

UNIVERSITI SAINS MALAYSIA

PROGRAM SARJANA FARMASI
SEMESTER II 1994/95

APRIL 1995

FCP 552: FARMAKOTERAPEUTIK II

(2 HOURS)

This examination consists of two sections.

Section A consists of 50 multiple choice questions.

Section B consists of two(2) long questions.

Answer ALL question.

Answers to section A must be entered into the scripts provided.

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Section A

Mark (/) the answers on the opposite space corresponding to a correct or most appropriate answer for each question. Each question has only one correct or most appropriate answer or statement.

Q1. Given that a drug 'A' is a weak acid, approximately 90% bound to plasma proteins, hepatic extraction ratio $E < 0.3$ and about 2% eliminated unchanged in the urine. Which of the following would you expect to occur with drug 'A' in a patient with renal failure.

- A. The binding to alpha-acid glycoprotein would be decreased.
- B. There will be no change in oral bioavailability
- C. There will be an increase in total drug clearance.
- D. A dosage change will be required based on renal function.

Q2. Which of the following statements is not true regarding requirement for dosage adjustment in renal failure?

- A. Theophylline is only about 8% excreted unchanged in the urine, therefore it does not require dosage adjustment.
- B. Dosage adjustment for phenytoin is not required because only less than 5% is excreted unchanged in the urine.
- C. Both procainamide and its active metabolite accumulate in renal failure and require a reduction in maintenance dose.
- D. The loading dose of digoxin should be reduced because of decreased volume of distribution.

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Q3. Which of the following is/are not likely to affect drug disposition in renal failure?

- I. Concomitant use of phosphate binders or calcium supplements.
- II. Increased in salivary urea levels.
- III. Reduced gastric emptying.
- IV. Increased in hepatic metabolic activity.

- A. I and III only.
- B. I, II and III only.
- C. II and IV only.
- D. IV only.

Q4. Which of the following statements concerning fluid replacement(s) is/are true?

- I Colloid is better than crystalloid for intravascular replacement.
- II Colloids is associated with allergic reactions.
- III Dextrose 5% is a crystalloid.
- IV Colloid is better than crystalloid for interstitial rehydration.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q5. Which of the following drug classes is/are most often implicated in acute interstitial nephritis?

- I. NSAIDs.
 - II. ACE inhibitors.
 - III. Antibiotics.
 - IV. Radio contrast agents.
-
- A. I and III only.
 - B. II and III only.
 - C. II and IV only.
 - D. I, II and III only.

Q6. Which of the following management(s) of head injury is/are true?

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- I Mannitol is used to treat cerebral edema.
 - II Hypercapnia can increase intracranial pressure (ICP).
 - III Dextrose 5% is a good resuscitation fluid.
 - IV Hypotension is necessary to reduce intracranial bleeding.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. IV only.

Q7. Which of the following statements regarding nephrotic syndrome is true?

- A. The most common form seen in adults is the minimal change disease.
- B. It is characterised by albuminuria, hypoalbuminemia, hyperlipidemia, edema and hypertension.
- C. It is almost always responsive to corticosteroid therapy.
- D. Diuretics like frusemide which are heavily protein-bound may show diminished effect.

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Q8. Which of the following statements regarding acid-base status is/are true?

- I In metabolic acidosis the standard HCO_3 is low.
 - II In respiratory alkalosis pH is high.
 - III Metabolic alkalosis is associated with hypokalaemia.
 - IV In respiratory acidosis, ratio of $\text{HCO}_3/\text{PCO}_2$ is increased.
- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q9. Which of the following statements regarding hyponatraemia is/are true ?

- I It should be rapidly corrected.
- II It is a feature of SIADH (Syndrome of inappropriate anti diuretic hormone).
- III It is often seen in ^{diabetes} dibetes insipidus.
- IV It could aggravate cerebral edema.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q10. Which of the following are true about the hyperlipidemia in nephrotic syndrome?

- I The low plasma oncotic pressure is one of the postulated causes.
- II Low density lipoproteins and cholesterol are the most frequently elevated forms of lipids.
- III The triglyceride level is usually not affected.
- IV It may resolve with the resolution of proteinuria.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q11. Which of the following statements are true about the treatment of nephrotic syndrome?

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- I It should be based on the histologic subclass of the disease.
 - II Corticosteroids are effective in minimal change disease.
 - III Patients most likely to benefit from antiplatelet therapy are those with membranoproliferative glomerulonephritis.
 - IV Children are particularly resistant to corticosteroid therapy.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

Read the following case and answer questions 12 through 15.

A 32-year old female was admitted to the hospital complaining of facial puffiness, leg edema and general feeling of lethargy. Physical examination was unremarkable except for some pallor and edema around her orbits and both her ankles. Initial laboratory examination revealed the following:

24-hour urinary protein	3.0 g
Total protein	50 g/dL
Plasma albumin	32 g/dL
Hemoglobin	7.2 g/dL
Total WBC	3500 mm ⁻³
Blood urea	6.7 μmol/L
Serum creatinine	89 μmol/L
Sodium	132 mmol/L
Potassium	3.5 mmol/L

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Q12. Which of the following statements are true about the above patient?

- I The patient may have nephrotic syndrome even though the 24-hour urinary protein is less than the customary 3.5 g per 24-hour.
- II Urinary loss of ferritin may be the cause of the anemia and this is usually resistant to iron therapy.
- III The patient may also suffer from thyroid abnormality.
- IV Recombinant erythropoietin is the drug of choice for the treatment of patient's anemia.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q13. Which of the following is true about the problem the patient is suffering from?

- A. Infection with encapsulated bacilli is the most common cause of death.
- B. The natural course of the disease can include exacerbations and remissions.
- C. It should always be treated with corticosteroids.
- D. The proteinuria is due to the breakdown in the walls of the renal tubules.

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Q14. Which of the following are possible complications that can occur in the patient?

- I Infections.
- II Anemia resistant to iron therapy.
- III Renal vein thrombosis.
- IV Reduced T₄.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q15. Which of the following are true about the use of drugs in this patient?

- I Alterations in antithrombin III levels that can occur may complicate the use of heparin.
- II The therapeutic range for drugs which are highly protein-bound may be altered.
- III The doses of drugs eliminated primarily by the kidneys must be adjusted.
- IV The thiazides are poor choice over frusemide in the treatment of edema.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q16.. Which of the following conditions can cause polyuria in a critically ill patient?

- I Diabetes insipidus.
 - II Glucosuria.
 - III Recovery phase of acute renal failure.
 - IV Hypotension.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. IV only.

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Read the following case and answer questions 17 through 26.

BD is a 75-year old female admitted to HUSM for severe hypertension and chronic renal failure. Her problems started two weeks prior to admission when she noted some swelling in her legs associated with reduced effort tolerance, dizziness and chest pain.

Physical examinations were significant for a blood pressure of 200/130 mmHg, bilateral basal crepitations in the lungs and gross leg edema which extended to her knees. Initial laboratory revealed the following:

Serum sodium	133 mmol/L
Serum potassium	6.3 mmol/L
Blood urea	46.9mmol/L
Total protein	52 g/L
Albumin	27 g/L
Serum creatinine	654 μ mol/L
Uric acid	699 μ mol/L
Calcium	1.84 mmol/L
Phosphate	3.16 mmol/L

Q17. Which of the following is the most urgent problem in the above patient?

- A. Hyperkalemia.
- B. High serum creatinine.
- D. Low serum albumin.
- E. Low serum calcium.

Q18. Which of the following can potentially aggravate the renal impairment in this patient?

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- I High blood pressure.
 - II High uric acid level.
 - III Low urine output.
 - IV Low serum calcium.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

Q19. Which of the following tests are likely to be abnormal in this patient?

- I Arterial blood gases.
 - II Red blood cell indices.
 - III Platelet count.
 - IV IgG.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

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Q20. Which of the following are appropriate therapeutic objectives for this patient?

- I Correction of hyperkalemic state.
- II Preservation of kidney function.
- III Relief of pulmonary congestion.
- IV Prompt lowering of blood pressure to 120/80 mmHg.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q21. Which of the following are appropriate treatments for hyperkalemia?

- I Insulin/glucose infusions.
- II Sodium bicarbonate infusion.
- III Dialysis.
- IV Potassium binding resins.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

On admission, the patient was started with the following therapy:

Nifedipine	10 mg TDS PO
Frusemide	40 mg STAT and Daily IV
Resonium A	15 g TDS PO
Aluminum hydroxide	I TDS PO
Ferrous sulphate	200 mg BD PO
Multivitamin	I QD PO
Allopurinol	100 mg BD PO

Q22. Which of the following drugs given to the patient needs their doses to be reduced in the setting of renal failure?

- I Allopurinol.
 - II Aluminum hydroxide.
 - III Frusemide.
 - IV Ferrous sulphate.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

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Q23. Which of the following mechanisms contribute to the anemia that occurred in the patient?

- I Reduced red cell survival.
 - II Reduced erythropoiesis.
 - III Dietary inadequacy.
 - IV Reduced ferritin levels.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

Q24. Which of the following are mechanisms for the reduced calcium level in the patient?

- I Reduced gastrointestinal absorption.
- II Failure to form active vitamin D.
- III Increased urinary loss.
- IV Increased bone resorption.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. I, II and IV only.

Q25. Which of the following are true about the use of frusemide in renal failure?

- I It may increase glomerular filtration rate (GFR).
- II It may cause further loss of plasma calcium.
- III It may accumulate and cause toxicity.
- IV Its withdrawal may cause a rebound reduction in GFR.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- . D. I, II and IV only.

Q26. Which of the following drugs is likely to be required by the patient in the course of her renal failure?

- A. Sodium bicarbonate.
- B. Chlorothiazide.
- C. Spironolactone.
- D. Cyclophosphamide.

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Q27. Which of the following is true about lupus nephritis?

- A. It is a very uncommon complication of systemic lupus erythematosus (SLE).
- B. It does not usually cause proteinuria.
- C. Prednisolone is an accepted form of treatment.
- D. It does not usually cause renal failure.

Q28. Which of the following are features of glomerulonephritis?

- I Hematuria.
 - II Proteinuria.
 - III Reduced GFR.
 - IV Hypertension.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. I, II and IV only.

Q29. Which of the following is not a known cause of glomerulonephritis?

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- A. Typhoid.
- B. Hepatitis B.
- C. SLE.
- D. Gold salt.

Q30. In which of the following patients would a loop diuretic be contraindicated, or be used with caution?

- I Diabetics.
 - II Gouty patients.
 - III Patients with hypercalcemia.
 - IV Patients being treated with aminoglycosides antibiotics.
- A. I only.
 - B. II and III only.
 - C. I, II and III only.
 - D. I, II, III, and IV.

Q31. Which of the following drugs is/are capable of producing diuretic effects?

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- I Theophylline.
- II Dopamine.
- III Digoxin.
- IV Dobutamine.

- A. I only.
- B. II and III only.
- C. I, II and III only.
- D. I, II, III, and IV.

Q32. Which of the following statements is/are true?

- I Metolazone is similar in potency to the thiazides, but it is effective in states of renal insufficiency.
- II The duration of action of the IV frusemide is prolonged in renal insufficiency.
- III Frequent and/or high bolus (IV) doses of loop diuretics may result in ototoxicity.
- IV Long acting thiazides (chlorthalidone) produce hypokalemia more predictably than shorter-acting agents.

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- A. I only.
- B. II and II only.
- D. I, II and III only.
- E. I, II, III, and IV.

Q33. Which of the following clinical parameter(s) is/are appropriate for monitoring diuretic therapy?

- I Daily weight.
- II Intake and output measurements.
- III Electrolytes at least on alternate days.
- IV Urea and creatinine.

- A. I only.
- B. II and II only.
- C. I, II and III only.
- D. I, II, III, and IV.

Q34. Which of the followings is/are true regarding the nephron ?

- I It is the basic functional unit of the kidney.
- II It is found in both the cortex and the medulla.
- III It is derived from renal artery.
- IV It produces aldosterone.

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- A. I and II only.
- B. I, II and III only.
- C. IV only.
- D. I,II, III and IV.

Q35. Which the following statements regarding the proximal convoluted tubules is/are true?

- I They reabsorb most of the water and salts of the glomerular filtrate.
 - II They reabsorb all the glucose in the glomerular filtrate.
 - III They contain juxtaglomerular cells.
 - IV They are the main target for antidiuretic hormone
-
- A. I and II only.
 - B. I, II and III only.
 - C. I and III only.
 - D. II and IV only.

Q36. Which of the following statement(s) is/are true?

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- I Potassium is secreted in the distal convoluted tubules.
 - II The juxtaglomerular apparatus cells secrete renin.
 - III The collecting ducts determine the final osmolality of urine.
 - IV Urea is actively secreted by the proximal tubules.
- A. I and II only.
- B. I, II and III only.
- C. I and III only.
- D. I, II, III and IV.

Q37. Which of the following statements regarding the cause(s) of obstructive uropathy is/are true?...

- I Renal stone.
- II Ureteral stricture.
- III Bladder cancer.
- IV Proliferative glomerulonephritis.

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- A. I and II only.
- B. II and IV only.
- C. I, II and III only.
- D. I,II, III and IV..

Q38. Which of the following biochemical changes is/are seen in diabetic acidosis?

- I Low serum bicarbonate.
 - II Anion gap is decreased with high serum lactic acid.
 - III High serum sodium initially.
 - IV Hypokalaemia initially.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. IV only.

Q39. Which of the following statements is/are true?

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- I Renal stone can precipitate pyelonephritis.
 - II Polycystic disease is inherited as an autosomal dominance.
 - III Systemic lupus erythematosus is a cause of nephrotic syndrome.
 - IV Goodpasture's syndrome is a known cause of rapidly progressive glomerulonephritis.
- A. I and II only.
- B. I, II and III only.
- C. I, and IV only.
- D. I, II, III and IV.

Q40. Which of the following statements regarding acute renal failure is/are true (ARF)?

- I Cardiogenic shock is a known cause of ARF.
- II Fluid overload does not occur in established ARF.
- III Vigorous fluid therapy is the treatment of choice in ARF secondary to hypovolemic shock.
- IV Hyperkalaemia is not a complication of ARF.

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- A. I and II only.
- B. I and III only.
- C. II, and IV only.
- D. I, II, III, and IV..

Q41. Which of the following statements regarding chronic renal failure (CRF) is/are true?

- I High protein diet should be given.
- II Hypocalcaemia should be treated with parathyroid hormone.
- III Hyponatraemia is due to low total body sodium.
- IV Hyperpigmentation is a feature of CRF.

- A. I and II only.
- B. I and III only.
- C. I, II and III only.
- D. IV only.

Q42. Which of the following statements are true?

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- I Ampicillin is a known cause of interstitial nephritis.
 - II Papillary necrosis is a cause of renal failure in diabetics.
 - III Aminoglycosides produce non-oliguric renal failure.
 - IV Post-streptococcal glomerular nephritis is due to direct bacterial invasion of the kidneys.
- A. I and III only.
- B. II and IV only.
- C. I, II and III only.
- D. I, II, III and IV.

Q43. Which of the following can be seen in patients with chronic renal failure?

- I Pericarditis.
 - II Hypertension.
 - III Polycythaemia.
 - IV Hypercalcaemia.
- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

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Q44. Which of the following condition(s) can worsen the renal function in a critically ill patient?

- I Septicemia.
- II Prolonged hypoxia.
- III Hypotension.
- IV Severe muscle necrosis.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q45. Which of the following statements regarding peritoneal dialysis is/are true?

- I The use of hypertonic solution may result in hypotension.
- II Peritonitis is a known complication.
- III It is more efficient than haemodialysis.
- IV It is a method of choice in post-laparotomy patients.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q46. The following sign(s) and parameter(s) is/are suggestive of dehydration?

- I Sunken fontanelle.
- II Low pulmonary capillary wedge pressure.
- III High haematocrit.
- IV Bradycardia.

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q47. Which of the followings is/are true concerning hyperkalaemia ?

- I Acute acidosis can aggravate the situation.
- II Tall T wave may be seen on ECG.
- III Patients with chronic renal failure can tolerate higher levels of potassium.
- IV All patients require dialysis.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q48. Which of the followings is/are complication(s) of Haemodialysis?

- I Hypotension.
- II Dysrhythmias.
- III Dysequilibrium Syndrome.
- IV Thrombocytopenia (low platelets)

- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q49. Which of the following reason(s) for starting dialysis is/are true?

- I Very high blood urea.
- II Fluid overload.
- III Hyperkalaemia.
- IV Hypernatraemia.

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- A. I and II only.
- B. I, II and III only.
- C. I, II, III and IV.
- D. IV only.

Q50.. Which of the following statements concerning drug and haemodialysis patients is/are true ?

- I Drugs that are principally excreted by the kidneys are dialysable.
 - II If drugs are dialysable, they should be given after dialysis.
 - III When information about dialysis loss is not available, maintenance dose should be given after dialysis.
 - IV The arterio-venous fistula is a convenient site for routine venous picture and drug administration.
-
- A. I and II only.
 - B. I, II and III only.
 - C. I, II, III and IV.
 - D. IV only.

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Section B

Question 1

Write short notes on the following:

- A. The cause and consequences of heavy proteinuria in nephritic syndrome.

(10 marks)

- B. The roles of cytotoxic drugs in renal disease.

(10 marks)

- C. Pathophysiology and treatment of hypocalcemia in renal failure.

(5 marks)

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Question 2

Pelage et.al. (Antimicrob Agents Chemotherapy, 25:201, 1984) established the following equation to describe ceftazidime clearance in terms of creatinine clearance:

$$Cl_{\text{ceftaz}}(\text{ml/min}) = 0.95 (\text{Ccr}) + 6.59$$

Where Ccr is creatinine clearance.

- (I) What is the appropriate dosage regimen of ceftazidime for treating Pseudomonase sepsis in Mr. AB (Aged 31, weight 70 kg) with a serum creatinine of 299 $\mu\text{mol/L}$? The normal dosage regimen for ceftazidime is 1.0 gram every 8 hours.

(12 marks)

- (II) Comment on the clinical use of the above equation in individualizing therapeutic regimen.

(8 marks)

- (III) Describe the advantages and disadvantages of either prolonging the dosing interval or reducing the drug dose in dosing adjustments in renal failure.

(5 marks)