Guidelines For The Management and Administration of Patient Controlled Analgesia (PCA)

Patient Controlled Analgesia is a method by which the patient self-administers a prescribed dose of intravenous opioids, using a handset connected to a pre-programmed and designated Graseby Omnifuse device.
This form of analgesia is primarily used to control acute post-operative pain and episodes of uncontrolled pain.

CONTRAINDICATIONS

- Known opioid allergies
- Disabilities of hands (which prevents use of the handset)
- Patient refusal
- Pre-existing neurological disease (dementia, learning disabilities)

STAFF EDUCATION

All nursing staff should have successfully completed the LUHT PCA Training Programme including successful completion of the Trust IV therapy course. 2 trained staff should program the pump but all staff need to be aware of how to set up the programme and be able to check that all the values have been correctly entered.

PATIENT EDUCATION

Patients for PCA will be selected by the anaesthetist pre-operatively. The nurse specialists or ward nursing/recovery staff will explain the principles of PCA and how to use it. The opportunity for the patient to familiarise themselves with the handset should ideally be given if possible. A PCA information booklet may be given at Pre-assessment clinic and the opportunity to ask questions allowed.

PREPARATION OF SYRINGES

PCA syringes are prepared in the clinical area by nursing staff. The administration sets used are the Westcott Medical PCA sets with antisyphon valve and non-return valve.

SETTING UP THE GRASEBY OMNIFUSE PCA PUMP (For PCA use only)

Before use ensure:

1. PCA device is in good condition. If cover or facia is broken or damaged in any way do not use (return to medical physics).
2. The patient handset is in good working order.

Switching machine on:

1. The grey key with 2 circles should be pressed to switch the pump on/off. The pump requires a key to open the cover and programme. Each ward area should have a key available.
2. A loud continuous alarm will sound when the machine is switched on, (this is a self test to check the pump's software) if this continues then turn the machine off and try again. However, if the alarm is still sounding then the pump has some internal malfunction and cannot be used.

3. When switched on the pump will acknowledge the BD Plastipak syringe as the pre-set option. This should be checked by the nursing staff to ensure the correct size and make of syringe is used.

Loading the syringe and programming the PCA pump:

- The syringe should be loaded and confirmed using the blue clamp and syringe-loading key and following the on screen instructions.
- The purple wheel acts as a "computer mouse" and can be pressed to confirm settings or turned in order to change settings within the pre-set protocol parameters.
- The required drug protocol can then be selected and confirmed as outlined in the table below.
- Once you have confirmed the protocol the screen will highlight TOTAL, this should be reset for each new patient.

The table below details drugs commonly used for PCA, their concentrations and standard PCA settings – The pump will default to the standard settings each time it is switched on. *These protocols may vary slightly across the hospital sites.*

Drug	Drug Concentration	PCA bolus dose	PCA dose time	Lockout period	Background rate	Standard Bolus	Standard Lockout Time
Morphine	**2mg/1ml**	**Variable 0-5mg**	**STAT**	**Variable 3-10 mins**	**Variable 0-10mg/hr**	**1mg (0.5ml)**	**5 mins**
Fentanyl	20mcg/ml	Variable 0-50mcg	STAT	Variable 3-10 mins	Variable 0-100mcg/hr	10microgram (0.5ml)	5mins
Tramadol	10mg/ml	Variable 10-20mg	STAT	Variable 3-10 mins	Variable 0-30mg	10mg (1ml)	5 mins
Oxycodone	1mg/1ml	Variable 0-5mg	STAT	Variable 3-10 mins	Variable 0-10mg/hr	1mg (1ml)	5 mins
Remifentanil	50mcg/1ml	Variable 30-60mcg	STAT	Variable 2-3 mins	NA	30mcg (0.6ml)	3 mins

Ketamine infusion protocol is also programmed into pump as outlined below:

See Ketamine protocol in Management of Acute Pain Guidelines booklet for further advice.

Ketamine	5mg/1ml	NA	NA	NA	Variable 5-25mg/hr	Default to 5mg/1ml	NA

TERMINOLOGY	DEFINITION
Drug concentration	The concentration of the drug in the syringe, see table above for standard concentrations.
Bolus dose	The bolus dose is the amount of drug the patient receives when the handset or demand button is pressed.
Lockout period	The time from the end of the delivery of one successful bolus until the machine allows the patient to receive another. (Usually set at 5 mins)
Background infusion	Continuous infusion that can be added to provide a more steady blood concentration of analgesic. Particularly useful for the opioid tolerant patient. The majority of continuous infusions are nursed in HDU/ICU.
Demands/Good demands	Each time the handset is activated it will be recorded as a 'demand', each time the patient presses the handset and receives a bolus this will be recorded as a 'good demand'.
Total amount of drug	Records the total amount of drug a patient has received since the device was reset. This includes all bolus doses and a background infusion if prescribed. When setting up for a new patient you must ensure that these values are all at zero.
Clinician bolus	To give an additional bolus dose between lockout periods, or if additional analgesia is required. The clinician bolus requires a password and should only be used by nursing or medical staff trained in this function.

Priming the syringe and giving set

1. Ensure line is completely primed and no air bubbles are present.
2. Purge the line by using the PURGE key to take up the mechanical slack in the plunger.
3. Close cover, lock and remove key.
4. Check programme values once more by pressing REVIEW then scroll down and press CONFIRM.
5. Attach to patient's cannula.
6. Press start to run. Pump will now display "ON STANDBY / PCA Available now"

For specific nursing actions and observations receiving the patient and at handover refer to Guidelines for Best Clinical Practice (QIS, June 2004)

Alarms

In the first instance the cause of the alarm should be noted and the alarm silenced by pressing the alarm key.

There are two types of alarm sounds:

- **Quiet chirping**: this is a warning double bleep that means the pump needs attention or a problem has arisen while programming.
- **Loud continuous**: this is an insistent alarm, which means the pump has found a problem when infusing. E.g. when an internal fault is detected. The fault code should be noted and the device returned to Medical Physics.

The pump will alarm for various reasons:

- If syringe is not correctly fitted.
- If there is 3mls left in syringe.
- When syringe is empty.
- Syringe tampering.
- Handset has become dislodged.
- Occlusion in giving set or cannula.
- Low battery.
- Internal fault – DISCONNECT PUMP AND DO NOT USE.

Care and cleaning

If any spillages occur or for general cleaning of the pump please use a damp cloth and mild detergent. Do not immerse the pump in water or use an alcohol wipe. Always remember to also clean the handset.

WHO TO CONTACT

Monday - Friday 08.00 – 1700:		
Clinical Nurse Specialist - Pain Management:	bleep RIE	**5247 or 5849**
	bleep WGH	**8292**
	bleep SJH	**3934**
Out of hours and weekends:		
the on-call anaesthetist	bleep RIE	**2140**
	bleep WGH	**8112**
	bleep SJH	**3948**

GRASEBY OMNIFUSE PCA SYRINGE PUMP
PRACTICE BASED COMPETENCIES

NAME - _____ **WARD -** _____

COMPETENCY	ACHIEVED
Define the type & usage of pump:	Patient controlled omnifuse pca pump
Identify and name the main external features of the pump:	AC power, pc port cover etc
Explain use of the LCD screen:	To allow you to read and understand the functions of the pump
Define use of the Command wheel:	Acts like mouse on computer
Describe the keys on the keypad:	On off button, stop/suspend, start alarm silence etc
Describe the purpose of the lockable cover and demonstrate how to open and close, lock and unlock the cover:	Ensure drug is secure etc
Demonstrate the ability to attach the pump to a pole and how to carry pump correctly:	
Turn the pump on:	
Identify the meaning of key beeps, and other sounds, discuss self test:	Ensure pump working correctly. Beeps to tell if pressed correctly. Alarms sounds
Demonstrate ability to load syringe correctly and discuss mechanical slack:	Ensure patient receives analgesia without delay
Identify three elements of the pump used to secure the syringe:	Barrel clamp, syringe ear slot and syringe pusher
Describe protocols available on the pump and program the pump by selecting a protocol:	
Demonstrate the ability to purge syringe via pump:	
Discuss and select appropriate occlusion pressure setting:	
Check and reset totaliser (prior to starting pump and if change in protocol):	

Start infusion and identify features of handset:	Green light identifies handset is ready for patient use
Demonstrate ability to give Clinician bolus and how to stop bolus early (depending on local policy):	
Demonstrate what to do if the pump sounds the alarm and how to restart infusion:	Silence alarm ready screen and carryout appropriate action
Demonstrate how to review programme as prescribed:	
Demonstrate how to access information for recording hourly checks on documentation:	
Demonstrate how to make alterations to programme as prescribed:	
Demonstrate how to change protocol (remembering to reset totaliser):	
Demonstrate ability to change syringe and unload from device:	
Discuss syphonage:	Pump should be lower than insertion site
Identify alarms and appropriate action:	
Discuss battery life and importance of keeping pump plugged in at all times:	12 hours and must be kept plugged in to ensure software remains fully functioning
Describe how to clean the pump and return to appropriate areas:	Clean damp cloth and return to recovery

I confirm that……..has achieved the required competency for the use of the graseby omnifuse pca pump.

Signature of Assessor:	Position:
Name:	Date:

I acknowledge my responsibility to meet the standards within the Code of Professional Conduct: Standards for Conduct, Performance and Ethics (NMC 2008)

Signature of Participant:

Name: Position:

Theoretical Competency:

COMPETENCY	ACHIEVED
List analgesics commonly used in a pca: Morphine Fentanyl Tramadol Also used in pca pump Ketamine. (never with a bolus facility, background infusion only)	
List side effects of these drugs: Nausea, vomiting, itch, constipation, sedation and respiratory depression.	
List how to reverse these side effects: Monitor and record sedation score and respiratory rate. Give antiemetics, laxatives. Give piriton, naloxone for itch	
State the standard prescription for the analgesics used in pca's in your clinical area: Morphine 100mgs in 50mls, 2mg per mil concentration with 1mg pca bolus. Fentanyl 1000mcgs in 50mls, 20mcgs per mil concentration with 10mcgs pca bolus. Tramadol 500mgs in 50mls, 10mgs per mil concentration with 10mgs pca bolus.	
Describe the observations performed whilst on pca and why we perform these observations: Cardiovascular obs: as tachycardia maybe result of pain. Respiration Score: To monitor respiratory rate Pain score: to monitor efficacy of analgesia Nausea Score: to record and monitor if nausea becoming an	

issue. Sedation Score: To safely monitor patients in order to reduce opiate toxicity	
List any adjunct analgesics used with a pca: Paracetamol NSAIDS	
Describe how you would assess patients and make appropriate adjustments: Pain score to identify efficacy of analgesia and allow alterations to be made. If patient sore then adjust analgesia as per protocol and review efficacy of adjustment. Respiration Score – if patient becomes respiratory compromised then you should stop pca pump, put patient on oxygen and contact medical staff. Maintain airway. If patient becomes sedated then stop pca pump, put patient on oxygen, check observations and pca settings, contact nurse in charge (if not you) and medical staff and patient may have to have naloxone. Continue to monitor patient and ensure patient does not become sedated again as if you act on sedated patient you will prevent respiratory arrest. Must reassess patient to appropriateness of pca analgesia.	
Discuss stopping PCA and step down analgesia: Ensure oral route established prior to step down. Ensure adequate analgesia prescribed and given then stop pca pump after oral dose administered (about 30 minutes). Review efficacy of analgesia and remember to continue to document and assess pain and analgesia.	
Describe how you would clean pump: Using a damp clean cloth. And return pump back to appropriate area (ie recovery)	

Signed: _____

Designation: _____

Date: _____