# Opioid analgesic dose conversions
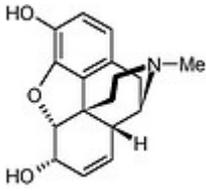
Original article by: Michael Tam

Opioid analgesics are the cornerstone to treatment and control of severe pain. Equivalence of dose potency is not absolute and care must be taken in changing analgesics. In general, it is safer to use a lower regular dose with breakthrough analgesia rather than to convert immediately to the "equivalent" dose.

It is important nevertheless to know the approximately dosage conversions.

morphine

| Equivalence to morphine 30 mg oral (1) | | |
|---|---|---|
| Drug | Dosage | Ratio |
| morphine (subcutaneous) | 10 mg | 1:3 |
| morphine (intramuscular) | 6 mg | 1:5 |
| morphine (intravenous) (2) | 5 mg | 1:6 |
| oxycodone (oral) (3) | 15 mg | 1:2 |
| hydromorphone (oral) (4) | 6.5-7.5 mg | 1:4-5 |
| hydromorphone (subcutaneous/intramuscular) | 1.3-2.0 mg | 1:15-25 |
| fentanyl (transdermal patch) | 50 mcg/hr (*) | complex |
| codeine (oral) | 180 mg (**) | 6:1 |
| codeine (intramuscular) | 120 mg (**) | 4:1 |

(*) Assuming morphine 30 mg (PO) q4-hourly dosing. Dose conversions to and from fentanyl transdermal patches are complex. Please refer to the prescriber guidelines, product information or a pain specialist.

(**) There is usually little benefit in using doses of codeine phosphate above 60 mg per dose. Higher doses may lead to agitation and eu/dysphoria (5)

**Conversion to oral slow release formulations**

Conversion to oral dosing is usually fairly simple.

**DO:**

1. Calculate total dose of opioid analgesia taken over 24 hours;
2. convert to oral equivalent dose;
3. split the total daily oral dose into twice daily dosing (round down);

4. don't forget to prescribe short acting analgesia for breakthrough pain (usually *50-100% of the regular dose per unit time*).

*An example:*

A patient has received morphine 5 mg subcutaneously q4-hourly regularly and in the past 24 hours, received an additional three 5 mg subcutaneous bolus breakthrough doses. To convert into and regimen of oral morphine:

(Step One): Calculate total dose over 24 hours

- regular doses: 5 mg x 6 doses = *morphine 30 mg (s/c)*
- bolus doses: 5 mg x 3 doses = *morphine 15 mg (s/c)*
- **Total:** *morphine 45 mg (s/c) per 24 hours*

(Step Two):

Conversion to equivalent oral morphine

- subcutaneous morphine to oral morphine ~ 1:3
- Thus: 45 mg/day x 3
- **Oral equivalent daily dose**: *morphine 135 mg (PO) per 24 hours*

(Step Three):

Split into divided doses

- Split dose (2 per day): morphine 135 mg (PO) / 2
- Thus: morphine SR 67.5 mg per dose twice daily
- **Rounded down**: *morphine SR 60 mg (PO) twice daily*

(Step Four):

Breakthrough analgesia

- Regular dose: morphine SR 60 mg (PO) per 12 hours
- Breakthrough dose: (60 mg /12) x 50-100% = *morphine 2.5-5.0 mg (PO) per hour*
- Given that oral (short acting) morphine is given every fourth hourly: 2.5-5.0 mg/hr x 4 hr
- **Breakthrough dose**: *morphine (immediate release) 10-20 mg (PO) q4-hourly PRN*

*Summary:*

morphine SR 60 mg PO twice daily

+

morphine (imm. release) 10-20 mg PO q4-hourly PRN

After 24 hours, review the breakthrough (PRN) requirements. If a significant amount of breakthrough analgesia was required, this should be added to the regular analgesia.

**Reference articles**

(1) Examples of approximate equivalent doses when changing from morphine to another opioid (Table 10.7). *Therapeutic guidelines: Analgesic, version 4, 2002*.

(2) Morphine Sulfate Injection BP (DBL). *MimsOnline*. Last updated: 20 October 2005.

(3) OxyContin (oxycodone hydrochloride). *MimsOnline*. Last updated: 29 October 2004.

(4) Dilaudid (hydromorphone hydrochloride). *MimsOnline*. Last updated: 9 July 2004.

(5) Codeine Phosphate. *MimsOnline*. Last updated: 6 September 2001.

*Please read the disclaimer*