MONOGRAPH

MORPHINE

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	All Clinical Areas

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this DISCLAIMER

⚠ HIGH RISK MEDICINE ⚠

QUICKLINKS

Dosage/Dosage Adjustments	Administration	Compatibility	Monitoring

DRUG CLASS

Morphine is an opioid analgesic that activates opioid receptors in the central and peripheral nervous systems to produce analgesia and sedation.[1]

Morphine is a High Risk Medicine and a Schedule 8 medication.

INDICATIONS AND RESTRICTIONS[1, 2]

- Relief of moderate to severe acute and chronic pain
- Relief of dyspnoea in acute left ventricular failure and pulmonary oedema
- Sedation
- Dyspnoea management in palliative care
- Opioid adjunct during general anaesthesia

CONTRAINDICATIONS

- Hypersensitivity to morphine or any component of the formulation.
- Significant respiratory depression in non-intubated patients on general wards[3, 4]

PRECAUTIONS[1]

- Hypothyroidism, adrenocortical insufficiency, acute alcoholism, myasthenia gravis, Central Nervous System (CNS) depression – careful titration and monitoring required
- Epilepsy, or patients at risk of having seizures (e.g., head injury, metabolic disorders, CNS infections) – may further increase risk of seizures
- Raised intracranial pressure – respiratory depression may cause retention of carbon dioxide and may further increase intracranial pressure
- Hypotension, shock – increased hypotensive risk, increased risk of respiratory depression
- Patients on oxygen therapy – may mask signs of respiratory failure

FORMULATIONS

Listed below are products available at PCH. Other formulations may be available; check with pharmacy if required:

Parenteral:

- Morphine sulfate ampoule –10 mg/mL
- Morphine sulfate syringes Baxter®– 1000 microg/mL, 2.5 mg/5 mL, 10 mg/30 mL, 50 mg/50mL.

Intrathecal:

- Morphine hydrochloride vial – 200 microg/mL

Enteral:

- Morphine liquid “Single Use Pods” – 5 mg/5 mL (for inpatient use only)
- Morphine hydrochloride mixture – 1 mg/mL
- Morphine sulfate Modified Release tablet – 10 mg, 30 mg, 60 mg

Imprest location: Formulary One

DOSAGE & DOSAGE ADJUSTMENTS

Neonates: Refer to Neonatal Medication Protocols

Dosing in Overweight and Obese Children:

- Calculate dose using ideal body weight.

Renal impairment:[1, 4]

- eGFR calculator
- Morphine has an active metabolite and will accumulate in renal impairment, which may lead to respiratory depression and delirium. Consider using a different opioid or reduce initial dose.

Hepatic impairment:[1, 4]

- Use with caution, titrate dose to response and monitor closely for toxicity. Avoid use in severe hepatic impairment

The doses outlined are within the standard reference range for opioid naïve patients; however, the dose of morphine may vary according to the patient's clinical requirements.

Oral (Immediate Release):[5]

- 1 month to 12 months: 0.1–0.2 mg/kg/dose every 4 hours
- > 12 months: 0.2–0.5 mg/kg/dose every 4 hours (max 10 mg per dose)

Oral (Controlled Release):[5]

Converting oral immediate release product to controlled release:

- Once pain has been adequately controlled with oral immediate release morphine, give half the 24-hour requirement as controlled release morphine every 12 hours then titrate to response.

Converting parenteral opioid to oral controlled release product:

- Once pain has been adequately controlled, calculate the total 24-hour requirement of parenteral opioid. Convert to the equivalent total daily dose of oral morphine using the table below. Start controlled release morphine at 50%-75% of the equivalent daily parenteral opioid dose and adjust dose according to breakthrough dose requirements.

Approximate equianalgesic potencies of various opioids[6]		
Opioid	**Parenteral**	**Oral**
Morphine	10 mg IM/IV/subcut	30 mg
Fentanyl	150 to 200 microg IM/IV/subcut	—
Hydromorphone	1.5 to 2 mg IM/IV/subcut	6 mg
Oxycodone	10 mg IV/subcut (not available at PCH)	20 mg
Tramadol	100 mg IM/IV	150 mg

- Alternative starting dose:

  0.3–0.6 mg/kg/dose (maximum 30 mg) twice daily, adjust dose according to breakthrough dose requirements.

Subcutaneous Bolus:[5]

- Birth (at term) to 1 month: 0.025–0.05 mg/kg/dose every 4–6 hours.
- 1 month to 12 months: 0.05–0.1 mg/kg/dose every 2–4 hours.
- 1 year to 18 years: 0.1–0.2 mg/kg/dose every 2–4 hours (max 5–10 mg/dose)

Repeated subcutaneous administration can cause local tissue irritation and pain. Consider using intravenous or oral administration if subsequent doses required.

Continuous Subcutaneous Infusion:[7, 8]

To be initiated in consultation with the palliative care team.

- ≤ 2 months: Initially 240 microg/kg per 24 hours, adjust to response
- > 2 months: Initially 480 microg/kg per 24 hours (maximum initial dose of 20 mg/24 hours), adjust to response

Intermittent IV Bolus:

On general wards, intermittent IV boluses must be prescribed on the "Intermittent Intravenous Ward Morphine Bolus Protocol" chart (MR 860.12).

- 6 months to 12 months: 25 microg/kg/dose
- > 12 months and < 40kg: 25–50 microg/kg/dose
- > 40kg: 1-2 mg per dose

Doses may be given every 15 minutes as required up to a maximum of 5 doses in 60 minutes.

See Morphine Intermittent Intravenous Bolus.

Intravenous Infusion and Patient Controlled Analgesia (PCA):

On general ward areas, intravenous infusions and patient controlled analgesia must be prescribed by an anaesthetist or Acute Pain Service.

See Opioid Infusion Management in General Ward Areas and Opioid Patient Controlled Analgesia (PCA)

Management of Iatrogenic Withdrawal Syndrome:

Refer to Withdrawal Syndrome Management Guideline

CRITICAL CARE AREAS

See Analgesia and Sedation in Paediatric Critical Care Guideline

Intravenous loading dose:

- < 6 months: 50 microg/kg/dose
- ≥ 6 months: 50–100 microg/kg/dose (max 2.5–5 mg/dose)

Intravenous continuous infusion:

- All ages: 0–60 microg/kg/hour (Neonates: 0–40 microg/kg/hour); max 1–4 mg/hour.
- Additional bolus dose for pain: 20 microg/kg/dose (max 1 mg/dose), repeat up to every 10 minutes as required.

Increase infusion rate in increments of 10 microg/kg/hour if more than 3 bolus doses required in 4 hours. Titrate infusion rate according to response and adverse effects. Higher doses may be required (e.g. in opioid-tolerant patients).

REVERSAL OF OPIOID TOXICITY WITH NALOXONE:[1, 5, 6]

See Opioid Infusion Management in General Ward Areas

Reversal of sedation:

- IV naloxone 2 microg/kg/dose (max 100 microg/dose) every 2–3 minutes

Opioid overdose:

- IV naloxone 10 microg/kg/dose (max 400 microg/dose). Doses may be repeated every 2–3 minutes, up to a total of 2 mg.

ADMINISTRATION

Continuous Subcutaneous Infusion:

Dilute the total 24-hour dose of morphine up to 18 mL with a compatible fluid. Infuse over 24 hours via Niki Pump.

See Continuous Subcutaneous Infusion for Palliative Care Patients

Intermittent IV Bolus:

Dilute to a maximum of 5 mg/mL with water for injections, OR use premade morphine syringes if available; inject slowly over at least 5 minutes.[9]

See Morphine Intermittent Intravenous Bolus

IV Infusion/PCA:

For general ward use:

- Dilute 0.5 mg/kg (max 50 mg) of morphine made up to 50 mL with a compatible fluid to give a solution where 1 mL/hour is equivalent to 10 microg/kg/hour.

See Opioid Infusion Management in General Ward Areas and Intravenous Patient Controlled Analgesia (PCA).

PCC – IV infusion in mechanically ventilated patients:

Patient's Weight	Concentration (in sodium chloride 0.9%)	Notes
10 kg or less	10 mg in 30 mL (0.33 mg/mL)	In a 3 kg patient, 10 microg/kg/hr = 0.1 mL/hr
Above 10 kg	50 mg in 50 mL (1 mg/mL)	In a 20kg patient, 20 microg/kg/hr = 0.4 mL/hr

Patients 10 kg or less may be prescribed the higher strength (50 mg in 50 mL) preparation to reduce fluid overload if clinically indicated, at the treating consultant's discretion.

Epidural/Intrathecal:

- Use preservative-free formulations ONLY.[9]

COMPATIBILITY *(LIST IS NOT EXHAUSTIVE)*

Compatible fluids: Glucose 2.5%, glucose 5%, glucose 10%, glucose in sodium chloride solutions, Hartmann's, Ringer's, sodium chloride 0.45%, sodium chloride 0.9%[9]

Compatible at Y-site: Atracurium, atropine, benztropine, benzylpenicillin, calcium chloride, calcium gluconate, caspofungin, cefazolin, cefotaxime, ceftazidime, ceftriaxone, cefuroxime, clindamycin, dexamethasone, dexmedetomidine, esmolol, fluconazole, heparin, hydrocortisone, ketamine, levetiracetam, lidocaine, magnesium sulfate, meropenem, methylprednisolone,

metoclopramide, midazolam, ondansetron, paracetamol, phenobarbital, piperacillin-tazobactam, potassium chloride, rocuronium, sodium bicarbonate, vancomycin, vecuronium[4]

Only commonly used drugs are listed below. This is not a complete list of incompatible drugs. Compatibilities of IV drugs must be checked when two or more drugs are given concurrently.

INCOMPATIBLE drugs: Aminophylline, amphotericin B liposomal, azathioprine, azithromycin, dantrolene, flucloxacillin, folic acid, ganciclovir, indometacin (indomethacin), micafungin, pantoprazole, pentamidine, pethidine, phenytoin, promethazine, sodium nitrite, thiopentone[4, 9]

For syringe driver drug compatibility, contact Palliative Care team or pharmacy.

MONITORING

General Monitoring for Intravenous Administration:

See Opioid Infusion Management in General Ward Areas and Intravenous Patient Controlled Analgesia (PCA).

- Pre-administration and ongoing pain assessment.
- Baseline and post dose heart rate, level of sedation, respiration rate, oxygen saturation and blood pressure.
- Continuous pulse oximetry for patients at high risk of respiratory depression or if ordered by medical staff.
- Withdrawal symptoms on discontinuation, especially if abrupt or after prolonged regular use (> 5 days). Refer to the WAT-1 form (MR859.80).[2]

Palliative Care:

- Pain assessment, symptom control.
- Discuss with Palliative Care team if additional monitoring required.

ADVERSE EFFECTS[1]

Common: Nausea, vomiting, dyspepsia, drowsiness, dizziness, headache, orthostatic hypotension, itch, dry mouth, urinary retention, constipation

Infrequent: Dose-related respiratory depression, bronchospasm, confusion, hallucinations, delirium, agitation, mood changes, tremor, flushing (due to histamine release), urticaria, hypothermia, muscle rigidity

Rare: Syndrome of Inappropriate Antidiuretic Hormone Secretion (SIADH), anaphylaxis, seizure

STORAGE

- Morphine is a Schedule 8 medication and must be stored as outlined in the Schedule 8 and Restricted Schedule 4 Medication Policy.
- Store below 25 ºC.
- Do not refrigerate.
- Protect from light.
- Ward prepared solutions for IV administration should be used within 24 hours.[3, 9]

INTERACTIONS

This medication may interact with other medications; consult PCH approved references (e.g. Clinical Pharmacology), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

Please note: The information contained in this guideline is to assist with the preparation and administration of **morphine**. Any variations to the doses recommended should be clarified with the prescriber prior to administration

Related CAHS internal policies, procedures and guidelines
High Risk Medicines
Schedule 8 and Restricted Schedule 4 Medication
Oral Conscious Sedation
Morphine Intermittent Intravenous Bolus
Continuous Subcutaneous Infusion for Palliative Care Patients
Opioid Infusion Management in General Ward Areas
Intravenous Patient Controlled Analgesia (PCA).
Drug Dosing in Overweight and Obese Children 2-18 Years of Age
Withdrawal Syndrome Management Guideline
Analgesia and Sedation in Paediatric Critical Care

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File Path:	W:\Safety & Quality\CAHS\CLOVERS MEDICAL Pharmacy\Procedures Protocols and Guidelines\Medication Monographs_Word\PCH.MED.Morphine.docx		
Document Owner:	Chief Pharmacist		
Reviewer / Team:	Senior Pharmacist, Anaesthetic Consultant, Intensive Care Consultant, CNS – Paediatric Critical Care, Paediatric Palliative Care Service Consultant.		
Date First Issued:	Oct 2016	**Last Reviewed:**	Jan 2023
Amendment Dates:	Feb 2020, May 2024	**Next Review Date:**	Jan 2026
Approved by:	Medication Safety Committee	**Date:**	May 2024
Endorsed by:	Drugs and Therapeutics Committee	**Date:**	Jun 2024
Standards Applicable:	NSQHS Standards: NSMHS: N/A Child Safe Standards: N/A		

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