

- 12- Which of the following statements is/are true about the refeeding syndrome:
- a- It is one of the complications of the long-term PN.
  - b- It is associated with a sharp decrease in phosphate, potassium and magnesium levels after the initiation of the PN.
  - c- It is potentially fatal.
  - d- A,b.
  - e- B,c.

- 13- Which one of the following terms describes a change in the lipid component of the PN that renders it NOT suitable for use

- a- Light creaming.
- b- Heavy creaming.
- c- Coalescence.
- d- All of the above.
- e- None of the above.

## Clinical Pharmacy

- 14- The use of extended release oxybutynin is associated with less adverse effects than immediate release preparations due to:

- a- Lower oxybutynin concentration when the extended release preparation is used.
- b- Lower oxybutynin bioavailability when the extended release preparation is used.
- c- Lower bioavailability of the active metabolite N-desethyloxybutynin when the extended release preparation is used.
- d- A,c.
- e- B,c.

- 15- In the critically-ill premature neonate; which of the following routes of administration should be avoided:

- a- IM.
- b- Oral.
- c- Topical.
- d- A,b.
- e- All of the above.

- 16- For an immobile geriatric patient on warfarin therapy and whom green leaves intake is limited because of their high vitamin K content, the most appropriate drug used for bladder overactivity is:

- a- Oxybutynin IR.
- b- Tolterodine IR.
- c- Tropsium chloride.
- d- Solifenacin.

Student name: .....

**NOTE: For questions 1 and 2; please fill in the following answer sheets.**

**QUESTION 1 (Multiple choice)**

1-	11-	21-	31-	41-
2-	12-	22-	32-	42-
3-	13-	23-	33-	43-
4-	14-	24-	34-	44-
5-	15-	25-	35-	45-
6-	16-	26-	36-	46-
7-	17-	27-	37-	47-
8-	18-	28-	38-	48-
9-	19-	29-	39-	49-
10-	20-	30-	40-	50-

**QUESTION 2 (True or False)**

1-	6-	11-	16-	21-
2-	7-	12-	17-	22-
3-	8-	13-	18-	23-
4-	9-	14-	19-	24-
5-	10-	15-	20-	25-

GR is a 90 kg, 65 yr old man, who developed tender swelling in the right knee approximately 1 yr ago. Since then he has experienced intermittent pain in the right knee and hip. He has experienced morning stiffness that is worsened by inactivity. His pain, however, is increased significantly with movement. He was controlled with paracetamol, but now the pain is not controlled any more even with the maximum dose of paracetamol. Examination revealed limitation of movement of the right hip joint and tenderness at the right knee joint. His medical Hx includes hypertension, hyperlipidemia, and stable angina, and a previous NSAIDs associated complicated ulcer. He is a heavy smoker and a heavy alcohol drinker. His current medications are: lisinopril, aspirin, omeprazole, misoprostol, paracetamol, and simvastatin.

Please answer the questions from 8-10:

- 8- The maximum daily dose of paracetamol in this patient should not exceed
- a- 4 g.
  - b- 2.6-4 g.
  - c- 2 g.
  - d- None of the above.
- 9- A good pharmacological option for this patient is:
- a- A nonselective systemic NSAID + capsaicin.
  - b- A COX 2 inhibitor + capsaicin.
  - c- Intraarticular hyaluronate injection + capsaicin.
  - d- Intraarticular corticosteroid injection + capsaicin.
- 10- The single most important intervention to limit the need for hip replacement therapy in this patient is:
- a- Weight reduction.
  - b- Strengthening exercises.
  - c- Education and advice.
  - d- Glucosamine therapy.
  - e- All of the above.
- 11- In neonates:
- a- Distribution may be altered as a result of immature liver function.
  - b- Volume of distribution of fat soluble drugs is usually larger in full term neonates compared to preterm neonates.
  - c- Volume of distribution of water soluble drugs is usually smaller in full term neonates compared to preterm neonates.
  - d- A,b.
  - e- All of the above.

**Question 1 (60 marks) :**

**Please encircle the most appropriate answer:**

Mr MA is a 67 yr old man who presented to the emergency department at 8 am after he noticed a sudden onset of weakness in his arm, difficulty saying "good morning" to his wife and right sided facial weakness when he woke up at 7:15 am. Upon examination, his blood pressure was 175/100. He had no nausea, vomiting nor headache. His past medical history includes only hypertension and hyperlipidemia. His medication Hx includes ramipril and atorvastatin.

Please answer the questions from 1-4.

- 1- The most likely diagnosis for his condition is ischemic stroke. Yet the best procedure to confirm the diagnosis is:
  - a- Coagulation studies.
  - b- ECG
  - c- Brain CT scan
  - d- Brain MRI.
  - e- All of the above.
  
- 2- The following statement is true regarding hypertension in this patient:
  - a- Lowering blood pressure in this patient is not indicated whether he is a candidate for fibrinolytic therapy or not.
  - b- Nitroprusside is the best blood pressure lowering agent to be used in this patient due to its very short duration of action but blood pressure should be lowered over hours.
  - c- Blood pressure lowering is only indicated if this patient needs fibrinolytic agent as hypertension carries a significant risk for cerebral hemorrhage.
  - d- None of the above.
  
- 3- The diagnosis of ischemic stroke was confirmed in this patient. ECG was done and atrial fibrillation was excluded. No contraindications to fibrinolytic therapy was shown. The emergency treatment for this patient should be as follows:
  - a- Blood pressure lowered to target, aspirin 325 mg given, and t-PA 0.9 mg/kg infusion over one hr is to be administered with the first 10% of dose given as bolus.
  - b- Blood pressure lowered to target, and t-PA 0.9 mg/kg infusion over one hr is to be administered with the first 10% of dose given as bolus.
  - c- Blood pressure lowered to target and aspirin 325 mg is given but t-PA will not be beneficial.

- d- Aspirin 325 mg given then t-PA 0.9 mg/kg infusion over one hr is to be administered with the first 10% of dose given as bolus.
- e- t-PA 0.9 mg/kg infusion over one hr is to be administered with the first 10% of dose given as bolus. No blood pressure lowering nor aspirin are indicated at this stage of treatment.

- 4- For secondary prevention, the following statement is true:
- a- This patient should continue using ramipril, atorvastatin but warfarin should be added to maintain an INR of 2.5.
  - b- A diuretic should be added to his antihypertensive drug therapy in addition he should also take atorvastatin and warfarin to maintain an INR of 2.5.
  - c- The patient should take ramipril + atorvastatin+ aspirin or clopedogril.
  - d- The patient should take ramipril + diuretic+ atorvastatin + aspirin or clopedogril.

5A is a 60 yr old woman complains of frequent urinary urges that leads to urine leakage. During the day and night she urinates 8-10 times. Her urinalysis and blood chemistry are all normal. Urinary leakage is not worsened by physical activity. No postvoid residual volume was found on bladder catheterization. The patient medical history includes hypertension which is controlled by lisinopril. She has no adverse effects with her medication except for dry cough that is tolerable.

Please answer the questions from 5-7.

- 5- The most probable cause for the patient's condition is:
- a- Urinary tract infection.
  - b- Urethra overactivity.
  - c- Increased intra-abdominal pressure as a result of the cough produced due to lisinopril use.
  - d- Detrusor muscle instability.
- 6- An appropriate option for treatment in this patient is:
- a- Doluxetin<sup>e</sup>.
  - b- Tolterodine LA.
  - c- Phenylephrin<sup>2</sup>.
  - d- Stopping lisinopril and using an ARB for hypertension and topical estrogen for incontinence.
- 7- In the following drug list; which drug is more likely to aggravate the condition in this woman:
- a- A diuretic.
  - b- Imipramine.
  - c- A calcium channel blocker.
  - d- A.c.

- 17- The single most important modifiable risk factor for ischemic stroke is:
- a- Atrial fibrillation.
  - b- Diabetes.
  - c- Hypertension.
  - d- Cigarette smoking.
- 18- Which one of the following drugs is given intra-articularly to provide both anti-inflammatory effects as well as to improve the viscosity of the synovial fluid in patients with osteoarthritis:
- a- Corticosteroids.
  - b- Hyaluronate.
  - c- Glucosamine.
  - d- A,b.
  - e- A,c.
- 19- Monitoring of hepatic function is needed for patients receiving any of the following drugs EXCEPT:
- a- Acetaminophen, especially upon the chronic use of  $\geq 4$  g/day.
  - b- Lithium.
  - c- Fibrates.
  - d- Statins.
- 20- Which one of the following laboratory changes is not well matched with the causative agent/condition:
- a- Prolonged PT – late onset hemorrhagic disease of the new born.
  - b- Increased CRP – osteoarthritis.
  - c- Hypercalciuria – furosemide.
  - d- Hypomagnesemia- amphotericin B.
- 21- Obesity is associated with increased risk of:
- a- Osteoarthritis.
  - b- A need for hip-replacement surgery in patients with osteoarthritis.
  - c- Ischemic stroke.
  - d- B,c.
  - e- All of the above.
- 22- Which of the following drugs is not well matched with the appropriate monitoring parameter:
- a- Warfarin – prothrombin time.
  - b- Glucosamine – blood glucose.
  - c- Digoxin – drug levels.
  - d- Niacin – drug levels.

24- All of the following are beneficial effects of steroids in cases of bronchopulmonary dysplasia EXCEPT:

- a- Reduction of elastase production.
- b- Enhancement of B-adrenoreceptor activity.
- c- Enhancement of surfactant production and lung maturation.
- d- Reduction of the risk of interstitial fibrosis.

25- The following statement is true regarding the use of corticosteroids in the treatment of osteoarthritis:

- a- Systemic steroids are used when joints with effusions are painful and swollen.
- b- Local adverse effects of intraarticular steroids include osteoporosis and osteonecrosis.
- c- Branched esters of triamcinolone and methylprednisolone are preferred intracuticular because of their low solubility.
- d- A, b.
- e- B, c.

26- All of the following are indications for the central administration of PN EXCEPT:

- a- Long term PN.
- b- Hypertonic PN.
- c- High risk of sepsis.
- d- Large volumes PN.

27- In patients with respiratory distress syndrome:

- a- The functional residual capacity is decreased.
- b- Surface tension is increased during expiration.
- c- Pulmonary edema may be present with impaired gas exchange.
- d- A, c.
- e- All of the above.

L.D., an 800-g male, was precipitously born at 27 weeks' gestational age. One hour after birth, L.D. seems cyanotic and has retracting respirations with nasal flaring. HR is 160 beats/minute and RR is 65 breaths/minute. An arterial blood gas (ABG) on 100% oxygen by nasal cannula is as follows:  $PCO_2$ , 50 mmHg;  $PO_2$ , 53 mmHg. L.D. is intubated immediately and placed on mechanical ventilation. Ampicillin and gentamicin are ordered IV to rule out sepsis.

Please answer the questions from 27-32.

28- This patient is classified as:

- a- Low birth weight neonate.
- b- Very low birth weight neonate.
- c- Extremely low birth weight neonate.

33- All of the following factors can increase the risk of calcium phosphate precipitation in the PN EXCEPT:

- a- A high PH.
- b- A high temperature.
- c- The use of calcium chloride instead of calcium gluconate.
- d- The use of potassium acid phosphate instead of dipotassium phosphate.

34- Lipid emulsions:

- a- Can be administered directly through the peripheral veins.
- b- Should be protected from light to prevent coalescence.
- c- 20% is preferred over 10% due to the higher amount of fatty acids provided in lower volumes especially in pediatrics.
- d- Two of the above statements are correct.

35- Which of the following conditions may lead to hypokalemia:

- a- Renal failure.
- b- Concomitant use of amiloride with ACE inhibitors.
- c- Addison's disease.
- d- Administration of salbutamol.
- e- Diabetic ketoacidosis.

36- Late onset vitamin K deficiency bleeding:

- a- Usually occurs between 2-12 weeks of age.
- b- Is more common in breast-fed children.
- c- Is more common in patients with frequent hospitalization for infectious diseases.
- d- A, b.
- e- All of the above.

37- The use of topical estrogen in the management of urinary incontinence is:

- a- Recommended for women with urge UI with urethritis or vaginitis.
- b- Recommended for women with overflow UI but it is marginally effective.
- c- More effective when used in combination with alpha agonists in stress UI compared to the use of alpha agonists alone.
- d- A, b.
- e- A, c.

38- All of the following statements regarding compounded parenteral nutrition formulations are true except:

- a- The patient's special requirements of the different nutrients should be considered.
- b- The chemical and physical compatibility of the different components of the mixture should be considered.



**28- The patient's condition might have been prevented by:**

- a- Suppression of premature labor by drugs that inhibit uterine contractions.
- b- Maternal administration of corticosteroids.
- c- Maternal administration of surfactant.
- d- A,b.
- e- B,c.

**29- The following statement is true regarding this patient:**

- a- This patient should have been given exogenous surfactant within the first 30 minutes after birth.
- b- The patient's oxygen therapy should not be continued to decrease the risk of oxygen toxicity.
- c- This patient has multiple risk factors for bronchopulmonary dysplasia.
- d- The patient should have been tested for infection before antibiotics were given.
- e- A,b.
- f- A,c

**30- Compared to full term neonates this patient carries a high risk of :**

- a- Bronchopulmonary dysplasia.
- b- Disability and death.
- c- Hemorrhagic disease of the new born.
- d- A,b.
- e- All of the above.

**31- A parenteral nutrition was ordered for this baby. The following should be considered:**

- a- Tyrosine and taurine requirements are reduced in this patient.
- b- High caloric intake should be maintained using dual energy system of 60% fat to 40% glucose.
- c- High caloric intake should be maintained using dual energy system of 40% fat to 60% glucose.
- d- None of the above.

**32- 2 weeks later, the patient was successfully weaned of mechanical ventilation, but he still in a need for oxygen at low concentration. He is fully fed on milk and growing well. One day he was noticed to have a large weight gain and he looks edematous all over. A good choice for this patient could be:**

- a- Digoxin.
- b- Dexamethasone.
- c- Furosemide.
- d- Caffeine.

- c- The mixture should not be left more than 24 hrs at room temperature.
- d- The mixture should be isotonic to prevent complications.

**39- Which of the following drugs doesn't commonly cause hyponatremia:**

- a- Chlopropamide.
- b- Carbamazepine.
- c- Phenytoin.
- d- Oxytocin.

**40- Urethral underactivity is associated with the following symptoms EXCEPT:**

- a- Leaking during physical activity.
- b- Ability to reach the toilet in time following an urge to void.
- c- Small amount of urinary leakage with each episode of incontinence.
- d- Frequency with urgency.

**41- All of the following changes may occur in geriatrics EXCEPT:**

- a- An increase in the constipating effects of TCAs and opioids.
- b- A decrease in the metabolism of lorazepam.
- c- A decrease in the metabolism of theophylline.
- d- An increase in the free levels of warfarin.

**42- The exclusion criteria for the use of alteplase in patients with ischemic stroke includes all of the following except:**

- a- Evidence of intracranial hemorrhage.
- b- Lumbar puncture within 7 days.
- c- History of heparin or warfarin use.
- d- History of intracranial hemorrhage.

**43- B2 agonists:**

- a- Can decrease the duration of oxygen therapy in patients with BPD.
- b- Can facilitate ventilator weaning in children with BPD.
- c- Provide short term improvement of respiratory function in 50% of patients with BPD.
- d- All of the above are correct.

**44- Factors that affect the absorption of drugs in the elderly include all of the following except:**

- a- Lengthened gastric emptying time.
- b- Decreased plasma albumin.
- c- Elevated gastric PH.
- d- Decreased intestinal blood flow.

**Risk of bronchopulmonary dysplasia is increased with:**

- a- Increased degree of prematurity.
- b- Increased duration of O<sub>2</sub> therapy.
- c- Prolonged mechanical ventilation.
- d- All of the above.

**The following statement is true regarding geriatrics:**

- a- Geriatrics have decreased orthostatic circulatory reserve compared to adults.
- b- The P-glycoprotein activity is reduced in geriatrics.
- c- Antispasmodic agents are not recommended as they alter cognitive function in geriatrics.
- d- Urinary tract infections may be associated with atypical symptoms such as urinary incontinence while dysuria may be absent
- e- All of the above are correct statements.

**All of the following laboratory data are consistent with liver disease except:**

- a- Hyperammonemia.
- b- Hypoalbuminemia.
- c- Elevated blood urea nitrogen levels.
- d- Elevated ALT.

**Peripheral venous route:**

- a- Is suitable for the administration of glucose 20% solution.
- b- Carries a risk for physical trauma if the catheter is not well secured in place.
- c- Is suitable for the administration of L- amino acid mixtures.
- d- Needs high specialized staff for insertion.

**Regarding vitamins in the parenteral nutrition:**

- a- Usually there is no single preparation that meets daily vitamins requirements.
- b- Parenteral nutrition mixtures containing vitamins should be administered in oxygen barrier bags to prevent oxidation of vitamin B complex.
- c- Parenteral nutrition mixtures should be protected from light during storage and administration.
- d- Two of the above statements are correct.
- e- All of the above.

**Cyclic infusions of the parenteral nutrition:**

- a- Carries a lower risk of steatosis.
- b- Associated with less phlebitis compared to 24 hrs infusions.
- c- Associated with lower risk of line sepsis.
- d- A,b
- e- B,c.

**Question 2 (25 marks):**  
**True or false: [correct the false statements].**

- 1- ( ) Complications of excess glucose in the PN includes hyperglycemia and hyperlipidemia.
- 2- ( ) Darifenacin is a uroselective agent utilized in the treatment of stress UI.
- 3- ( ) The classic vitamin K bleeding usually occurs in the first week of life.
- 4- ( ) Hematocrit (packed cell volume) may be decreased in cases of polycythemia.
- 5- ( ) The presence of lipid emulsion totally protects against vitamin photodegradation.
- 6- ( ) In osteoarthritis, pain is most commonly associated with motion.
- 7- ( ) gamma glutamyl transpeptidase levels may rise by the use of enzyme inducing drugs.
- 8- ( ) Propranolol produces less adrenergic blocking effects in the elderly compared to adults.
- 9- ( ) the most common use of INR is to monitor oral anticoagulant therapy but it can be also used to monitor kidney function.
- 10- ( ) activated partial thromboplastin time test (aPPT) is performed by adding thromboplastin to stimulate the intrinsic pathway and thus is used to monitor heparin therapy.
- 11- ( ) Most of the ADRs in geriatrics are dose-dependent.
- 12- ( ) peripheral administration of parenteral nutrition into large veins carries a less risk of phlebitis.
- 13- ( ) Amino acid solutions should not be administered into the peripheral circulation.
- 14- ( ) Osteoarthritis is associated with damage to the articular cartilage and pronounced systemic inflammatory response.
- 15- ( ) The inclusion of medium chain fatty acids is associated with lower oxidative stress compared with the use of long chain fatty acids in the lipid emulsion of the PN.
- 16- ( ) For patients with mild BPD, respiratory support can be accomplished by oxygen therapy alone in most of cases.
- 17- ( ) liver toxicity may be associated with some NSAIDs such as diclofenac sodium.
- 18- ( ) Pneumothorax and hydrothorax are 2 possible catheter-related complications associated with the central administration of the PN.
- 19- ( ) In the case of heavy creaming, the free oil is released from the lipid emulsion, and this could occlude the lung microvasculature and may lead to death.
- 20- ( ) Diuretics can improve gas exchange in patients with BPD.
- 21- ( ) Usually a single dose of parenteral vitamin K is sufficient for the treatment of the classical hemorrhagic disease of the newborn.

- 22- ( ) Neonates have an increased sensitivity to morphine compared to older children and adults.
- 23- ( ) The use of trimethoprim may result in elevated levels of serum creatinine that is not related to kidney dysfunction.
- 24- ( ) marasmus refers to insufficient energy provision while kwashiorkor means insufficient protein provision.
- 25- ( ) With aging, alpha 2 responsiveness is reserved while alpha 1 responsiveness is reduced.

Q3 (15 marks):

1. What is the dual energy system? And what are the advantages of dual energy systems over glucose only energy systems (list only 7) ?
2. List down five of the metabolic complications of the PN and briefly mention how can we minimize the risk of occurrence of two of them?

**BEST WISHES**