Prescription and Management of Patient Controlled Intravenous Analgesia

December 2012 (Revised October 2015)
Introduction

Scope

This policy is intended for use in all Western Australian public hospitals and departments where intravenous patient controlled intravenous analgesia (PCIA) is prescribed. It aims to ensure that prescription, administration and monitoring of PCIA is safe and appropriate. This document describes the minimum standards for the provision of routine PCIA care, focusing on opioid use and associated patient care.

The document is not able to encapsulate all peculiarities of individual patient presentations or care and in each instance therapy and monitoring is to be adjusted for the individual patient’s needs. An exemplar, include high-risk patients (e.g. those with head injuries, pre-existing respiratory disease such as obstructive sleep apnoea, or renal/hepatic failure) requiring more intensive monitoring or dose adjustment, which is out of this document’s scope.

Background

A patient controlled analgesia (PCA) is a generic term which refers to a method allowing a person in pain to deliver their own pain relief. The PCA is used for the more continuous control of moderate to severe pain, where oral or intermittent analgesia would be less effective. The intravenous route is referred to as PCIA in this document, as opposed to the epidural route, referred to as patient controlled epidural analgesia (PCEA).

Fentanyl and morphine are the most commonly used opioids in PCA regimens in Western Australia, although other opioids may be considered in selected cases.

In principle, the PCIA enables a patient to self-control the amount and timing of analgesia received, and may improve patient satisfaction, when compared with conventional parenteral opioid regimens. It is therefore important to educate patients in the correct usage of PCIA devices, ensuring only the patient controls the device. The scope of this document excludes PCA pumps that are nurse-controlled.

In individual cases a background infusion may be necessary in opioid-tolerant patients to provide for some of their background opioid requirements, but generally the routine use of a background infusion to the PCIA does not improve the quality of pain relief, but increases the risk of respiratory depression.

Definitions

PCA is a treatment using a programmable pump that delivers a pre-set amount of analgesia (usually an opioid) when the patient presses the hand control.

PCEA is a PCA, which uses the epidural route of administration.

PCIA is a PCA, which uses the intravenous route of administration.

NCA is a nurse controlled analgesia which uses a combination of background infusion and boluses through an intravenous route of administration. PCIA is the preferred option over NCA unless contraindicated.
Multimodal analgesia refers to the use of different classes of analgesic drugs which act in a balanced, additive or synergistic way. The aim is to reduce opioid consumption and provide better total coverage of the patient’s pain.

_Tolerance_ is a state of adaptation in which exposure to a drug induces changes that result in a lessening of the drug's effects over time.

Western Australian (WA) observation and response charts refer to observational and response charts approved for use in your practice setting. Some examples may include; WA Health Adult Observation and Response Chart, Children’s Early Warning Tool, Maternal Observation and Response Chart.

**Key Considerations**

1. **Patients on oral analgesia with uncontrolled pain or unable to tolerate oral analgesia should be considered for a PCIA.**

   For patients without normal hand function, consider alternative sets such as chin or breath-activated devices, or a RN/RM _controlled_ opioid analgesia (NCA), as potential options.

1.1. **Contraindications and special precautions**

   Development of written patient selection criteria is advisable. The following points are to be considered by the prescriber and RN/RM (administering the treatment) before commencing the PCIA:

   - physical or mental barriers, such as spinal cord injuries or cognitive impairment
   - concurrent sedative use
   - patient history of opioid use and concurrent opioid therapy
   - airway compromise
   - acute alcohol intoxication
   - obstructive sleep apnoea, chronic obstructive pulmonary disease (COPD) or asthma, which may increase risk of respiratory depression
   - morbid obesity
   - renal impairment
   - hepatic impairment
   - previous allergy or sensitivity to a specific opioid.
2. **PCIA should be prescribed as part of a multimodal analgesic regimen.**

Where possible include regular paracetamol and / or non-steroidal anti-inflammatory drugs (NSAIDs), and / or other adjuvants; bearing in mind contraindications.

3. **PCIA should only be prescribed and administered by staff deemed competent to do so.**

3.1. **Persons authorised to prescribe:**

PCIA is to be prescribed by authorised staff. Depending on the hospital policy, a prescription is to only be initiated and altered by:

- a medical member of an Acute Pain Service (APS), (this may include nurse practitioners qualified and authorised to prescribe opioids)
- an anaesthetist or GP anaesthetist, or
- an intensive care Registrar or Consultant (with anaesthetics training) or emergency medicine Registrar or Consultant (with anaesthetics training) with referral to an APS medical practitioner recommended
- a GP or Senior Medical Practitioner employed in a rural or remote setting working within their scope of practice.

There must be a clearly nominated primary team or prescriber that can be called by nursing staff for assistance with PCIA, at all times (24hrs/day).

There should be at a minimum, a once daily medical review of the patient and prescription by the prescriber or appropriate primary team member.

If an authorised PCIA prescriber is not available onsite daily, then a PCIA cannot be used in the facility.

The PCIA prescriptions are to be written on a hospital approved PCA prescription form. The order should include:

- date and time
- dose expressed in milligrams (mg) or micrograms (microgram) and volume to be administered
- drug concentration (mg/mL or microgram/mL)
- PCIA bolus dose (mg or microgram)
- loading dose (mg or microgram)
- continuous (background) rate (mg/hr or microgram/hr)
- lockout period (minutes)
- desired oxygen saturation parameters
Any changes to a PCIA prescription need to be authorised by the primary PCIA prescriber or prescribing team (e.g. APS, anaesthetist, GP-anaesthetist, ICU intensivist)

PCIA order forms must clearly state the contact details for the prescribing medical service / practitioner.

3.2. Persons authorised to administer PCIA:

An RN/ RM or EN caring for the patient must be deemed proficient and safe in accordance with local health service’s required experience, competency standards, policies or guidelines and take into consideration the Decision Making Framework (DMF)\(^3\) in order to manage patients with a PCIA device.

Health services and nursing staff are dually responsible for maintaining PCIA competencies/ educational requirements in line with health service/ hospital policies and individual scope of professional practice requirements.

Other relevant guiding documents can be found in the Department of Health operational directives, and legislation at the State Law Publisher website.\(^4,5\)

4. Only the patient may press the PCIA bolus button

Relatives must be advised not to press the button on behalf of the patient.

5. Equipment

The PCIA uses a health service approved dedicated pump. The pump must be lockable to prevent tampering; provide small prescription bolus doses and have a ‘lockout’ interval system. The dedicated pumps are often identified by colour.

The pump is to be programmed by the prescriber or a competent Registered Nurse (RN) or Registered Midwife (RM). Two nurses are required to check programming of the PCIA together, one of whom must be a RN/RM, and the other may be an Enrolled Nurse (EN) as per the OD376/12, Medication Administration – Role of the Enrolled Nurse.\(^6\)

Syringes and lines should be changed every 72 hours or more frequently as per local policy, guidelines or patient status.

The PCIA pump must be locked both electronically and physically to avoid reprogramming or tampering.

The pump at minimum should be checked to ensure the 6 rights of patient medication administration (Right -patient, dose, drug, time, route, documentation) at the beginning of each shift change and whenever the PCIA pump is opened. Once checking is completed it should be documented on the PCIA chart. The process is to be undertaken in accordance with OD 0141/08, \(^7\) Code of Practice for the Handling of Schedule 8 medications.

A dedicated PCIA pump and IV tubing and a giving set with an anti-siphon and anti-reflux valve must be used.

The infusion line is to be clearly labelled in accordance with the ACSQHCs National Recommendations for User-applied labelling of Injectable Medicines, Fluids and Lines.
and a joint statement supporting user-applied labelling standardisation for all injectable medicines and fluids User-Applied Labelling Standardisation for All Injectable Medicines and Fluids. 8, 9

Epidural and IV tubing may have the same connection mechanism and are interchangeable. Care is required to reduce inadvertent interconnection between the IV and epidural routes.

6. Patient Observations

It is recommended observations specific to the use of PCIA pumps are performed at a minimum, at the following intervals:

<table>
<thead>
<tr>
<th>Time since commencement</th>
<th>Observation frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2 hours</td>
<td>Every 30 minutes</td>
</tr>
<tr>
<td>2-8 hours</td>
<td>1 hourly</td>
</tr>
<tr>
<td>8-24 hours</td>
<td>2 hourly</td>
</tr>
<tr>
<td>&gt; 24 hours</td>
<td>As warranted; but at least every 4 hours</td>
</tr>
</tbody>
</table>

Recommence the ‘observation frequency’ intervals in the event of variation in dose.

Infusion observations at a minimum are to include the following PCIA specific parameters:

- date and time
- respiratory rate
- oxygen saturation
- blood pressure
- pain score at rest and movement
- sedation score
- nausea score
- cumulative dose (measurement in mg or microgram).
Observation charts are to include a description of sedation, nausea and pain scores with instructions on intervention points. A suggested scoring system is described below.

<table>
<thead>
<tr>
<th>Observation</th>
<th>Score Range</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| Sedation    | 0 – 3       | 0 – wide awake  
1 – easy to rouse  
2 – easy to rouse but constantly drowsy  
3 – somnolent and difficult to rouse |
| Pain        | 0 – 10      | 0 – no pain  
10 – worst pain imaginable |
| Nausea      | 0 – 4       | 0 – no nausea  
1 – mild nausea  
2 – severe nausea  
3 – dry retching  
4 – vomiting |

Care must be taken to distinguish the over-sedated patient from one in normal sleep as the former highlights a risk of impending respiratory depression.

Physiological observations should be recorded, and actions followed as per escalation protocol, in line with the parameters detailed on the WA Observation and Response Charts.

PCIA orders must include clear guidance regarding the triggers for seeking medical advice (see Key considerations 8 & 9). In sites where there is no dedicated pain service, contact numbers of those who hold clinical responsibility for the patient are to be clearly documented, enabling contact when required (24hrs/day).

7. Oxygen and Pulse Oximetry

Oxygen therapy may be prescribed at 5 L/min via Hudson mask or 2 L/min via nasal prongs or as otherwise directed by the prescribing medical practitioner.

**Oxygen therapy can mask:**

1. **Respiratory depression:** It is essential that respiratory rate and level of sedation (in the undisturbed/ sleeping or restful state) is closely observed, particularly in patients with known opioid dependence. It is suggested the respiratory rate is the
first vital sign taken, prior to disturbing the patient.

2. Evolving upper airway obstruction: If there is a risk of upper airway obstruction, avoid indiscriminate administration of oxygen as worsening obstruction may not be recognised i.e. saturations may be maintained, until critical state is reached.

In line with the Operational Directive Guidelines for Acute Oxygen Therapy for Western Australian Hospitals, clause 3; the prescribing medical practitioner must specify the target saturation percentage for each patient.  

Patients considered high risk and who may require continuous pulse oximetry include patients with:

- concurrent sedative medication
- known cardio-respiratory impairment
- known sleep apnoea, airway obstruction, morbid obesity, COPD or asthma
- sedation score greater than 2 (increased sedation can be one of the earliest signs of potential respiratory depression)
- unexplained drop in oxygen saturation levels.

8. Concurrent Sedative Medications

The risk of inadvertent overdose or respiratory depression from concurrent prescription of other sedative or analgesic drugs must be considered. No additional opioids / sedatives are to be given by any route unless ordered by the authorised prescriber (as noted in Section 3). This may include notification that the prescribing medical member of an APS / anaesthetist/ GP anaesthetist/ ICU intensivist is to be consulted if analgesic or sedative prescriptions are to be altered.

Where multiple drugs are prescribed for analgesia, it is recommended that either these are charted on the same order / medication chart; or documented in a manner which allows co-administered drugs to be easily reviewed.

Where other drugs with sedative potential are prescribed, these are to be readily apparent upon review of the medication chart and as necessary clarified by writing ‘Not to be given with PCIA’.

Where standard medication charts are used in conjunction with the PCA chart, a notice alerting users to the PCIA prescription is to be inserted e.g. “PCA chart in use” alert in the standard drug chart, or “other drug” alert on the PCIA chart.

Precaution: Some individuals have ultra rapid metabolism of codeine to morphine – which may lead to morphine toxicity on recommended doses of oral codeine.¹¹
9. **Triggers for Early Clinical Intervention**

The management of problems, in particular the threshold for obtaining medical assistance, must be outlined on the PCIA order form.

<table>
<thead>
<tr>
<th>Patient sign / symptom</th>
<th>Management</th>
</tr>
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| Apnoeic or pulseless   | Call the hospital Medical Emergency Team (MET) - code blue.  
Cease PCIA, commence basic life support, and if instructed, administer intravenous naloxone.  
Urgent medical advice should be sought and arrangements made for ongoing monitoring and care as the patient may require a naloxone infusion (the duration of a naloxone injection may be less than that of the opioid). |
| Respiratory depression (significant sedation and / or respiratory rate less than 8 per minute) | Cease PCIA and give oxygen (5 L/ min by Hudson mask).  
Attempt to wake patient with both verbal and / or physical stimulation.  
Call the prescribing medical service / practitioner or as per the hospital’s clinical deterioration procedures. |
| Confusion or agitation | Cease PCIA.  
Call the prescribing medical service / practitioner. |
| Spot pulse oximetry - oxygen saturations equal or below 90% | Interventions as per the escalation actions in the WA observation and response chart or clinical deterioration procedures.  
Call the prescribing medical service / practitioner. |
| Persistent pain / Inadequate analgesia | Administer adjunctive pain medications, if charted.  
Contact the prescribing medical service / practitioner. |
| Nausea and Vomiting | Administer anti-emetics as charted.  
If charted anti-emetics are not effective, contact the prescribing medical service / practitioner. |

Additional signs/symptoms requiring urgent medication attention include:

- Tachypnoea, hypotension, cyanosis or pallor
For response to additional patient signs/symptoms refer to your WA observation and response chart; site specific deterioration, escalation or emergency response guidelines, for early recognition and response to patients whose condition is deteriorating.  

10. Additional Drug Requirements

PCIA prescription forms should also include the following:

- Naloxone 400 microgram must be available on the resuscitation trolley in any environment where a PCIA is utilised.

11. Discontinuation of PCIA

Patient check list before removal of the PCIA:

- A decision to cease the PCIA has been made by an authorised prescriber (refer to 3.1).

- Pain relief is being controlled using appropriate alternatives e.g. oral analgesia-paracetamol, NSAIDs, opioids.

- Tolerating oral diet and fluids occurs before prescribing oral analgesia.

- Consider discontinuing the PCIA when the most support is available to the patient e.g. when most nursing staff are rostered on-duty and prescribing practitioners are available.

- Any remaining opioid must be disposed of in line with the Poisons Regulations 1965⁴; the OD 0141/08⁷ for handling schedule 8 medications and in accordance with hospital policy.

- Record the volume of S8 discarded on the PCIA chart.
• References


