Medication: Hydromorphone	PDN: 6997.04	Last Updated: July 20 2023	PMD: Andrew Travers*	PDC: Tanya Fraser*	

HYDROMORPHONE
For palliative care use only

1.0 Classification
- Semi-synthetic opioid analgesic

2.0 Mechanism of Action
- Full agonist at mu receptor leading to analgesia and sedation.
- Hydromorphone is 10 times more lipophilic than morphine leading to potent and rapid central nervous system effects.

3.0 Indications
- Moderate to severe pain **(PALLIATIVE PATIENTS ONLY)**

4.0 Contraindications
- Known hypersensitivity
- It is **NOT** to be used outside of the palliative population

5.0 Precautions
- Hydromorphone has active metabolites which can accumulate in hepatic or renal failure, therefore dose reduction required.
- Opioids should always be used with caution and in reduced doses in older adults or for patients with dementia due to the potential for drug accumulation and increased sensitivity to CNS active medications.
- Dose reduction should be considered if comorbidities such as COPD, sleep apnea, obesity or any other condition which may increase risk of sedation or cardiorespiratory depression.

6.0 Route
- Subcut is preferred in the palliative setting.

7.0 Dosage
Though standard doses are included below, all dosing will be discussed with MCCP prior to administration. Dosing will depend on how much long- and short-acting opioid the patient is taking on a regular basis as well as when and how much breakthrough has been taken in the last 24h. For patients still tolerating oral hydromorphone, MCCP may advise a breakthrough of the patient's own oral hydromorphone.

Adult
- Usual subcutaneous dose: 1-2 mg or half the patient's usual oral breakthrough dose q 3-6 hours

Pediatric
- 50kg and above: 0.2-0.6 mg/dose q 3-6 hr PRN
- Under 50 kg: 0.015 mg/kg/dose q 3-6 hrs PRN

8.0 Supplied
- 2 mg in a 1 mL ampule

9.0 May Be Given By

- ACP/CCP (after consultation with MCCP)

10.0 Adverse Effects

- Respiratory depression
- Sedation/neurotoxicity and seizures
- Histamine release leading to hypotension and pruritis
- Euphoria
- Miosis
- Slow gastrointestinal motility and constipation

11.0 Special Notes

- Hydromorphone is much more potent than morphine. Exactly how much more varies depending on the reference used, but most pain experts use a factor of 5 when converting to morphine (and then reduce the dose to account for potentially decreased cross-tolerance). Hydromorphone is so potent that seemingly small dose increases can dramatically increase the risk of respiratory depression, sedation, and neurotoxicity. This is even more true for the IV formulation which is approximately 5 times additionally more potent than the oral form. It is for this reason that IV administration is not advised.
- Hydromorphone lasts approximately 2-4 hours regardless of route. For palliative patients who are unable to take oral medication, the subcutaneous route is preferred as it's less painful than starting an IV. For acute pain in palliative patients who are still accepting of IVs, careful IV titration of morphine or fentanyl may be more appropriate as the absorption is predictable and rapid thereby leading to more rapid pain relief in a safer manner.
- It is acceptable for patients who have their own supply of oral hydromorphone to self-administer the oral medication instead of receiving the medication via the subcutaneous route.
- All opioids carry risk of addiction; however, this is much less of a concern in the palliative population. In some instances, palliative patients will resist pain control due to these concerns and reassurance will be needed to adequately medicate and control pain. With regard to addiction, hydromorphone crosses the blood-brain barrier more quickly than morphine thereby causing more euphoria and, in general, it is a common drug of choice for those who abuse opioids. It is for these reasons that many emergency systems avoid its use outside the palliative population.
- The Centers for Disease Control and Prevention (CDC) recommends non-opioid pain relievers such anti-inflammatories and acetaminophen be used as adjuncts to help reduce the amount of opioid required and thereby minimize their associated risks. Using non-opioid pain relievers such as ketorolac or acetaminophen and non-pharmacological techniques are important adjuncts which can be helpful in minimizing the amount of opioid required.
- Opioids should not be combined with benzodiazepines in the prehospital setting unless for the purpose of procedural sedation or if specifically included in a patient's written care plan. If a palliative patient requires the administration of an opioid in conjunction with a benzodiazepine as part of their care plan, this would be part of the discussion with the MCCP.
- Pregnancy category C [if the patient will benefit from a Category C drug, it is generally used]

12.0 References

- Palliative Care Clinical Practice Guideline
- Pain Management Clinical Practice Guideline
- Compendium of Pharmaceuticals and Specialties (CPS)

*Electronically Signed

Table 1. Conversion guide for comparing opioid potency.

	Oral	Subcutaneous*	Morphine Equivalents**
Morphine	10 mg	5 mg	1
Fentanyl	---	50 mcg	0.1 (100 mcg)
Hydromorphone	2 mg	1 mg	4
Codeine	100 mg	---	0.15
Oxycodone	5 mg – 7.5 mg	---	1.5
methadone	1 mg	---	4

*Absorption time and bioavailability is variable by the subcutaneous route: the IV route is preferred when immediate control of pain is required for acute pain.
**CDC conversion guide for comparing opioid potency. If converting from one opioid to another, use the guide to convert dose but then also decrease the new opioid by half.

Table 2. Opioid onset, peak effect, and duration table

	Onset Time	Peak analgesic effect	Duration of analgesia
Morphine	IV: 1-2 min	IV: 15-20 min IM/Subcut: 15-30 min Oral: 30 min-1 hr	3-4 hr
Fentanyl	IV: <1 min	IV: 2-5 min	30-60 min
Hydromorphone	IV: 5-15 min	IV: 10-20 min	2-4 hr
Codeine	Oral: 30-60 min IM: 10-30 min	---	2-4 hr (oral)
Oxycodone	Oral: 10-15 min	---	3-4 hr (oral)