

# Westmead Intensive Care Unit



## Pharmacology Learning Package

### **Aim of the Package**

To provide the registered nurse with the opportunity to acquire the level of knowledge, through self-directed learning, on which to base the nursing skills necessary for safe practice.

### **Objectives of the Package**

1. Discuss medications commonly given in the ICU in relation to the:
  - a. class of drug
  - b. its action
  - c. indication
  - d. contra-indications and precautions
2. Understand the legal implication of medical administration as it applies in the ICU

### **What to do with the Package**

1. Attempt all questions
2. You will need to exceed 80% correct answers to pass the package, if this is not achieved you will need to repeat the package
3. Your package will reviewed by a CNE and then you will be provided with the package answers to allow further review

### **Useful Resources**

- Textbooks are available in the CNE nook
- CIAP can be access on all the computers through the intranet site

**For every drug mentioned (highlighted) in these 3 case studies describe the:**

1. **Class of drug**
2. **Its action**
3. **Its indication for use in the case scenario.**
4. **Explain also any precautions that should be taken with administration of the drug, how it would be administered and answer any questions that arise.**

**The emphasis on this package is for you to gain your *own understanding* of these drugs and as such we do not want huge slabs of text from MIMS and the like copied for answers.**

### **Case study 1: Neuro-Trauma Patient**

Peter is a 30yr old male admitted through the emergency department following a fall from a ladder whilst roof tiling. The patient has suffered a R/ #femur, traumatic subarachnoid haemorrhage frontal contusions and cerebral oedema, # ribs R/ 4, 5, 6 and R/ lung contusions.

Following operating suite for insertion of EVD, and pinning of R/ femur he is admitted to ICU. He is intubated, ventilated and remains sedated.

Peter is sedated with **Morphine**, **Midazolam** and **Propofol** infusions.

1. **Morphine –**
2. **Midazolam –**
3. **Propofol –**

Despite being sedated Peter's ICP is high >25mmhg. Sedation is increased, however maintaining CPP > 60mmhg is difficult therefore he is commenced on a **Noradrenaline** infusion.

4. **Noradrenaline –**

Following a further rise in ICP Peter is ordered a bolus of 200mls **Manitol**.

5. **Manitol -**

Despite a diuresis from the Manitol, Peter's ICP continues to rise he is commenced on a **Thiopentone** infusion and requires a **Vasopressin** infusion to maintain CPP.

6. **Thiopentone -**
7. **Vasopressin –**

Peters Na is 147mmol/L; he is ordered **20% Saline** at 5mls/hr.

8. **20% Saline –**

Over the next few days Peter develops a fever. Temp 38.5c He is commenced on **Cephazolin** following septic screen. He also is having a diuresis and is diagnosed with having diabetes insipidus. He is ordered 4mcg **DDAVP**.

9. **Cephazolin –**
10. **DDAVP –**

The doctors are concerned that Peter is having vasospasm. They have ordered a **Nimodipine** infusion.

**11. Nimodipine –**

Peter also requires some prophylactic medication. He has been on **Pantoprazole** and **Thiamine**.

**12. Pantoprazole -**

**13. Thiamine –**

Despite Peter's critical injuries, he eventually makes good progress. Following the weaning of sedation and inotropic infusions, he is agitated and difficult to control. He is ordered a **Dexmedetomidine** infusion.

**14. Dexmedetomidine -**

Peter is extubated and is discharged to high dependency for further care.

### **Case study 2: Respiratory patient**

Mary is 65yr old lady admitted with acute respiratory failure. Mary is asthmatic and has presented in respiratory distress. Her chest X-ray indicates L/lower lobe pneumonia.

Mary is intubated, ventilated and requires sedation to control her ventilation. She has a past history of hypertension and chronic renal failure, not requiring dialysis.

Mary is intubated after receiving **Cistatracurium, Fentanyl** and Propofol. She requires Fentanyl and Propofol infusions post intubation. **If Mary required a cistatracurium infusion what neurological observations would she require?**

**1. Cistatracurium –**

**2. Fentanyl –**

Mary remains difficult to ventilate and on auscultation she has an inspiratory and expiratory wheeze. She is commenced on a **Salbutamol** infusion and also receiving Salbutamol and **Atrovent** nebulisers. She is also commenced on IV

**Hydrocortisone 6/24**

**3. Salbutamol -**

**4. Atrovent –**

**5. Hydrocortisone -**

At this stage Mary has received her antibiotic therapy of **Timentin, Vancomycin and Gentamycin**. Her BP is reduced due to her sepsis and she is requiring an **Adrenaline** infusion to maintain a MAP >70mmhg. **Why choose Adrenaline over Noradrenaline in this circumstance?**

**6. Timentin –**

**7. Vancomycin –**

**8. Gentamycin –**

**9. Adrenaline –**

Mary remains unstable and is commenced on continuous **Prostocyclin** nebulisation.

**10. Prostocyclin –**

Mary requires prophylactic medication and is ordered S/C **Heparin**, Pantoprazole, Thiamine and **Coloxyl**.

**11. Heparin –**

**12. Coloxyl –**

Mary is making a good recovery and her Sedation, Salbutamol and Adrenaline infusions have been weaned off. In fact she is now hypertensive, as she has been not receiving her antihypertensive medication. She restarts **Ramipril** and **Metoprolol** tablets. **Do you think these are suitable antihypertensives for Mary?**

**13. Ramipril –**

**14. Metoprolol –**

Mary has now been extubated and is awaiting discharge from ICU. She has been having difficulty sleeping and following investigation into her normal routine it is found that Mary normally takes **Temazepam** to sleep. She is ordered this and sleeps well the next night.

**15. Temazepam –**

Mary is discharged to a high dependency ward for further care.

**Case study 3. Cardiac patient.**

John is a 65yr old man admitted to ICU from cath lab following stenting for his triple vessel disease. He is in cardiogenic shock. He is diagnosed with an AMI and has the intra aortic balloon pump insitu and is going into acute renal failure. His x-ray indicates pulmonary oedema. John has a history off type II diabetes, AF on digoxin, hypertension and peripheral vascular disease.

John is intubated, ventilated and sedated with Fentanyl and Propofol. To maintain adequate cardiac output John is requiring Adrenaline, **Dobutamine** and **Milrinone** infusions. **Do you think these inotropes are suitable for John's condition?**

**1. Dobutamine –**

**2. Milrinone –**

Johns FBC indicates his Hb is only 72mmol/L and his albumin is 18.

To try and optimise John's oxygenation and preserve his renal function John is firstly given a blood transfusion and also 1 bottle 20% albumin. This is followed by a dose of **Frusemide**.

**3. Frusemide –**

It was found that John's Digoxin level was low and he is ordered Digoxin 250mcg. His BSL is 10mmol/L and is commenced on an Actrapid infusion. **At what dose**

**would you commence the Actrapid infusion? How often would you check the BSL?**

- 4. Digoxin –**
- 5. Actrapid –**

Due to acidosis and a rising creatinine and urea, John is commenced on CVVHDF using **Hemosol** solution containing **NaHCO<sub>3</sub>** with 15mmol/L **potassium** added.

- 6. Hemosol –**
- 7. NaHCO<sub>3</sub> –**
- 8. Potassium –**

John is having episodes of rapid AF, which is compromising his cardiac output he is given a loading dose of **Amiodarone** followed by an infusion. He is also given **MgSO<sub>4</sub>** replacement. **Why?**

- 9. Amiodarone –**
- 10. MgSO<sub>4</sub> –**

The doctors have decided to give John **Levosimendan** in a hope that his condition will improve.

- 11. Levosimendan –**

Fortunately John's condition begins to improve and he is weaned from the IABP and his sedation is decreased. He is then weaned from the ventilator and is eventually transferred to coronary care for his cardiac rehabilitation.

He remains in rate controlled AF, he continues with his Digoxin as per prior to admission, however he is commenced on **Warfarin**. He is also commenced on oral **Captopril**.

- 12. Warfarin –**
- 13. Captopril -**

**Please answer the following questions in relation to drug administration.**

1. What are the 5 rights when administering drugs?
2. Briefly describe the procedure for checking and administering any scheduled drug
3. What is the procedure for drawing up and administering any IV infusion?
4. According to ICU policy, what time period should infusions be changed due to expiration?
5. Give 3 examples of drug infusions requiring non-PVC giving sets?
6. According to ICU policy can you administer a drug without a medical written order?