PATIENT CONTROLLED ANALGESIA (PCA) – INTRAVENOUS OR SUBCUTANEOUS

This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.

1. AIM
To provide a framework for the safe and effective prescribing and delivery of opioids (Morphine, Fentanyl and HYDROMorphone) and to guide in the management of patients receiving intravenous or subcutaneous opioid via a patient controlled Analgesia (PCA) programmable pump for the control of acute pain.

2. PATIENT
- Surgical or non-surgical acute pain.
- See educational notes for precautions

3. STAFF
- Acute Pain Relief Service
- Anaesthetists
- Medical Officers
- Registered Nurses and Midwives
- Pharmacists

4. EQUIPMENT
- Dedicated PCA pain management pump & PCA giving set
- Premixed opioid bag (Morphine or Fentanyl) or
- HYDROMorphone 10 mg vial and 100mL bag of sodium chloride 0.9%.
- Blue additive label
- 5mL syringe & 10mL vial of sodium chloride 0.9%.
- Blue tray
- NSW Health PCA Chart Adult (NH606622) with written prescription

5. CLINICAL PRACTICE
Prescribe the PCA order on the NSW Health Patient Controlled Analgesia (PCA) Adult form (NH606622). For comprehensive directions in completing the PCA Chart refer to (Appendix 2).

Preparing the Medication
- Prepare the opioid solutions as per dosage chart below. The primary medications for PCA are morphine, fentanyl or HYDROMorphone
- Check the medication with two RN/RMs and follow the S8 handling of medications policy.
- Record on the PCA Chart.
- Complete an additive label and attach it to the infusion bag. (Both premixed or prepared)
- Change bag and giving set and reprogram pump when changing solutions. (e.g. from Morphine to Fentanyl)
PATIENT CONTROLLED ANALGESIA (PCA) – INTRAVENOUS OR SUBCUTANEOUS cont’d

STANDARD OPIATE CONCENTRATIONS AND PCA BOLUS DOSES

<table>
<thead>
<tr>
<th>DRUG &amp; PRESCRIPTION</th>
<th>CONCENTRATION</th>
<th>PCA Bolus Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>1mg per 1mL</td>
<td>0.5mg - 2.0mg</td>
</tr>
<tr>
<td>100mg in 100mL of sodium chloride 0.9%</td>
<td>0.5mL - 2.0mL</td>
<td></td>
</tr>
<tr>
<td>Select pre-mix morphine bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>10 microgram per 1mL</td>
<td>10microg - 20microg</td>
</tr>
<tr>
<td>1000 mcg in 100mL of sodium chloride 0.9%</td>
<td>1mL - 2mL</td>
<td></td>
</tr>
<tr>
<td>Select pre-mix fentanyl bag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HYDROMorphone</td>
<td>0.1mg (100 microgram) per 1mL</td>
<td>0.1mg - 0.4mg</td>
</tr>
<tr>
<td>10mg in 100mL sodium chloride 0.9%</td>
<td>1mL – 4mL</td>
<td></td>
</tr>
<tr>
<td>NOT available in premix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take one x 10mg ampoule and add to a bag of 100mL sodium chloride 0.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB. HYDROMORPHONE IS 5 TIMES MORE POTENT THAN MORPHINE</td>
<td></td>
<td></td>
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</tbody>
</table>

PCA Set Up
- Deliver all PCAs and opioid infusions via a dedicated pain management pump. The pump must be locked in a lock box. The key must be kept with the Schedule 8 medication keys.
- Set up the PCA pump. This is usually done in Recovery.
- Check the medication and program settings with two RNs/RMs before connecting the PCA to the patient.
- Ensure the patient is familiar with the principles of PCA and is able to activate the pump. The patient receiving PCA is the only person who may press the PCA button.
- Check that naloxone for sedation has been prescribed on the PCA chart and is available in the clinical area.
- Administer oxygen therapy via mask or nasal prongs for the duration of the therapy.
- Do not administer other opioids or sedatives unless ordered by the Acute Pain Relief Service or equivalent medical officer.
- Call APRS or Anaesthetist if there is any concern about the appropriateness of PCA analgesia for a patient.

Monitoring
- Record pain observations on the PCA chart hourly for the first six (6) hours then second hourly for the duration of the PCA or more frequently if patient’s condition indicates.
- Record Pain Score
  - Assess pain both at rest (record as R) and with relevant movement (record as M) e.g. deep breathing and coughing.
  - Use Verbal Numerical Rating Scale 0 to 10 or Verbal Descriptor Scale: no pain, mild pain, moderate pain, severe pain or worst possible pain.
- Record Sedation score using the following scale:
  - 0 - Wide awake
  - 1 - Easy to rouse
  - 2 - Constantly drowsy, unable to stay awake (Yellow Zone - activate PACE Tier 1) OR a sedation score of 2 and a respiratory rate <= to 5 (Red Zone - activate a PACE Tier 2)
  - 3 - Difficult to rouse (Red Zone activate a PACE Tier 2) OR Unresponsive (Red Zone activate a Code Blue).
PATIENT CONTROLLED ANALGESIA (PCA) – INTRAVENOUS OR SUBCUTANEOUS  cont’d

- Record Respiratory Rate:
  - Assess at rest and when asleep if patient is drowsy.
  - A respiratory rate between 6 to 10 bpm (Yellow Zone - activate PACE Tier 1) and notify the APRS.
  - A respiratory rate between ≤ 5 bpm (Red Zone - activate PACE Tier 2) and notify the APRS.
- Record other information on the PCA chart as follows:
  - Cumulative dose
  - Background infusion rate (if in progress)
  - Total demands and good demands.
- The PCA pump settings should be checked and recorded at the commencement of each shift, on patient transfer, and when the bag is changed.
- Refer to possible complications and their management – (Appendix 1)

5. DOCUMENTATION
- NSW Health Patient Controlled Analgesia (PCA) Adult form (NH606622)
- Patient’s Health Care Record
- Standardised Adult General Observation (SAGO) chart. (State)
- Standardised Maternity Observation Chart (SMOC) chart. (State)
- Obstetric and Gynaecological HDU/High Acuity Cart. (Local)
- Partogram and Birth Details Summary (Local)
- The PCA observation chart includes the coloured coded warning system (red and yellow zones) in line with Between the Flags (BTF) for early detection of patient deterioration.

6. EDUCATIONAL NOTES

   General
   - PCA is an opioid delivery system whereby the patient is able to deliver his/her own intermittent intravenous or subcutaneous analgesia. This overcomes the wide variation in analgesic requirements and allows patients to adjust the level of analgesia to their own level of comfort and tolerance of side effects.
   - Patient preference for PCA is higher when compared with conventional parenteral opioid regimens.
   - In an adult patient, age rather than weight is a better predictor of opioid requirement.
   - Individual opioid requirements may vary widely between patients.
   - Small doses should be used for elderly or very sick patients.

Precautions
- History of sleep apnoea
- Co-existing diseases e.g. obesity, diabetes, renal impairment
- >65 years old and opioid naïve
- Current opioid or sedative medications
- Inappropriately high opioid dose
- Previous sensitivity to opioids resulting in the patient having episodes of apnoea

Patient Education
- Patients attending the preadmission clinic prior to surgery should be given verbal and written information on PCA.
- Further education must be given when commencing patient on PCA e.g. post-surgery in the Recovery Unit.
- On return to the ward the RN/RM receiving the patient must determine the patient’s level of understanding of the PCA principles and ability to activate the device.
- Ongoing PCA education (as needed) should be given to the patient by the clinicians on the ward and the APRS team on their daily rounds.
PATIENT CONTROLLED ANALGESIA (PCA) – INTRAVENOUS OR SUBCUTANEOUS  cont’d

Nursing/Midwifery Information and Education
- Patients on PCA should be managed in wards/areas where the nursing staff have received appropriate education and accreditation in PCA management.
- Each relevant ward/area should aim to have at least 80% of RN/RMs accredited in PCA management.
- An RN/RM who has received education or has had previous experience in the management of patients receiving this form of analgesia may perform PCA related observations and must take appropriate action when opioid-related side effects or complications present.
- Only an RN/RM who has been accredited as competent in PCA may:
  - Set up, program and operate the PCA pain management pump.
- Steps to attain PCA competency:
  - Step 1 – read the PCA LOP.
  - Step 2 – completion of HETI Patient Controlled Analgesia (PCA) eLearning module (course code 430 610 23) Print course certificate as evidence of eLearning completion.
  - Step 3 – attendance of practical “hands-on” PCA session with APRS CNC.
  - Step 4 – Successful completion of Category 2 for PCA competency assessment.
- Compliance will be measured by:
- 80% of RNs assessed/accredited as competent in managing patients with PCA.
- Regular Audits of LOP & PCA Chary compliance and:
- By IIMS incidents relating to PCA.

7. RELATED LOPS
- Medications Policies and Procedures
- Accreditation of Staff to Give Drugs in Specific Units
- Pain Protocol Recovery
- Neuraxial Opioid Analgesia
- Sedation – Respiratory Depression
- Naloxone – guidelines for use of naloxone HCL for the treatment of respiratory depression and over-sedation following opiate
- Adult Clinical Emergency Response System (CERS) and Escalation

8. RISK RATING

High

9. EXTERNAL REFERENCES

<table>
<thead>
<tr>
<th></th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>POWH PCA Clinical Business Rule - January 2015</td>
</tr>
</tbody>
</table>

REVISION & APPROVAL HISTORY
Reviewed and endorsed Therapeutic & Drug Utilisation Committee 11/8/15 (titled ‘Patient Controlled Analgesia”)
Reviewed and endorsed Therapeutic & Drug Utilisation Committee 16/6/09
Approved Quality Council 15/3/04

FOR REVIEW : AUGUST 2017

…/Appendix 1 & 2
<table>
<thead>
<tr>
<th>Complication</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor comprehension</td>
<td>Patients unable to comply with PCA instructions will require alternative analgesia.</td>
</tr>
</tbody>
</table>
| Inadequate analgesia | **Education:** ensure adequate patient understanding and management of PCA  
**Review dose:** Any patient requiring more than 6 bolus doses per hour may require a bolus dose increase, background opiate infusion or the addition of regular subcutaneous opiate.  
**Additional medication:** Other medications may be administered concurrently with a PCA e.g. ketamine. |
| Nausea | • Ensure antiemetic’s are prescribed and offered as frequently as the PRN order permits.  
• If one antiemetic does not work proceed to alternative or page APRS for advice.  
• Anti-emetics should be ordered on the medication chart but administration should be recorded on both the medication chart and pain observation chart in the comments section.  
• Any patient requiring more than 2 doses of antiemetic may need a regular dose ordered on their medication chart.  
• Identify if the patient is hypotensive and check their fluid balance |
| Pruritus (itch) | DO NOT use sedative antihistamines – consider naloxone. Refer to naloxone LOP. If persistent, contact APRS |
| Respiratory Depression | **If Respiratory Rate 6-10 bpm and/or SpO2 < 90%**  
• Cease administration of all opioids.  
• Give oxygen via mask and support airway if necessary  
• Assess sedation level and if possible encourage patient to breathe deeply  
• Activate a PACE Tier 1 call  
• Contact APRS/Anaesthetist  
 **If Respiratory Rate ≤ 5 breaths per minute**  
• Cease administration of all opioids including PCA  
• Give oxygen at 10L/min via Hudson mask and support airway if necessary  
• Activate a CODE BLUE  
• Give IV naloxone as prescribed OR as per naloxone LOP  
• Contact APRS |
| Increased Sedation | **Sedation Score 2**  
• Cease administration of all opioids.  
• Give oxygen  
• Check respiratory rate frequently  
• Activate a PACE Tier 1  
• Contact APRS/Anaesthetist  
**Sedation Score 3 (Difficult to rouse)**  
• Cease administration of all opioids.  
• Give oxygen  
• Check respiratory rate  
• Activate a PACE Tier 2  
• Give naloxone as prescribed OR as per naloxone LOP  
• Contact APRS  
**Sedation Score 3 (Unresponsive)**  
• Cease administration of all opioids.  
• Give oxygen  
• Check respiratory rate  
• Activate a CODE BLUE  
• Give naloxone as prescribed OR as per naloxone LOP  
• Contact APRS |
| Urinary Retention | Contact the patients primary care team |
| Constipation | Prophylactic aperients therapy is beneficial. Contact primary care team |
| Alcohol Withdrawal | Place patient on Alcohol Withdrawal Scale (AWS) and follow the guidelines of alcohol withdrawal management.  
PCA must be set up as bolus only. Do not use opioid background infusion. Liaise with Drug and Alcohol Team as well as APRS. |
| Ketamine infusion | Ketamine may be added to the analgesia plan and if IV access is limited the following should apply:  
• PCA Infusion connected to cannula without 3 way or multi-port tap  
• Ketamine connected to back check valve of PCA without 3 way or multiport tap  
• Maintenance fluid connected to back check valve of Ketamine.  
• A back check valve is required to prevent the inadvertent pooling and accumulation of drug in a maintenance line with the potential for overdose of medication  
• Ketamine may run by a separate IV and does not require a maintenance fluid as the infusion rate is constant and will therefore KVO |
NSW Health Patient Controlled Analgesia (PCA) Adult form

PCA Prescription
- PCA must be prescribed on the NSW Health Patient Controlled Analgesia (PCA) Adult form (NH606622)
- Patient identification details to be handwritten or a patient label affixed
- The first prescriber to check patient label is correct and print patient’s name
- The prescriber must complete the allergy and adverse reaction section in full.
- The prescriber must complete all prescribing sections as per Medication Handling in NSW Public Health Facilities (PD 2013_043).
- PCA must be prescribed by a Medical Officer.
- A Medical Officer with limited experience in prescribing PCA can refer to section 5.4 to section 5.7 of this LOP and/or contact the APRS during business hours or the Anaesthetist on call after hours.
- The PCA prescription is valid for a maximum of 4 days unless ceased earlier.
- If changing from one opioid to another, a new PCA chart must be commenced.
- Prescriber contact details must be included.

PCA Program and Dosing
- Date and time to be completed
- Complete primary drug and concentration: name of drug in PCA and concentration
- PCA bolus dose: the dose the patient receives when he/she activates the pump successfully in mg or mcg and mL
- Lockout interval (mins): the length of time that the demand function is disabled following a bolus even if the button is pushed (minimum 5 minute interval).
- Background infusion: a background continuous infusion may be prescribed to supplement the PCA mode.
- If the PCA program is changed it has to be rewritten and signed on the next line. The current order is the most recently prescribed order.
- The chart allows for three changes then a new chart must be used.
- Prescriber contact details must be included.
Neuraxial (intrathecal or epidural) Opioid Prescription
- Patients who have had a stat dose of Neuraxial (intrathecal/epidural) morphine or HYDROmorphine intra-operatively require observations to be recorded hourly for either 6 hours OR 12 hours.
- The prescriber must select the appropriate box for observations
- Prescriber contact details must be included

### PCA + NEURAXIAL OPIOID SINGLE DOSE (intrathecal or epidural)
If the patient has also been given a neuraxial opioid, complete the following:
Observations to be recorded: ☐ Hourly for 6 hours OR ☐ Hourly for 12 hours.
Then second hourly until 24 hours post administration even if PCA has been ceased.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Drug</th>
<th>Route</th>
<th>Dose given (mg or microgram)</th>
<th>Prescriber’s signature</th>
<th>Print your name</th>
<th>Contact</th>
</tr>
</thead>
</table>

Naloxone prescription
- This chart incorporates a recommended dose and frequency of administration of naloxone.
- This is not considered a standing order for naloxone and completion of the prescription is needed prior to administration.

### NALOXONE:
For sedation score 3 or when sedation score is 2 and respiratory rate less than or equal to 5 breaths per minute. Obtain urgent medical review. Continue resuscitation including administering prescribed naloxone (as below) until respirations greater than 10 breaths per minute and sedation score less than or equal to 2. Provide ventilatory assistance if required.
(Recommended dosage up to 100 microgram, x4 every 2-3 minutes).

<table>
<thead>
<tr>
<th>Date</th>
<th>Drug (Print ‘naloxone’ below)</th>
<th>Route</th>
<th>Dose (microgram)</th>
<th>Number of doses</th>
<th>Frequency</th>
<th>Prescriber’s signature</th>
<th>Print your name</th>
<th>Contact</th>
</tr>
</thead>
</table>

Oxygen Therapy
- This is a default order for all patients receiving PCA otherwise ordered.

### OXYGEN THERAPY:
Give oxygen at 2 to 4 litres per minute via nasal prongs or 6 litres per minute via face mask at all times unless otherwise ordered.

PCA Ceased
- Must be completed by prescribing Doctor

**PCA to be ceased** according to instructions in the medical record. Date: ……………….. Time: ……………..
Page 3 of the PCA chart includes space for the documentation of:
  - PCA commencement
  - discard of remaining PCA opioid or drug
  - naloxone administration

There is no maximum time limit for treatment of acute pain with PCA.

PCA can be ceased when instructed by the Acute Pain Relief Service or by the medical officer of the patient's primary team by documenting date and time on the PCA chart plus documenting in the patients' health care record.

When PCA is ceased, appropriate analgesia must be prescribed by the medical officer who ceased the PCA.

Any remaining opioid to be discarded must be checked and disposed of by two RNs and documented on the PCA chart.

Record of naloxone

- Naloxone may only be administered when the prescription section of the PCA chart has been completed in full.
Observations

PCA adult observations

The PCA chart provides observations for a maximum of 4 days. If the PCA continues beyond 4 days, a new PCA chart must be started and a new prescription written.

Pain Score (R&M)

Sedation

Respiratory Rate

Oxygen Therapy

Nausea and Vomiting

PCA Delivery

Check PCA

Change PCA (2 Signatures)