of pill might have been prescribed for her and why?
Is there any drug interaction between contraceptive pills and antihypertensive drugs?
What are other drug interactions with contraceptive pills?
Discuss the mechanism of action of contraceptive pills?

Problem No. 74 (Cytotoxic drugs)

A 35-year old patient on cytotoxic therapy for treatment of lymphoma. He developed haematuria.
What are the possible causes of this haematuria? Could it be drug-induced?
Which cytotoxic drug(s) commonly cause such adverse effect?
Could such effect be prevented and how?

Problem No. 75 (Cytotoxic drugs)

An old man with scaly and rough skin growth on his face and scalp for several years with a long history of sun exposure. He was diagnosed as the precancerous actinic keratoses[figure 75] . Skin protection from the sun is recommended with prescription of topical 5-fluorouracil.
What is 5-FU?
What is its mechanism of action and adverse effects?
Could it be given parenterally?

Problem No.76 (immunosuppressant drugs)

Renal transplantation has been performed to a 30 year old female. Postoperatively, she has been put on an immunosuppressant medication.
For what reason(s) these drugs are used?
What are the possible immunosupressant drugs that could be used in this case? Which one you prefer? What are the hazards of such medications?