

Use of a Syringe Driver (CSCI)

The syringe driver is a battery-operated device designed to deliver drugs via a continuous subcutaneous infusion (CSCI) over 24 hours.

The main indications are the inability to swallow or absorb drugs due to:

- Weakness or coma
- Persistent nausea and vomiting
- Medical management of intestinal obstruction if surgery is not possible or appropriate

Drugs commonly used in a syringe driver

A combination of drugs can be used to achieve good symptom control.

The syringe driver site, stability of the contents and rate of infusion should be checked regularly.

Analgesics

Morphine is the most commonly used opioid analgesic used by CSCI in a syringe driver although other opioids can also be given via this route.

Calculating doses of opioid via CSCI

- Calculate the 24 hour dose of opioid on the basis of the previous 24 hour opioid requirement. Remember oral and parenteral opioid doses are not equipotent (see conversion table or access the online “Pallicalc” at <http://book.pallcare.info/index.php> to aid calculations).
- For breakthrough pain, prescribe $1/6^{\text{th}}$ of the 24 hour opioid dose which will be the SC bolus PRN injection every 2-4 hours.
- Review the syringe driver medications every 24 hours. Review how much breakthrough medication has been required in the past 24 hours. If persistent pain or more than 3 PRN doses of analgesia have been required, consider increasing the opioid in the syringe driver to take account of this.
- Remember to adjust the breakthrough opioid dose if the background opioid dose is increased.
- Opioids are often combined with other drugs and should be diluted to an appropriate volume with water for injections or 0.9% sodium chloride.

NSAIDS

If a patient is unable to take a NSAID by mouth, an equivalent dose of diclofenac can be given rectally, or by CSCI. Diclofenac should not be combined with any other drugs in the syringe driver and should be diluted with 0.9% sodium chloride with a minimum volume of 20 mls within the syringe.

Transdermal opioids and CSCI

If setting up a CSCI via a syringe driver in a patient using transdermal patches, **continue with the patch** at the appropriate interval and top up the analgesic requirements with the infusion.

To calculate the dose of opioid in the syringe driver, add up how much opioid has been required for breakthrough pain in the previous 24 hours. Remember to **include the opioid dose equivalent within the patch** as well as the syringe driver when calculating the breakthrough dose of opioid [refer to page 41 Opioid Conversion Table or access the online “Pallicalc” at <http://book.pallcare.info/index.php>).

If pain persists seek advice from the Palliative Care Team.

Anti-emetics

Drug	Usual starting dose range/24hours
Haloperidol	1.5mg - 5mg
Levomepromazine	5mg – 12.5mg
Cyclizine	150mg
Metoclopramide	30mg - 60 mg

Respiratory secretions and bowel colic

Drug	Usual starting dose range/24hours
Glycopyrronium bromide	600 micrograms – 2.0 mg
Hyoscine butylbromide (Buscopan)	40mg - 120mg

Terminal agitation and restlessness

N.B. exclude urinary retention and pain [refer to page 24].

Drug	Usual dose range/24hours	Comments
Midazolam	10mg - 60mg Add in levomepromazine if agitation not controlled with 60mg	Useful if anxiety is a feature.
Levomepromazine	25mg - 50mg	Useful if psychotic features are present.

Higher doses can be used but if symptoms do not improve on lower doses then specialist advice should be obtained.

Seizures

If an individual is unable to take oral anti-epileptics and at high risk of seizures or seizures occur, midazolam can be used, starting with 20mg over 24hours and increasing as required.

Pre-emptive prescribing of midazolam 5-10mg SC or IM as PRN dose to be given if a seizure occurs. If uncontrolled seizures despite higher doses (>60mg midazolam) seek specialist advice.

Management of constipation

Assessment

This should include the following:

- Thorough history and examination including rectal examination
Remember that diarrhoea can be overflow from a constipated stool.
- Medication history (to exclude potentially causative medication and to check that laxatives are co-prescribed with strong opioids)
- Exclusion of malignant bowel obstruction

Treatment

- Correct **reversible causes**
- Drugs should be prescribed according to patient needs and preferences
- Oral laxatives are usually preferable to rectal interventions

Consider:

- Side-effects and contraindications
- Patient preferences
- Volume that can be tolerated

Suggested regimens

- Senna 7.5 – 15mg usually at night and increasing as necessary
Side effects: can cause cramps and should be avoided in bowel obstruction
- Combination laxatives: containing softener and stimulant *e.g.* Co-danthramer or Co-danthrusate)
Side-effects: Cramps, diarrhoea. In immobile patients, prolonged contact with skin can cause a ‘dantron burn’ and excoriation. Dantron can discolour urine.
- Osmotic laxatives *e.g.* Macrogols [Laxido]).
Side-effects: Abdominal distension, pain, nausea, flatulence
- Rectal interventions
Suppositories *e.g.* Glycerol and Bisacodyl
Bisacodyl suppositories can cause local rectal inflammation and can cause faecal leakage
Enemas *e.g.* Phosphate enema

Nausea and vomiting in palliative care

Nausea and vomiting are common symptoms in palliative care occurring in over 50% of patients. There is often more than one precipitating factor making management particularly difficult.

Causes of nausea and vomiting

- Area postrema (chemoreceptor trigger zone) activity: *e.g.* biochemical abnormalities (raised calcium or renal failure), drug changes (opioids, cytotoxics, antibiotics, digoxin) or infection.
- Cerebral cortex activity: *e.g.* anxiety
- Emetic pattern generator (Vomiting centre): *e.g.* radiotherapy to head or neck, primary or secondary cerebral tumours
- Gastric irritation: *e.g.* NSAIDs, iron, cytotoxics, radiotherapy
- Gastric stasis or compression: *e.g.* pressure from tumour or ascites or drug induced such as opioids, tricyclic antidepressants, phenothiazines, hyoscine
- Gastrointestinal obstruction [refer to page 15].

An approach to managing nausea and vomiting

- Review current medication and discontinue any non-essential precipitating drugs
- Remove or minimise any other identified precipitating factors
- Treat any reversible causes *e.g.* hypercalcaemia
- Prescribe a regular oral anti-emetic.
- If a patient is vomiting then an injection is necessary and if this successfully controls the vomiting, it can be followed by regular oral anti-emetics
- If the vomiting persists, commence CSCI via a syringe driver
- *N.B.* Reluctance to commence a syringe driver is a common reason for poor management of nausea and vomiting.

First line medication

- Haloperidol 1.5 mg-3 mg as a single night time dose (*N.B.* potential risk of arrhythmias)
- Cyclizine 50 mg tds (often combined with haloperidol)
- Levomepromazine 5-12.5mg as a single night time dose
- Metoclopramide 10 mg-20 mg tds especially if improved gastric emptying is required

Possible adjuvant medication

- Lorazepam 500 micrograms sublingual or PO PRN may be helpful where anxiety is a precipitating factor
- Dexamethasone 4mg - 16 mg/day for raised intracranial pressure.
- Proton pump inhibitors *e.g.* lansoprazole 30mg for gastric irritation.

N.B. Theoretically the prokinetic effect of metoclopramide will be lost if prescribed with an antimuscarinic drug such as tricyclic antidepressants, cyclizine or levomepromazine.

Before moving to 2nd line treatment, consider giving a subcutaneous injection and then starting a CSCI with the relevant drug if necessary.