Department of Anaesthesia & Perioperative Medicine

Cairns Hospital
Cairns & Hinterland Hospital and Health Service

Acute Pain Service

Guidelines
for
Prescriptions and Problems

2019

CONTENTS

GENERAL INFORMATION

The objectives of the APS are to prevent suffering, avoid complications of pain or pain treatment, and encourage earlier mobilisation.

Service Provision:

- Education and advice for acute and (some) chronic pain problems on the wards.
- Supervision of specialised analgesic techniques.

Responsibilities:

- For postoperative pain relief the choice of technique and the responsibility for initial pain control remains with the theatre anaesthetist.
- New ward referrals, which must be from medical (**NOT** nursing) staff, must be attended to **in person** within a reasonable time frame. Verbal orders alone, eg for a PCA prescription, are **NOT** acceptable.

Forms:

- **APS Record Sheet** - must be completed and placed in the box in the Recovery Room ('Recovery') postoperatively.
- **Prescription orders** - standardised sheets, available in each theatre, are to be used.
- **Spinal and epidural audit forms** (pink) and **Non-neuraxial block audit forms** (yellow) are to be completed for all relevant patients, to ensure adequate surveillance for complications (eg nerve injury, PDPH) as well as to document efficacy.

Principles:

- All infusion techniques (including PCA) are intended for **maintenance** of analgesia.
- To **achieve** initial patient comfort, bolus doses of local anaesthetic or opioid are required, eg using the Recovery IV Pain Protocol (details are available in Recovery).
- Initial stabilisation of the technique is essential. This means adequate pain relief, control of nausea and good hydration. Postoperative patients should not leave Recovery until these aims are achieved.
- For adults, oxygen (Hudson mask or nasal cannulae) should usually be ordered routinely on the anaesthetic sheet or drug chart.
- Supplemental analgesia (eg with regular paracetamol and NSAID) should be started if possible while the patient is still on the primary analgesic technique.

Observations:

- Patient observations (as per Standard Orders) are recorded in ieMR and on the PCA and Epidural supplementary observation form.

1. ADULT PCA

1.1. Introduction

- PCA is a good technique after major procedures or trauma, for patients who are otherwise well.
- If at all possible, PCA should be discussed with the patient preoperatively. Patient education is the key factor in proper utilisation of PCA. In addition, patients may have anxieties about its safety, risk of addiction etc, which should be addressed.
- The patient must understand the importance of being comfortable enough to **sleep**, **move**, **breathe** and **cough**.
- The ability to use PCA effectively is hard to predict, and patients often need ongoing "coaching" on the ward.
- Morphine is the standard opioid as it results in less acute tolerance than fentanyl, and a lower potential for toxicity than pethidine or tramadol.

1.2. Standard Prescription is:

1.2.1. **Morphine** 120mg with saline to 120ml (add further saline to 100ml bag) in the Hospira Sapphire pumps,
bolus 1mg or 2mg, **lockout** 5 mins, no background and no 4 hour limit.

- For adults, age is more important than weight for determining doses:
- In young and fit patients a 2mg bolus may be advisable, with 1mg in the middle-aged. For patients over 65-70 years, consider a smaller bolus eg 0.5mg.
- Opioid tolerant patients generally need larger doses (see Section 7).

1.2.2. **Fentanyl** is the preferred opioid if the patient has had adverse effects from morphine, or has renal impairment.

- Prescribe **1000mcg** in **100ml** (10mcg/ml)
- Use **20mcg** fentanyl ≅1mg morphine, with 5 min lockout and no background.

1.2.3. **Oxycodone** is another alternative to morphine; use 100mg in 100ml with boluses as per morphine.

1.2.4. **Pethidine** is not recommended because of its higher potential for confusion, toxicity and addiction compared to morphine, though it is not prohibited. It should clearly be avoided if the patient has high requirements (eg prior opioid tolerance) or renal impairment, because of the risk of norpethidine toxicity. More than 1000mg/day is potentially harmful in young patients; less than this may be harmful in the elderly or renally impaired.

1.2.5. **Tramadol** is appropriate for patients who are at increased risk from opioid side effects. Examples are patients with obstructive sleep apnoea,

patients with (or at high risk of) paralytic ileus and some elderly patients. It is more expensive than morphine and is more emetic when given IV.

- It should NOT be prescribed in conjunction with MAOIs include moclobemide (Aurorix); concurrent SSRIs/SNRIs are a relative C/I.
- Ondansetron counteracts the analgesic effect and is less effective than dopamine antagonists as an antiemetic for tramadol.
- Prescription: **500mg** in **100ml** (**5mg/ml**), **20mg** bolus, 5 min lockout.

1.2.6. **Background infusions** are unnecessary for most patients receiving PCA, and increase the risk of adverse events. However they are appropriate for patients currently nil orally, who are usually on regular opioids (**give 1/3 of daily oral morphine dose IV over 24 hours**)[#]**,** and can also be used in those who wake at night because of pain. As a starting guideline, the bolus dose and hourly rate should be equal in these situations**.**

- [#]**Example:** A patient on 300mg MS Contin daily ≅ 100mg IV morphine daily. Give 4mg/hour as background infusion (if nil orally) and 4mg morphine bolus with 5 min lockout.
- If able to take tabs, it is better to give the patient's usual MS Contin, with 4mg PCA boluses but no background.

1.2.7. **Ketamine** infusions can be added for patients with severe neuropathic pain or who are very opioid tolerant (see section 5.5). It can result in CNS side effects.

- Ketamine can also be combined with Midazolam for **treatment of burns** (debridement during baths) or repeated prolonged dressing changes. The recommended mixture is ketamine 200mg with midazolam 10mg in 100ml, prescribed as ketamine 10mg bolus and 5min lockout.

1.3. PCA Problems

1.3.1. Problems and Side Effects Standard Orders

- For all patients receiving specialised analgesic techniques, there are standard orders for problems and side effects available on the analgesic prescription sheet.
- The standard orders cover problems such as nausea, sedation, itch, hypotension and poor pain relief, with prescribed treatments and advice about when to call the APS.
- If appropriate for the patient, they simply need to be authorised by signing and dating. On the hospital drug sheet prn section write "Antiemetic Protocol", sign and date, and cross out other antiemetics to avoid confusion and duplicate treatments.
- When the analgesic technique is stopped, the nurses may continue to use the PSE standard orders unless they are specifically stopped as well.

- If the standard orders are unsuitable for a patient (eg previous dystonic reactions) the anaesthetist should modify the standard orders accordingly, or cross out the standard orders and write antiemetics individually on the hospital drug sheet.

1.3.2. PCA "not working" (poor pain relief)

- Is the PCA **attached** to the patient? Check connections for leaks and blockages.
- Check that the **programming** of the pump and the syringe additives are correct.
- Ensure "**compliance**": has the patient received at least 4 or 5 boluses in the last hour? If not, check the patient's understanding, ability and willingness to use the button.
- Are analgesic requirements **more than expected**?
  - If so, consider other causes eg compartment syndrome, urinary retention, abdominal bleeding.
  - If the above factors are not relevant, and successful attempts are at least 4 or 5/hour, then **double** the bolus dose.
- Also consider:

  (i) **manual IV boluses** to regain analgesic control

  (ii) treatment of **side effects** (such as nausea) to improve compliance

  (iii) **additional therapy** (eg NSAIDs) or

  (iv) a **different technique** if still unsuccessful.

1.3.3. Nausea and Vomiting - the A to E of Antiemesis:

A. Assess risk of Post-operative Nausea and Vomiting (PONV)

- Patient, anaesthetic and specific surgical risk factors are relevant: Complete emesis risk analysis (Sticker on Anaesthetic Chart)
- Prophylaxis is clinically indicated and cost-effective for patients at significant risk of PONV, ie with 2 or more risk factors. However, the relative benefits, risks and costs of prophylactic treatment should be assessed for each patient.

Suggested Antiemetic Prophylaxis			
Risk Factor	**✓ if present**	**If patient has**	**Use at least**
Hx PONV or motion sickness	☐	✓✓	1 antiemetic
Female or child ≥ 3 years	☐	✓✓✓	2 antiemetics
Non-smoker	☐	✓✓✓✓ or more	3 antiemetics
Post-op opioids	☐	**Options:** Dex 5mg/droperidol 1mg/ ondansetron 4mg/ TIVA	
Hysterectomy/chole/TKR	☐		

B. Baseline factor reduction is important and effective

- Consider regional anaesthesia
- Consider omitting N_2O or using TIVA for general anaesthesia
- Ensure adequate hydration
- Use supplemental analgesics (paracetamol, NSAIDs, nerve blocks) to minimise opioid requirements.

C. Choose correct antiemetic drugs

- Dexamethasone, droperidol and ondansetron (or other $5HT_3$ antagonists) are the most validated prophylactic drugs.
- The "order" of prophylactic drugs should be determined by the risk of PONV, the drug cost and potential adverse effects for a patient.

  For example, use dex $\rightarrow$ droperidol $\rightarrow$ ondans $\rightarrow$ TIVA for increasing risk for most adults having major surgery.
- Dexamethasone should be given after induction (slow onset but risk of perineal pain with injection).
- Droperidol and ondansetron should be given 15-30mins before waking (short duration).
- Droperidol can also be added to PCA morphine (5mg per bag), especially for high risk patients.
- Consider potential contraindications: previous dysphoria/dystonia/QT prolongation with droperidol; tramadol use (antagonism) with ondansetron.
- Dexamethasone (0.2-0.4mg/kg) and ondansetron (0.1mg/kg) are better than droperidol (0.02mg/kg) for paediatrics.
- Cyclizine (50mg IV) is an effective but more expensive antihistamine antiemetic with anticholinergic properties.
- Promethazine (0.1mg/kg IV) is useful for both children and adults, but may cause sedation.

D. Degree of risk determines degree of prophylaxis

- Multiple antiemetics should be used for patients at high risk (see above).

E. Emesis should be treated with drugs from different classes

- If emesis occurs within 4-6 hours of previous treatment, different drugs to those already used should be employed.
- Symptomatic relief should usually follow a straightforward pattern unless there is an important cause that can be treated (see below).
- **The Nausea Protocol** (on APS sheets) follows a set pattern, **taking account of recommended prophylaxis**. It reads as follows:
- Give drugs in the order prescribed until nausea is relieved, and record below.
- If nausea persists after 15 minutes, give the next drug.
- If a drug works (nausea relieved for 4 hours), start with that drug next time.
- If all three drugs are ineffective or nausea recurs within 4 hours, notify APS.

Drug	Dose/Route	Record of drug given					
		Date/ Time	Name/ Sign	Date/ Time	Name/ Sign	Date/ Time	Name/ Sign
Metoclopramide	10mg iv/im						
Ondansetron	4mg iv/wafer						
Droperidol #	1mg iv						

Droperidol preparation: dilute 2.5mg (1 amp) into 2.5ml total with saline and give 1ml

Please Note:

- The Nausea Standard Order is intended for "normal" adults, so modification may be required for the frail elderly (eg decrease droperidol dose) or children (eg try ondansetron first).
- Prescribers should be aware of the potential adverse effects of the drugs for different patient groups.
- **The Recovery Room Antiemetic Protocol** is very similar, but with 10 minutes between doses.

If treatment remains ineffective, consider:

- Specific causes eg paralytic ileus (which requires a nasogastric tube), hypotension, or other drugs eg antibiotics (such as erythromycin or metronidazole), digoxin.
- A decrease in bolus size if nausea follows the bolus doses.
- A different anti-emetic eg. Cyclizine 50mg IV, Phenergan (promethazine) 5-10mg IV (0.1mg/kg), Stemetil (prochlorperazine) 12.5mg IM, dexamethasone or naloxone in 50-100ug IV increments.
- Low-dose midazolam (eg 2mg) or propofol (20mg) have been reported to be of some value.
- A change of opioid, which works in some patients.
- Stopping opioid analgesia altogether and using Paracetamol ± NSAIDs.

1.3.4. Pruritus

The Itch Protocol reads:

- Give drugs in the order prescribed until itch is relieved and record below.
- If itch persists after 15 minutes, give the next drug.
- If a drug works (itch relieved for 4 hours), start with that drug next time.
- If both drugs are ineffective or itch recurs within 4 hours, notify APS.

Drug	Dose/ Route	Record of drug given					
		Date/ Time	Name/ Sign	Date/ Time	Name/ Sign	Date/ Time	Name/ Sign
1. Naloxone ##	0.1mg iv						
2. Promethazine* (Phenergan)	5mg iv 10mg oral						

Naloxone preparation: dilute 0.4mg (1 amp) into 4ml total with saline and give 1ml.
*Promethazine IV preparation: dilute 50mg (1 amp) into 5ml total with saline and give 1ml.
NB Omit Promethazine if sedation score >1.

Additional points:

- If itch is persistent, consider a change of opioid. In general, itch is worst with morphine, intermediate with fentanyl and oxycodone and least with pethidine. Also consider stopping opioids altogether.
- Consider other causes of itch, eg scabies, eczema, which require specific treatment.

1.3.5. Sedation

- Excessive sedation is due to **opioid-induced respiratory depression** until proven otherwise. It results from both a direct drug action and a high pCO_2.
- Other sedatives potentiate these effects, and should usually be avoided while the patient is on opioids.
- **The Naloxone Protocol** reads:

  If Sedation Score = 2 and Resp rate less than 8/min OR if Sedation Score = 3, a Registered Nurse/Midwife is authorised to:

  1. Dilute Naloxone 400micrograms to 4ml with 0.9% NaCl (100micrograms/mL)
  2. Give Naloxone 100mcg every 2 minutes until sedation score <2.
  3. Ensure APS has been notified and patient is receiving oxygen. Monitor for further 2 hours. If sedation score returns to <2, repeat steps 1-3. Record doses given on medication chart.

Additional points**:**

- Sedation is graded as follows:

Sedation Score	
0 = Nil	Awake, alert
1 = Mild	Slightly drowsy, easily roused
2 = Moderate	Very drowsy but easy to rouse
3 = Severe	Somnolent, difficult to rouse
A = Asleep	Normal sleep, easy to rouse

- Patients with a **Sedation Score of 2** find it hard to stay awake while being spoken to. In this event the bolus dose should be halved, any background infusion stopped and oxygen administration ensured. If the respiratory rate is also <8/min, titrate naloxone IV in 100mcg increments.
- A change **of technique** (eg epidural or nerve block) or **change of drugs** (to paracetamol and/or NSAIDs and/or tramadol) may be required.
- A Score **of 3** necessitates O_2, naloxone and possibly assisted ventilation. Some patients will not wake up despite naloxone until the pCO_2 is lowered with manual ventilation.

1.3.6. Stopping PCA

- If the patient is taking oral fluids, oral analgesia should be considered as soon as practicable.
- **Regular** paracetamol (eg 1g qid) and **NSAID** (see below) should usually be started while the patient is still on PCA.
- The **morphine requirements** over the previous 12 hours (and the trend in usage) can be used to estimate the type and dose of oral analgesia required:
- For patients **already on paracetamol and NSAID**, an ongoing IV morphine requirement of <20mg over 12 hours will usually be covered by adding immediate release (IR) **tramadol** 50-100mg q4h or q6h prn or regular, or sustained release (SR) 100-200mg bd, and/or **oxycodone** IR (5-15mg q3h prn), depending on the morphine requirement and level of pain.
- If more than 20mg morphine was required in 12 hours, supplemental **oxycodone** will usually be necessary initially. Controlled release (CR) oxycodone **eg Targin (Oxycodone/Naloxone)** or **Oxycontin** is useful

if morphine requirements are not falling: for x mg of morphine over 12hours, change to x mg CR oxycodone bd regularly.

- For patients **not previously on oral analgesia**, an ongoing IV morphine requirement of < 10mg over 12 hours will usually be covered by Panadeine or Paracetamol (q4h prn) and/or NSAID.
- If >10mg were used in 12 hours consider**:**

  NSAID+paracetamol+tramadol and/or **oxycodone CR and/or** IR, depending on morphine requirements. However, a choice of analgesics should be prescribed as requirements will vary between individuals, and will usually decrease with time.
- **Intermittent SC analgesia** with morphine (SC is preferable to IM) is an appropriate "back-up" for de-cannulated patients after stopping PCA, however SC pethidine is irritant. It can also be used as the primary technique for patients unable to use PCA, or patients who may need an occasional bolus (eg. for physio) but who otherwise have low opioid requirements.
- If repeated injections are likely, an indwelling SC cannula should be considered as it will cause less discomfort (and less risk to staff) than intermittent jabs.
- Requirements on PCA or IV boluses can be used to guide dosage; otherwise the following is suggested: minimum dose interval should be **2-hourly prn** in almost all circumstances.
- Suggested SC morphine doses for "well" patients are:

Age	Dose (mg)
≈20-40	10-15
40-70	5.0-10.0
>70	2.5-5.0

- Some patients will require more or less than these dose ranges: the prescription should be altered accordingly.
- Within the prescribed range, nursing staff should be encouraged to give an amount appropriate for pain and sedation scores.

2. IV OPIOID INFUSIONS

2.1. Principles

- PCA is a safer and more effective technique except with the best nursing care. However, some patients find PCA too difficult (eg. children less than school age).
- IV opioid infusions necessitate even closer monitoring than PCA.
- Like PCA, an IVI is for **maintenance** of analgesia after pain control is gained with IV boluses.
- **Continuous O_2** should **always** be prescribed in adults, and continuous **oximetry** +/- O_2 in children.
- Meticulous patient observation (of **pain** and **sedation**) is essential to achieve efficacy and safety.

2.2 Prescription

- Outside of ICU, prescribe on the usual IV PCA order sheet and Sapphire pump, using the PCA + continuous mode.

  For **children**, round off the patient's weight to the nearest 5kg. For those **≥ 25kg** use **120 mg** morphine in 120ml; for those < **25 kg** use **60 mg** in 120ml.

  Suggested initial rate is **20ug/kg/hour** (range 0-40) – see table below.

  Bolus doses (nurse administered) should usually be permitted (eg **20 ug/kg** with lockout of **20 mins**):

Patient Weight	Morphine (MG) in 120ml with saline	Final Conc'n (MG/ML)	Bolus dose (MG)	Continuous Rate (MG/H)	Lockout (minutes)
10	60	0.5	0.2	0.2 (0-0.4)	20
15	60	0.5	0.3	0.3 (0-0.6)	20
20	60	0.5	0.4	0.4 (0-0.8)	20
25	120	1	0.5	0.5 (0-1.0)	20
30	120	1	0.6	0.6 (0-1.2)	20

2.3. IVI Problems

2.3.1 Analgesic failure

- As with PCA, consider other (eg. surgical) causes if the pain seems excessive.
- However, a low infusion rate, or no provision of boluses (eg. for physio), are the chief causes of failure.
- Review of the prescription, advice to the nursing staff, or additional boluses to regain analgesic control may be required.

2.3.2 Pruritus and nausea

- The rate of infusion is often more than is required for adequate analgesia. Otherwise, management is similar to that suggested for PCA (see above).

2.3.3 Sedation

- Patients with a sedation score of 3, or a score of 2 and a respiratory rate of less than 8, require oxygen ± assisted ventilation, naloxone and the infusion stopped.
- Patients with a score of 2 but adequate respiration should have the infusion rate halved, or stopped for a time if pain is absent or mild.

2.3.4 Naloxone infusion

- As the half life of Naloxone is shorter than that of opioids, the patient should be observed for 2-3 hours after Naloxone administered in case of relapse. If an infusion is required, the patient should have continuous pulse oximetry and have a Registered Nurse "Special"
- Infusion dilute 4mg in 100ml 0.9% sodium chloride or 5% glucose
- Titrate patient's response – usually 0.5 to 1.0mg per hour – 12-25ml per hour

3. EPIDURALS

We use **Epidural continuous infusions (with PCEA)** and **Patient Controlled Epidural Analgesia (PCEA).** An IV cannula must be in situ until the epidural is removed and its effects have disappeared.

3.1. Epidural continuous infusions (with PCEA)

An infusion containing local anaesthetic is the analgesic technique of choice for older patients having open major abdominal surgery.

- **For the surgical wards** the preferred mixture is:
- **200ml levobupivacaine 0.125% and morphine 5mg** to make **200ml**.
- Final concentrations are therefore 0.125% levobupivacaine and 25 mcg/ml morphine.
- Levobupivacaine with fentanyl 5mcg/ml is less reliable but causes less itch.
- The prescribed **delivery** (infusion) **rate** is **0-12ml/hr**. The starting rate needs to be prescribed to allow the pump to be programmed. A suggested starting rate is **6ml/hour**, but this may be altered depending on patient condition and age (often 3 or 4ml/hr for small or frail patients).
- The **bolus dose** is **2ml q 20mins** controlled by the patient demand button.
- **Initial analgesia** should be obtained either with a bolus of 10-15ml of 0.125% levobupivacaine or with stronger LA solutions. An **initial bolus** of **morphine, 1 or 2mg** epidurally, should also be given early during surgery.

3.2. PCEA with pethidine is an excellent technique after caesarean section, and can be considered for some other operations eg THR/TKR.

- The standard order is **500mg** in **100ml**, with **20mg** bolus, **15min** lockout via a Sapphire pump.
- **Obstetric epidural PCEA** solution is **0.125%** levobupivacaine and **2ug/ml** fentanyl in **50ml** via the Go Medical disposable PCEA.
- The bolus dose (4ml) and lockout interval (15min) are fixed by the mechanical design of the pump.
- Full details for birth suite analgesia are in the appropriate Obstetric Analgesia protocol documents.

3.3. Epidural problems

3.3.1. Prevention

- Ensure the patient has no contraindications, such as anticoagulation, sepsis or hypovolaemia.
- For most LA techniques the catheter **MUST** be sited at the dermatomal level of the operation.
- Postoperatively, a period of stabilisation in PACU (eg 1-2hours) is essential for an epidural infusion (Section 3.1).
- A locking epidural device with a clear dressing over it prevents displacement and allows easy checking of the site.

3.3.2. Analgesic failure

- Check for obvious **disconnection** or **catheter displacement**. Check depth of the epidural space and other information from the notes or the inserting anaesthetist. A unilateral block warrants withdrawing the catheter so that 2-3cm only remains in the epidural space.
- However, **inadequate dose** is the usual cause.
- **Plan:**
  - The nurses should encourage the patient to push the demand button every 20 mins and can increase the rate of infusion, eg by 25-50% of the current rate if not greater than the maximum prescribed.
  - Give a bolus of 5-10ml of 0.25% (levo) bupivacaine if the patient is in severe pain, or nursing adjustments are unsuccessful. This may help confirm correct placement and regain analgesia.
  - Give a fluid bolus at the same time to help prevent hypotension.
  - If not working, re-site the catheter or change technique. PCEA pethidine is useful if the block is too low despite corrective measures (first give an epidural bolus of 25-50mg of 5mg/ml pethidine to check that it’s going to work).

3.3.3. Hypotension

- This is usually due to **relative hypovolaemia** from vasodilation.
- Initially give 1 or 2 fluid boluses, eg of 500ml of saline/Hartmann's.
- Consider ongoing fluid/blood loss, or a subarachnoid block.
- **Vasopressors** such as ephedrine (5-10mg IV and/or 30mg-60mg IM) or metaraminol (0.25-0.5mg IV and/or 5-10mg IM) should be used if the patient's overall fluid status is euvolaemic. These can be repeated if necessary, or an infusion started (consider transfer to ICU2).
- The level of an LA block should be checked and if too high the epidural can be stopped for an hour or two, and/or set at a lower rate. Only on rare occasions should the epidural be abandoned.
- Ongoing fluid losses (eg bleeding), sepsis, cardiovascular drugs and rarely cardiac disease are other important causes of hypotension.

3.3.4. Duration of epidural analgesia

- This should depend on the surgery and individual analgesic requirements. In general, 24 hours is sufficient after peripheral vascular surgery and LSCS, 48 hours after THR, and 48-72 hours after TKR or major abdominal surgery. If analgesia is inadequate or there are significant adverse effects, earlier removal should be considered.
- **NB:** see **Patients on Anticoagulants** (Section 3.3.10).
- Daily review of the insertion site is essential, and the catheter removed if there are any signs of infection. In this case, the catheter tip and a swab of the site should be sent for C and S (it is *not* done routinely).
- Local antisepsis (eg. alcohol or betadine) is then required, ± antibiotics and drainage of any collection.

3.3.5. Motor/sensory block

- With low concentration solutions leg weakness is rarely a problem after 24-48 hours. A lower rate may be helpful.
- A different technique should be considered if there is a persistent dense block, or mobilisation is delayed by leg weakness.
- Careful documentation of **unexpected** weakness or numbness is **essential**. In this case the epidural should be **stopped immediately** to differentiate between an LA effect (which should wear off over 2-4 hours) and other problems including a space-occupying lesion.
- **Epidural haematomas** or **abscesses** result in new or persistent weakness, numbness or sphincter disturbance, and need urgent MRI and surgical (ie orthopaedic) referral. Severe backache or unexplained pyrexia are other important signs.

3.3.6. Urinary retention

- Electively catheterise **everyone** at the time of operation. The IDC can usually be removed at 24-48 hours. A bladder scan may be useful to ensure adequate voiding 4-6 hours after IDC removal.

3.3.7. Pruritus

- Naloxone and promethazine are on the Itch Protocol on the Epidural Order Sheet (see Section 1.3.4).
- Remove morphine from the solution if persistently troublesome. Low concentration fentanyl (eg 500 mcg in 200ml) with 0.5mg adrenaline may be necessary to maintain analgesia.

3.3.8. Nausea

- Consider hypotension and non-opioid causes (eg. paralytic ileus). Antiemetics are on the Nausea Protocol on the Epidural Order Sheet (see Section 1.3.3)

3.3.9. Catheter-filter disconnection

- Either remove the catheter (eg. if 2-3 days old or in the event of heavy contamination), or re-insert the catheter into the filter after the following procedure:
- First clean the outside with alcohol, allow to dry, then trim 2-3cm off the end with sterile scissors.
- Increased vigilance for possible infection is required in the latter case.

3.4. Patients on Anticoagulants

- The timing of epidural catheter removal is very important to minimise the risk of bleeding.
- Catheters should be removed:
  - > 6 hours after subcutaneous unfractionated heparin (UFH)
  - > 12 hours after low dose LMWH eg Clexane (enoxaparin sodium)
  - > 24 hours after low dose NOAC (eg Rivaroxaban)
  - > 2 hours before next dose of UFH, LMWH or starting Clopidogrel
  - > 6 hours before a starting dose of a NOAC
- Daily Clexane should be prescribed at 1800hrs, to enable epidural catheter removal in the morning.
- Use of Clopidogrel or full anti-coagulation of any kind (IV UFH, therapeutic bd LMWH, warfarin or NOAC) **MUST NOT** occur with an epidural in situ. Inadvertent full anticoagulation should generally be fully reversed before epidural catheter removal.
- See also our Perioperative Anticoagulant and Antiplatelet Protocols.

4. REGIONAL ANALGESIA TECHNIQUES

4.1 Overview

- Ultrasound guided nerve blocks (either single dose or catheter techniques) are most commonly done in Cairns Hospital for major orthopaedics or major abdominal surgery.
- For further information see the Ultrasound Workbook on the Cairns Anaesthetists Association website at cairnsanaesthesia.org. Only prescriptions and advice for ongoing analgesia are given here.

4.2 Prescriptions:

4.2.1 Regional Intermittent Infusion:

- For catheter techniques we favour this method over a continuous infusion
- Standard solution: 200ml of **ropivacaine 0.2%**, dose volume of 20ml dose, dose interval of 3 hours.
- Patients will also require **regular supplemental analgesics**, as well as analgesics for **breakthrough pain.**
- Patients with bilateral **rectus sheath catheters** will need two separate prescription forms for the intermittent infusions, and will generally need an IV PCA for the first 24 hours as well.

4.2.2 Single shot block:

- Following a single shot block a stat dose of CR oxycodone is usually indicated approximately 6-8 hours after the block to minimise pain when the block wears off.
- Suggested doses are Targin 10/5 mg if age >65 years and 20/10 mg if age <65, though taking account of patient opioid tolerance and co-morbidities.

5. SUPPLEMENTAL ANALGESIC DRUGS

5.1. Oxycodone

- A full mu opioid agonist, available in 5mg IR tablets, and CR tablets as either **Targin** (oxycodone/naloxone) as preparations from 5/2.5mg up to 80/40mg or **oxycontin** tablets from 10 to 80mg.
- The required dose, as an oral substitute, is approx 1mg of oxycodone for each mg of IV morphine used per time period. **As required** IR oxycodone should be prescribed with a range of doses, eg. **5-20mg oxycodone 3 hourly prn**.
- Advise **patient** and **nursing staff** to start at a suitable dose (often 2 or 3 tabs) depending on previous morphine requirements, and suggest they increase the dose if pain relief is inadequate and nausea/dizziness are not excessive.
- In contrast, **CR preparations** (for ongoing severe pain) should be prescribed **regularly bd** with dose predetermined (often with oxycodone IR back-up). A plan for stopping the CR opioids should be made.

5.2. Tramadol

- Can be given orally (also see Section 1.2.4) to supplement or instead of NSAIDs/ paracetamol, as well as for neuropathic and chronic pain.
- The standard oral dose is 50-100mg qid IR, or 100-200mg slow-release (SR) bd, but higher doses (eg 150mg IR qid) can be used. Nausea and dizziness can be problematic, though perhaps less with the SR preparation.
- **Drug interactions: Contra-indicated** with MAOIs and moclobemide; relative C/Is are SSRIs, venlafaxine etc; ondansetron (See Section 1.2.4).

5.3. Tapentadol

- Similar to Tramadol but without serotonergic effects.
- Contra-indicated with MAOIs but less interaction with SSRIs/SNRIs.
- Currently only available in CR form in Cairns as 50, 100, 200mg tablets.

5.4.NSAIDs

- NSAIDs should be considered in all patients on parenteral opioids, as they may improve pain relief, decrease opioid side effects or abolish the need for opioids.
- It is **essential** to recognise that there are many situations in which they are **contraindicated or inadvisable**, eg: hypovolaemia, sepsis, cardiac failure, renal impairment, severe or aspirin-sensitive asthma, peptic ulceration, pregnancy, before major surgery, in situations with significant risk of

bleeding, high risk of fracture non-union (eg previous non-union; smokers), and in the presence of other nephrotoxic drugs (esp aminoglycosides).

- Recommended NSAIDs are ibuprofen 400mg tds/qid, naproxen 250-500mg bd, parecoxib 40 mg IV daily (only licensed for single dose usage). NB: Combining NSAIDs increases adverse effects.
- Ibuprofen and naproxen can be used with lactation, but ketorolac and indomethacin are not permitted.
- Parecoxib does not cause bleeding, but is C/I with significant IHD.
- Adequate hydration and vigilance for adverse effects (eg. renal dysfunction) are important.
- Consider treatment with a PPI (eg omeprazole 20 mg) or H_2 blocker (eg famotidine 40mg bd) if there is some risk of GI intolerance.
- In most situations NSAIDs should be prescribed on a regular (not prn) basis.

5.5. Paracetamol

- Paracetamol should be prescribed as **regular** (not prn) supplemental analgesia for most patients after surgery, as it decreases opioid requirements, improves analgesia and has few side effects in normal doses.
- It is **essential to write up administration times** for regular treatment, and explain the purpose of supplemental analgesia, to encourage both nursing and patient compliance.
- Patients with liver disease (including heavy drinkers without known cirrhosis) are at increased risk of toxicity – consider reducing the dose or omitting altogether in this group.
- For doses and different preparations, see Section 6.2.

5.6. Acute Neuropathic Pain Treatments

- These include ketamine (also see Section 1.2.6), tramadol (Sections 5.2 and 1.2.4), tapentadol (5.3) tricyclic antidepressants, anticonvulsants, membrane stabilisers, and specific treatments eg antiviral therapy.
- Ketamine infusion: use 200mg (1 amp) in 100ml saline prescribed on Intravenous PCA Order sheet. Initial bolus dose is 0.1-0.3mg/kg, then eg 10mg/hour or approx. 0.1mg/kg/hour. Example: give 8-25mg as a slow bolus, then 8mg/hour (4ml/hour) for an 80kg person. Max dose is 20mg/hour.
- Starting doses for other neuropathic treatments: amitriptyline 10-50mg nocte, Pregabalin 75mg (may start nocte or bd, slowly increasing to 300mg bd), carbamazepine 100-200mg bd.
- IV lignocaine infusion (5mg/kg over 1 hour) may occasionally be used, given in the Recovery Ward. Needs Consultant and APS nurse approval.

- All these treatments can cause sedation and a variety of other adverse effects.

6. PAEDIATRICS

6.1. General Principles

- Doses should be on a mg/kg basis, rounded off to make calculations easier and safer.
- Children hate injections, so use oral or IV routes in preference to IM.
- Pain should be **prevented**, eg EMLA cream, regional blocks, oral medications ± IV opioids.
- Parental agreement is advisable for most forms of analgesia considered.

6.2. Simple Treatments

- **Paracetamol** preparations: tablets and soluble (500mg), syrup (120mg/5ml and 240mg/5ml), suppositories (125, 250 & 500mg), IV (500mg or 1000mg, 10mg/ml).
- Loading dose: oral 20 mg/kg, or IV (15mg/kg = 1.5ml/kg) 15-20mg/kg or rectal 30-40mg/kg.
- Maintenance: oral, IV or rectal 15-20mg/kg 4hrly prn (maximum 4 doses/day), or regular 15mg/kg qid. NB For regular administration it is **essential** to write up administration times to encourage nursing compliance.
- **Ibuprofen** can be prescribed as a liquid (Nurofen Junior, 20mg/ml).
  Dose is 5-10mg/kg qid, regular or prn.

6.3. IV Opioids

- **IV opioid boluses** (eg 0.05mg/kg morphine q30min prn) should be prescribed whenever oral treatments might be inadequate, but more advanced techniques are not indicated.
- **IV infusions** are described in **Section 2**.
- **Paediatric PCA:** School age children can easily manage PCA ("if it hurts, push the button"):
  - As always, education and encouragement are very important, and supplement with regular paracetamol etc.
  - First **establish analgesia**, with nerve blocks or the **Recovery IV Pain Protocol** (details in PACU).
  - **Prescription:** morphine **120mg** in **120ml**, bolus **20ug/kg** and **5 min** lockout, no BG or 4hr limit.
    Round off weight to the nearest 5kg for calculations - for a child of approx 25kg use a bolus of 0.5mg; for 30kg use a bolus of 0.6mg; for 35kg use a bolus of 0.7mg. See Section 1.3 for managing PCA problems.
  - **Oxycodone IR** (eg 0.1-0.2mg/kg q4h orally prn) can be used as either tabs or liquid (5mg/5ml)

7. OPIOID TOLERANT PATIENTS

(Including cancer pain, chronic non-cancer and substance abusers)

7.1. Aims of treatment

- **Adequate analgesia:** will almost invariably need **more** for **longer** (usually extra 1-2 days).
- It is essential to **individualise**, taking account of previous treatment modalities, drug doses and patient acceptance of proposed treatment.
- **Prevent side effects:** danger of both excessive **sedation** because of poor pain relief (so maximise co-analgesics) and **withdrawal** (including alcohol and benzodiazepines - may need judicious diazepam treatment).
- It is usually wise to **separate chronic from acute therapy**, especially for methadone program patients

8.2. Managing difficult patients

Aim to get **patient's agreement** to treatment plan:

- Explain nature and expected duration of therapy
- Give realistic goals (more comfortable, NOT pain free)
- Inform patient of plans for cessation (give 1or 2 days notice of planned stoppage)
- Warnings about tampering (if relevant to a particular patient)
- Involve other disciplines as required (eg psychiatry; alcohol and drug services), but usually **NOT** for advice on acute pain management.

8.3. Specific therapies

- **PCA** with generous dosing is often suitable but pethidine is contraindicated. See "BG infusions" in Section 1.2.5 and "ketamine" in Sections 1.2.6 and 4.5.
- **Regional analgesia** (including epidurals) may be helpful, but is unsuitable if the patient is unwilling or litigious. It is important to supply adequate systemic opioids to avoid withdrawal. Patients with a history of recreational drug use will rarely acknowledge RA to be adequate: well-planned parenteral therapy is nearly always preferable.
- **Methadone** is a useful substitute for morphine tolerant patients at 10 to 25% of the previous daily morphine dose. It comes in 10mg tabs, and should be given in divided doses **TDS or QID** until the dose is stabilised.
- **Tramadol OR Tapentadol** may be useful as a supplemental analgesic, but offer no protection against opioid withdrawal symptoms.

8. SUGGESTED ANALGESIC TECHNIQUES

8.1. GENERAL/VASCULAR SURGERY

Operation/ Trauma	Primary Techniques	Duration of Primary Therapy	Adjuvant Analgesia/ Comments
Major abdominal (eg bowel resection, AAA repair)	1. Rectus sheath catheters 2. IV PCA 3. Thoracic epi PCEA 4. IV intra-op lignocaine infusion 2.5mg/kg/hr	2-3 days	Paracetamol *as soon as possible* (asap) - oral, IV or PR. Targin to minimise ileus. NSAID if possible.
Peripheral vascular	1. Lumbar epi 2. Oral opioid or tramadol	1 day	GA or spinal as primary anaesthetic Remove epidural at 24 hours unless severe ischaemic pain. Paracetamol + tramadol/tapentadol
Rib fractures	1. IV PCA 2. Thoracic epi-inf'n 3. Paravertebral intermittent inf'n 4. Oral only is OK for some	1-3 days	Epidural or paravertebral block for poor lungs and/or severe pain/poor cough. Paracetamol + NSAID asap. **Severe injury or significant comordities may need ICU care – refer early**.
Laparoscopic cholecystectomy	1. Oral opioid or tramadol 2. PCA (rarely)	1-2 days	Dex IV intraop; NSAID (IM/IV/oral) and Tramadol IV near end of procedure. Paracetamol.
Mastectomy	1. Oral opioid or tramadol	1-2 days	PCA is NOT recommended. NSAID (eg IV start in OT) + Paracetamol from the outset.
Inguinal hernia (open)	1. I-I block + SC/oral opioids or tramadol/tapentadol	Hours	GA or spinal as primary anaesthetic Paracetamol + NSAID asap. SC/oral opioid prn.
Burns/Procedural Pain (eg burns bath/wound dressings)	1. IV opioid bolus ± PCA 2. Oral opioid or tramadol/tapentadol 3. Ketamine & midaz PCA (10/0.5mg bolus) – on IV PCA order sheet 4. Entonox – order on standard medication chart		Paracetamol +NSAID asap. Pregabalin regular.

8.2. ORTHOPAEDIC

Operation/ Trauma	Primary Techniques	Duration of Primary Therapy	Adjuvant Analgesia/ Comments
Hip replacement	1. Oral opioid 2. IV PCA 3. epi-inf'n	1-2 days	GA or Spinal +/- fascia iliaca single shot block as primary anaesthetic Paracetamol + NSAID + Tramadol/Tapentadol.
Knee replacement	1. Single shot adductor canal block + IV PCA 2. epi-inf'n in select cases	2-3 days (try to remove at 48 hours unless very sore). Less for hemi-arthro.	GA or Spinal as primary anaesthetic Surgical infiltration 50-100ml 0.2% Ropivacaine intraoperatively Paracetamol + NSAID. Tramadol/Tapentadol. Oral opioid IR +/- CR.
Shoulder surgery (open)	1. Interscalene block +/- IV PCA 2. Intermittent LA inf'n 3. IV PCA	1-2 days	Paracetamol + NSAID routinely. Tramadol/Tapentadol. Oral opioid IR.
Back surgery	1. IV PCA 2. epi-inf'n	2-3 days	Paracetamol + tramadol/tapentadol Pregabalin. Oral opioids IR +/- CR..
Open fracture reduction/other major	1. IV PCA 2. Single shot block or Intermittent LA inf'n (discuss with surgeon)	2-3 days	Paracetamol +NSAID, but avoid NSAIDs if bone grafts/major non-union risk/smoker. Tramadol/tapentadol Oral opioid IR +/- CR.
Knee reconstruction	1. Single shot adductor canal block 2. IV PCA	1-2 days	Paracetamol +NSAID routinely. Tramadol/tapentadol Oral opioid IR +/- CR.
Major ankle/foot surgery	1. Popliteal block (single shot) 2. IV PCA	1-2 days	Paracetamol + NSAID routinely Oral opioids.

8.3. OBS AND GYNAE.

Operation/ Trauma	Primary Techniques	Duration of Primary Therapy	Adjuvant Analgesia/ Comments
C Section	1. PCEA peth 2. IV PCA 3. I/T morph 0.1mg	1-2 days	NSAID + Paracetamol Oral opioid. TAP block
TAH/ other open abdominal	IV PCA	1-2 days	Paracetamol +NSAID asap (end of OT or next day). Oral opioid Epi inf'n or PCEA peth for older patients or those with lung disease.
Vag hysterectomy	IV PCA	1-2 days	Paracetamol +NSAID asap (end of OT or next day). Oral opioid.

Notes / Updates / Amendments

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Please direct any queries to:

Dr James Sartain or Tash Hazelhoff CNC

Department of Anaesthesia & Perioperative Medicine

Cairns Hospital

PO Box 902, Cairns QLD 4870

Ph: 07 4226 6938 / Fax: 07 4226 6854

Email: CHHHS_AcutePainService@health.qld.gov.au

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The Cairns Anaesthetists' Association website:
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